

BIG HILL ENHANCED DEVELOPMENT PROJECT

ASSESSMENT

under

ENVIRONMENT EFFECTS ACT 1978

Minister for Planning

October 2014

GLOSSARY

AH Act	<i>Aboriginal Heritage Act 2006</i>
CGC	Crocodile Gold Corporation
CHMP	Cultural Heritage Management Plan
dB(A)	Decibels (A-weighted)
DEPI	Department of Environment and Primary Industries
DSDBI	Department of State Development, Business and Innovation
DTPLI	Department of Transport, Planning and Local Infrastructure
EE Act	<i>Environment Effects Act 1978</i>
EES	Environment Effects Statement
EMS	Environmental Management System
EP Act	<i>Environment Protection Act 1970</i>
EPA	Environment Protection Authority
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)
ERR	Earth Resources Regulation
ESD	Ecologically sustainable development
EVC	Ecological Vegetation Class
FFG Act	<i>Flora and Fauna Guarantee Act 1988</i>
GWM Water	Grampians Wimmera Mallee Water
IRAEs	Industrial residual air emissions
MIN	Mining licence
MRSD Act	<i>Mineral Resources (Sustainable Development) Act 1990</i>
Mt	million tonnes
NEPC	National Environment protection Council
NEPM	National Environmental Protection (Ambient Air Quality) Measure
NGSC	Northern Grampians Shire Council
NIRV	<i>Noise from industry in regional Victoria: Recommended maximum noise levels from commerce, industry and trade premises in regional Victoria</i> (EPA publication 1411)
P&E Act	<i>Planning and Environment Act 1987</i>
PAH	Polyaromatic hydrocarbons
PCR	Permitted Clearing Regulations
PEM	<i>Protocol for Environmental Management: Mining and extractive industries</i> (EPA publication 1191)
PHW Act	<i>Public Health and Wellbeing Act 2008</i>
PM ₁₀	Particulate matter 10 microns or less in diameter
PM _{2.5}	Particulate matter 2.5 microns or less in diameter
RCS	Respirable crystalline silica
SDW Act	<i>Safe Drinking Water Act 2004</i>

SEPP	State Environment Protection Policy
SGM	Stawell Gold Mines
TRG	Technical Reference Group
TSF	Tailings Storage Facility
TWRS	Temporary waste rock stockpile

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1 INTRODUCTION

1.1 Purpose of this document

This is the assessment of environmental effects (Assessment) by the Minister for Planning under the *Environment Effects Act 1978* (EE Act) for the Big Hill Enhanced Development Project (the 'Project'). It represents the final step in the Environment Effects Statement (EES) process under the EE Act by providing authoritative advice to decision-makers on the likely environmental effects of the Project, their acceptability and how they should be addressed in relevant statutory decisions. The Assessment is informed by the report of the Inquiry together with the EES and public submissions.

This Assessment will inform the decisions required under Victorian law for the Project to proceed or to be refused, in particular under the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act).

1.2 Project Description

Crocodile Gold Corporation (CGC) proposes to develop a new open-cut gold mine along the Big Hill ridge within the Stawell Gold Mines (SGM) mining licence MIN 5260 area, adjacent to the existing underground mine (refer to Figure 1).

Big Hill is located in the north-east of Stawell township in western Victoria, near the central business area. Residential areas directly about the Project site to the south-west (Fisher Street) and north (Upper Main Street and Crowlands Road). Parts of Big Hill ridge are currently part of a recreational reserve that is accessible to the public.

The Project footprint would comprise north and south open cut pits, a temporary waste rock stockpile (TWRS), upgraded haul roads and land to be used for various supporting purposes. Some of the site is cleared. The total area to be subject to works for the Project would amount to about 65 hectares.

The Project would involve extraction of 2.3 million tonnes (Mt) of gold ore using open-cut mining technology. Ore would be trucked via existing internal roads to the licensed SGM processing plant already on site. Tailings from gold processing would be disposed of to the existing Tailings Storage Facility (TSF) no. 2. Other SGM infrastructure, including SGM's water storages, offices and workshop, would also be utilised to support the project.

Waste rock generated from the Project would be temporarily stored on adjacent cleared land, much of which is managed by Grampians Wimmera Mallee Water (GWM Water), and would be used progressively to backfill and re-establish the Big Hill topography upon completion of mining activities.

The estimated life of the Project would be approximately four and a half years, which includes three and a half years of mining and a further year to complete site rehabilitation works, followed by a period of maintenance and management, especially with respect to settlement of fill and establishment and care of vegetation.

A detailed description of the proposed Project is provided in Chapter 6 of the EES.

1.3 Structure of this Assessment

Section 2 of this Assessment outlines both the EES process and the statutory approvals required for the proposed Project, and notes the Project's background with respect to the earlier EES for open cut mining at Big Hill. Section 3 provides a summary of the conclusions of this Assessment.

The core part of this Assessment is found in Section 4, which assesses the environmental effects of the Project based on the applicable legislative and policy framework. Section 4 specifies the evaluation objectives for this Project, including the relevant objectives and principles of ecologically sustainable development (ESD). These are used to structure the integrated evaluation of the environmental effects within the Assessment.

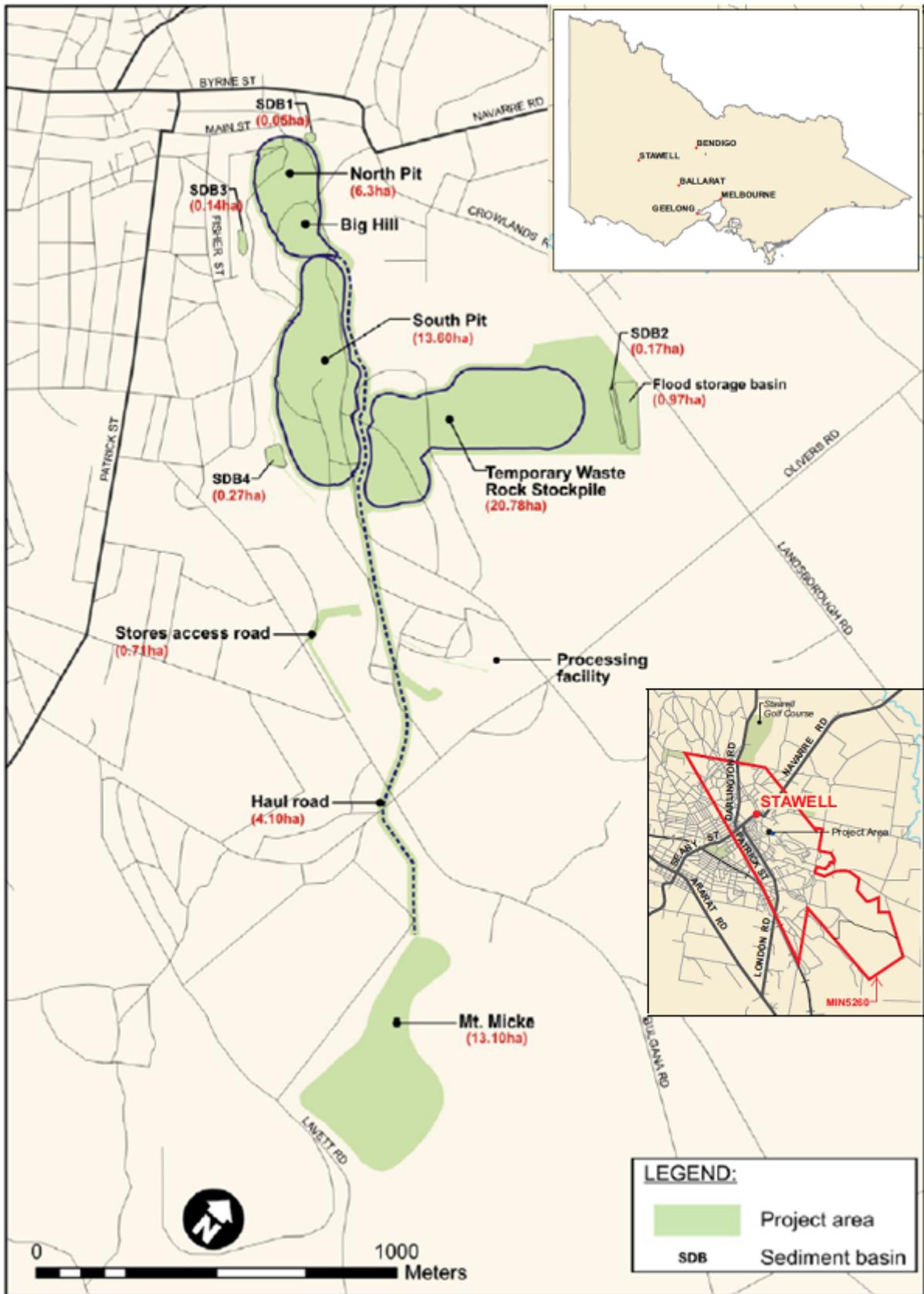


Figure 1. Big Hill Enhanced Development Project location

2 STATUTORY PROCESSES

2.1 Environment Effects Act 1978

On 23 April 2013, the Minister for Planning determined that an EES was required for the Project under the EE Act. The EES has been prepared by the proponent, in consultation with a Technical Reference Group (TRG) convened by the Department of Transport, Planning and Local Infrastructure (DTPLI), and in response to Scoping Requirements issued by the Minister for the Proposal in October 2013.

The EES was placed on public exhibition from 28 March 2014 until 13 May 2014. 359 submissions were received, nine of which were from state and local government bodies. Well over 200 submissions supported the Project, an unusually high proportion, although the majority of supporting submissions were pro-formas. About 100 submissions opposed the Project.

The Minister appointed an Inquiry under the EE Act to review submissions and inquire into the environmental effects of the Project, in accordance with terms of reference issued by the Minister on 15 April 2014.

The Inquiry held a directions hearing on 2 June 2014, followed by its public hearing over 12 days from 2 to 18 July 2014. The Inquiry provided its Report to the Minister on 16 September 2014. The Inquiry Report has informed the preparation of this Assessment of the environmental effects of the Project under the EE Act.

The Inquiry commented on its task being made more difficult by the late provision of critical information after the conclusion of the public hearings. This necessitated the circulation of late documents, with provision for submitters and authorities to make further comments and for the proponent to respond to those comments. As a result the Inquiry was permitted to finalise and submit the report two weeks following its original deadline. It is unfortunate that important information was not supplied by the proponent at the hearing, or indeed in the exhibited EES. However, the information provided has been subject to adequate scrutiny by stakeholders and has been able to be considered appropriately by the Inquiry, and therefore provides an adequate basis on which to make an assessment under the EE Act.

I have also noted the Inquiry's comments with regard to the desirability of a layperson's plain English summary of an EES to assist community stakeholders to understand the project and participate in the process. I note that in other jurisdictions EIA procedures include a requirement for a "non-technical summary" document to be exhibited with the complete impact statement. I intend to ask DTPLI to investigate best practice in this respect and develop appropriate guidelines with objective standards for proponents. At the same time, I note that it would still be necessary to maintain the technical rigour of the EES itself, especially in essentially technical areas such as mathematical modelling.

I also note that the role of the EES TRG is to ensure that relevant technical standards have been met with respect to specialist reports prepared for the EES (which normally constitute the Technical Appendices of the exhibited EES). The EES itself should provide an intelligible and objectively accurate summary of the study findings, which might be lengthy but should not be impenetrable for community readers, nor should a non-technical summary be seen as a valid replacement for a conventional EES.

The next step is the provision of this Assessment to statutory decision-makers, who must consider it before deciding whether to grant approval for the Project.

2.2 Statutory Approvals

The Project would require a number of Victorian statutory approvals, including:

- Work Plan variation and Work Authority to commence works under the *Mineral Resources (Sustainable Development) Act 1990* (MRSD Act)¹.
- Authorisation to take and/ or disturb wildlife under the *Wildlife Act 1975*.
- An approved Cultural Heritage Management Plan (CHMP) under the *Aboriginal Heritage Act 2006* (AH Act)².
- Consents for the disturbance or destruction of archaeological material protected under the *Heritage Act 1995*.

¹ The present requirement for a work authority will no longer apply when the repeal of the relevant provisions of the MRSD Act comes into effect on 1 November 2014.

² CHMP No. 12677 has already been approved for the project.

2.3 Project Background and Previous Assessment

This Project, assessed in the remainder of this Assessment, is the second proposal for a large scale open cut mine at Big Hill, each being the subject of an EES under the EE Act. The previous proposal involved two pits in similar locations and of similar dimensions to the present proposal. However, only the smaller northern pit was to be backfilled. Waste rock was to be dumped on the site of a nearby patch of Box Ironbark Forest, south of the current proposed TWRS site, which would have been permanently lost.

In 2000, the then Minister for Planning issued an unfavourable Assessment under the EE Act of this earlier proposal for an open cut mine at Big Hill. The Minister's Assessment concluded it should not be approved because of the potential for various significant environmental effects and related uncertainties, including with respect to whether the significant effects on air quality, human health and social well-being would be adequately mitigated to acceptable levels. The Minister was not satisfied that the project's economic benefits outweighed the significant residual adverse effects, including in light of the costly and challenging nature of implementing the necessary avoidance and mitigation measures.

The environmental risks of the current Project do differ from the previous proposal, mainly in terms of the reduced extent of native vegetation to be cleared and effects on biodiversity values, as well as the reinstatement of the Big Hill ridge landform (now proposed), including fully backfilling the southern void and therefore preventing public safety issues post mining. However, the key effects on air quality, health risk and social well-being remain at the centre of environmental assessment for the current Project.

3 SUMMARY OF THIS ASSESSMENT

Following careful consideration of Inquiry's findings and, for the reasons explained in detail in the following Section, it is my assessment that the Project examined through the EES is highly likely to result in unacceptable effects, given it would lead to inevitable exceedances of established statutory air quality objectives that are in place to protect beneficial uses, in particular human health. Therefore, the Project as proposed should not be approved. I concur with the Inquiry's conclusions that the Project's expected effects conflict with statutory objectives to a major rather than marginal degree.

It is also my assessment that the additional risks to the health of members of the Stawell community, especially but not only those living in close proximity to Big Hill, are also likely to be unacceptable, even with the control measures identified through the EES process in place. This needs to be considered in the context of the available separation distance between the proposed works and residential and other sensitive land uses (which is less than 50 metres), relative to EPA's recommended separation distance for open cut gold mining (which is 250 metres) and the proposed suite of "best practice" and "maximum extent achievable" control measures. Given the very close proximity of the mining related sources of effects on air quality, it is essential that any proposed mitigation provides for constant and assured compliance with the statutory limits that protect human health.

I have noted the conclusions of the Inquiry that adverse impacts would be likely to occur in other parameters, some of which may contribute to exacerbating the health impacts identified as likely to result from air quality impacts alone. While it is not possible to quantify the additional risk resulting from those compounding factors, it is clear that the heightened health risk across other factors adds weight to the conclusion that the Project should not be permitted to proceed.

I also note that minor adverse impacts would be expected in some parameters (for example cultural heritage and biodiversity), which fall within acceptable limits and would not contribute to a finding that the Project should not proceed. These likely effects are also discussed under relevant headings in the next Section.

The predicted economic and related benefits of the project, including through ongoing business and employment activity, have also been considered, although the financial costs resulting from some adverse impacts have not been fully addressed in the economic calculations. While I recognise that the further period of about five years of mining operations enabled by this proposal would deliver a level of economic benefit to the community, it is my assessment that this benefit would not outweigh the negative impacts outlined above and discussed in detail in the Section below. Therefore, it is my assessment that the Project as proposed would not deliver a net community benefit.

This Assessment constitutes authoritative advice on the Project's environmental effects and their acceptability, to enable decision-makers to take these matters into account in making relevant statutory decisions. While it is not binding, under the *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978*, a decision-maker who proposes not to adopt part of the Minister's assessment should advise and consult with the Minister. In that case I would expect that, at a minimum, close consideration would be given to the secondary recommendations of the Inquiry, while noting the Inquiry's conclusion that even with those secondary recommendations fully implemented an acceptable environmental outcome would not be either assured or indeed likely.

4 INTEGRATED ASSESSMENT OF EFFECTS

4.1 Approach to this Assessment

To provide a coherent and integrated structure for this Assessment of likely environmental effects, the key aspects of relevant legislation, statutory policy and the principles and objectives of ESD³ have been synthesized into a set of evaluation objectives that are pertinent to the Project. A draft set of evaluation objectives was included in the Scoping Requirements for this EES, which were used by the proponent in its investigations of alternatives and effects within the EES. Although the Inquiry did not explicitly use the draft objectives to frame its consideration of the key issues of the Project, its conclusions can conveniently be discussed generally under those objectives as headings.

Table 1 lists the final set of evaluation objectives used in this Assessment and the core legislation that underpins them.

Table 1. Assessment Evaluation Objectives

Evaluation Objectives	Key Legislation
1. Air Quality, Health and Social Well-being - To protect the air quality, health, safety and well-being of residents and the social fabric of the community in the area, in the context of project hazards.	MRSD Act EP Act, SEPPs and PEM PHW Act P& E Act
2. Amenity - To minimise adverse noise, vibration and other amenity effects on nearby residents and local communities.	EP Act and SEPPs PHW Act P&E Act MRSD Act
3. Resource Development and Economic Effects - To enable an economically viable mining project that makes the best use of available gold resources.	MRSD Act
4. Landscape, Visual and Recreational Values - To minimise adverse effects on landscape, visual amenity and recreational values associated with Big Hill and environs.	P&E Act
5. Water - To ensure that surface water and groundwater quality and potable water supply are adequately protected from adverse impacts arising from the Project.	MRSD Act EP Act & SEPPs SDW Act PHW Act
6. Cultural Heritage - To avoid or minimise adverse effects on Aboriginal and historic cultural heritage values, sites and places.	AH Act Heritage Act
7. Biodiversity - To avoid or minimise adverse effects on native vegetation and listed flora and fauna species and ecological communities and address opportunities for offsetting potential losses consistent with relevant policy.	MRSD Act FFG Act Wildlife Act
8. Environmental Management Framework - To provide a transparent framework with clear accountabilities for managing environmental effects and hazards associated with construction, operation, decommissioning and rehabilitation phases of the Project, in order to achieve acceptable environmental outcomes.	MRSD Act EP Act EE Act EPBC Act
9. Sustainable Development - Overall, to demonstrate that the Project would achieve an appropriate balance of economic, social and environmental outcomes that contribute to ecologically sustainable development and provide a net community benefit.	MRSD Act EE Act PHW Act EPBC Act P&E Act

³ See *Ministerial guidelines for assessment of environmental effects under the Environment Effects Act 1978* made under section 10 of the EE Act, pp. 19 and 27.

4.2 Air Quality, Health and Social Well-being

Evaluation Objective – *To protect the air quality, health, safety and well-being of residents and the social fabric of the community in the area, in the context of project hazards.*

Key Issues

The Inquiry Panel identified potential impacts on air quality and resultant effects on the health and well-being of the community as the most serious environmental issues raised by the proposed Project. Key aspects of the issues include:

- The changes in relevant environmental standards and expectations that have taken place over the fourteen years since the Minister's Assessment of the earlier Big Hill open cut mining proposal;
- The close proximity of the proposed open cut pits to residential areas, and the large number of residences and other sensitive land uses within the recommended separation distance between the pits and sensitive land uses;
- The likely frequency of days on which, in addition to ambient background levels, the mine would contribute to fine particulate levels in the atmosphere in excess of statutory limits specified under the National Environmental Protection (Ambient Air Quality) Measure (NEPM), the *Environment Protection Act 1970* (EP Act) and subordinate statutory instruments (State Environment Protection Policies (SEPPs) and the Protocol for Environmental Management: Mining and Extractive Industries (PEM));
- The potential for levels of Class 3 indicators, particularly arsenic, in the atmosphere to exceed statutory criteria;
- The likely effectiveness or otherwise of proposed "best practice" and "maximum extent achievable" control measures and practices to prevent mine-related exceedances of statutory air quality objectives;
- The potential for further design changes post-assessment, which could impact on the validity of modelling undertaken on which the assessment process has depended;
- The potential health impact of elevated noise levels, in excess of guideline limits, resulting from mine activities, including both incidental exceedances and prolonged periods of sustained exceedances;
- The known relatively low level of community health, well-being and socio-economic status and resultant high vulnerability of the Stawell community to elevated health risk factors; and
- Broader social impacts arising from the proposal.

Discussion and Findings

Changed air quality criteria since 2000 Minister's Assessment of previous proposal

Since the Minister's Assessment of the EES for the previous mining proposal at Big Hill was released in November 2000, new or revised statutory instruments relevant to air quality have come into effect, including in particular:

- *State Environment Protection Policy (Air Quality Management)* (SEPP (AQM)), December 2001
- EPA Publication 1911: *Protocol for Environmental Management: Mining and Extractive Industries*, December 2007 (an incorporated document of SEPP (AQM))
- EPA Publication 1518: *Recommended Separation Distances for Industrial Residual Air Emissions – Guideline*, March 2013

Importantly, the general trend of the more recent documents is towards higher standards. Equally importantly, a driver for setting standards across Australia has been to protect human health, in addition to protecting amenity.

Separation distance/ buffer

Based on the Project design in the EES, and the revised design presented at the Inquiry hearing⁴, the nearest dwelling to the limit of proposed works would be within 40 metres, some 35 dwellings would be within 100 metres and about 160 dwellings within 250 metres⁵. This is significant because the EPA's recommended separation ("buffer") distance between open cut mines (other than coal mines) and sensitive land uses including dwellings and schools is 250 metres⁶. Separation distances are recommended to help address unusual but foreseeable "upset" conditions, rather than deal

⁴ Inquiry Report, pp. 25-6

⁵ *Ibid.*, p. 12, and Inquiry document DoH61.

⁶ *Recommended separation distances for industrial residual air emissions*, EPA publication 1518, March 2013

with emissions associated with routine circumstances and operations⁷. A separation distance less than one fifth of the recommended distance would require correspondingly exceptional mitigation measures, to ensure that neighbouring sensitive receptors are not unduly impacted by industrial residual air emissions (IRAEs).

EPA's recommended separation distances assume a high standard of site management ("best practice"). However, a reduced separation distance may be acceptable where:

- a. The industrial plant and equipment have an exceptionally high standard of emission control technology; or
- b. An environmental risk assessment of IRAEs has been completed that demonstrates a variation is justified; or
- c. There are exceptional topographic or meteorological characteristics which will affect dispersion of IRAEs; or
- d. Particular IRAEs are highly unlikely to occur⁸.

The proposal's response to these criteria is discussed below.

Air emissions and modelling

The emissions of principal concern in the case of the Big Hill Enhanced Development Project are emissions of dust containing fine particulates (PM₁₀ and PM_{2.5}), due to their capacity to intrude deeply into the human respiratory tract, and pollutants such as arsenic, respirable crystalline silica (RCS) and polyaromatic hydrocarbons (PAH) (all of which are recognised Class 3 indicators known to act as human carcinogens). These pollutants occur in the ambient air at Stawell, and therefore the issue of concern is not only whether emissions from the mine, considered in isolation, would exceed statutory limits, but whether in combination with background levels the mine emissions would contribute to exceedances that would compromise beneficial uses, in particular human health.

The EES predicted that the PEM daily PM₁₀ assessment criterion would be reached or exceeded in Year 2 on two days, affecting eight receptors, and in Year 5 on six days, affecting seven receptors⁹, based on modelling of indicative mine emissions in combination with background levels measured at Bendigo in 2004/2005 and a meteorological file derived from data recorded at regional Bureau of Meteorology (BoM) stations including Stawell Aerodrome¹⁰. Bendigo background air quality data were used in the EES, in the absence of a full year of local data, as specified in the PEM.

Collection of local background air quality and meteorological data commenced in Stawell at two stations adjacent to the proposed project site in May 2013, to enable later revised modelling in full accordance with PEM specifications. This new modelling was undertaken once the full year's local dataset was available in May 2014, and the results were presented at the Inquiry public hearing. This modelling using the new local data set predicted exceedances of the PM₁₀ assessment criterion on a much higher number of days (33), affecting three receptors, in Year 5 (discounting days on which background levels attributed to bushfire activity peaked above the PEM criterion)¹¹. Predicted exceedances in Years 1 and 2 were all related to background PM₁₀ peaks, attributed to bushfires.

Modelling based on local data also predicted exceedances of the annual average air quality objective for arsenic, an element occurring naturally in local soils and rocks at Stawell, at five sensitive receptors in Year 1, 23 receptors in Year 2 (with levels at a further four receptors predicted to reach but not exceed the objective) and at two receptors in Year 5¹². These results differed from the modelling based on Bendigo background data presented in the EES, which had predicted exceedance at a single receptor only in each of Years 2 and 5. The revised modelling also predicted exceedances of annual average criteria for RCS at one receptor in each of Years 1 and 5, and for PAH at 23 receptors in year 2 and two receptors in Year 5, all of which represented worse results than those predicted by the modelling presented in the EES¹³.

The report presenting the revised modelling noted that (with the exception of bushfire-attributed peaks in February 2014) background PM₁₀ data for the two local Stawell stations were lower than those recorded in Bendigo and used for the air quality modelling reported in the EES¹⁴. No explanations for the substantially greater incidence of modelled

⁷ Ibid.

⁸ Ibid.

⁹ EES Main Report, Table 8-49

¹⁰ Ibid., p. 8-142

¹¹ *Air Quality Impact Assessment, Big Hill Enhanced Development Project, Updated Report*, URS Australia Pty Ltd, 3 July 2014

¹² Ibid., pp. 51-53

¹³ Ibid., pp. 59-61

¹⁴ Ibid., p. 27

exceedances of the daily PM₁₀ assessment criterion or for the greater exceedances of annual average criteria for arsenic and PAH were presented in the report.

The proponent proposed a number of mitigation measures for air quality, presented as representing “best practice” and “maximum extent achievable”, as those terms are defined in relevant SEPPs and PEM. However, the application of the proposed mitigation measures were accounted for in the modelling process¹⁵ and therefore would not change the predicted exceedances.

The remaining mitigation measures available are first to intensify routine dust suppression actions and then to cease operating when a predetermined trigger level is measured at local monitoring stations. This approach assumes (in line with the emissions inventory for the Project) that mining activity within the site would be expected to give rise to most emissions (for example due to earthmoving and mobilisation of dust from road surfaces by passing vehicles)¹⁶. Therefore, ceasing activity was expected to eliminate the majority of emissions, although active measures such as watering might still be necessary during these non-operational periods, especially on days of elevated ambient levels of relevant air quality indicators, to control emissions of windblown dust from bare, disturbed or working surfaces.

It is noted that the time series plot for PM₁₀ for the revised air quality impact assessment (informed by the local data set) predicts that mine contributions alone would exceed the PEM criterion of 60µg/m³ at receptor R6 on approximately 16 of the modelled 32 days on which the total (mine plus background) PM₁₀ level would exceed the PEM criterion¹⁷. It therefore seems that exceedances on those sixteen days result directly from work activities despite proposed best practice measures being implemented, in which case not operating on those days would merely postpone these impacts rather than avoid them.

It is also noted that the PEM criteria for arsenic, RCS and PAH are annual averages, which are predicted to be exceeded at various receptors in different years. It does not appear that ceasing mining operations on particular days could confidently be expected to avoid exceedances of average annual limits for arsenic, RCS and PAH, set to protect human health. It is worth highlighting that for some receptors the mine contribution alone exceeds the respective average annual PEM assessment criteria for arsenic and PAH.

The PEM provides assessment criteria, which derive their statutory weight from the PEM’s status as an incorporated document under SEPP (AQM). The environmental quality objectives in SEPP (AAQ) provide Victoria’s statutory expression of the mandatory national standards for protection of air quality in the NEPM. Protection of air quality within residential areas of the town should conform to relevant objectives or criteria established under SEPP.

While there might be valid technical difficulties in providing reliably indicative contour plots, the absence of this information (model outputs) requested from the proponent by the Inquiry, hinders confidently assessing the exact geographic extent of exceedances of statutory air quality standards, likely to impact on neighbouring sensitive receptors and land uses. Without such plots, it is necessary to take the modelled exceedances of air quality standards at face value, taking into account the modelled mitigation measures as well as the remaining mitigation option of ceasing work on all days when (due to ambient background levels or local meteorological conditions), mine emissions would contribute to predicted exceedances of the statutory standards. Given the number of predicted exceedances, the modelled occasions when mine emissions alone would exceed PEM criteria and the number of points at which exceedances are predicted to occur over different periods of the proposed mining operation, it is not feasible that stopping work will provide an adequate and reliable safeguard against unacceptable impacts on air quality and the health risks for nearby residents of Stawell.

Project design changes

The Inquiry noted that the pit design presented at the hearings differed materially from that described in the exhibited EES, and that the proponent foreshadowed further design changes, which might necessitate further modelling. In particular, the Inquiry was concerned that the distance between the works area and neighbouring residences, already much smaller than the recommended separation distance for such a land use, had been further reduced¹⁸.

As a matter of planning practice, project design changes that make no difference to outcomes may be of limited concern, or may be addressed through “secondary consents” anchored to appropriate performance-based standards. Approvals

¹⁵ As required under the PEM – see section 3.5

¹⁶ EES Main Report, pp. 8-140-141

¹⁷ Inquiry document P42 - proponent presentation on revised air quality impact assessment (p. 25)

¹⁸ Inquiry Report, pp. 25-26

that may be granted for a project can lock in the project version they relate to through conditions, and can require further approval for changes. Therefore, mechanisms may be available to address the situation deployed by the Inquiry.

However, the proponent's intention to vary further key aspects of the Project post Assessment and prior to approval, as noted by the Inquiry¹⁹, does not enhance stakeholder confidence in the integrity or certainty associated with the outcomes of the statutory assessment and approval process. Substantive changes (such as moving the lip of the pit closer to houses) directly affect impacts and may invalidate previous model results, on which the primary assessment relied. If and when relevant, such changes need to be considered with the same level of scrutiny applied to the exhibited Project proposal.

Air quality in relation to health

Air quality objectives specified in subordinate legislation such as SEPPs and reflected in the PEM are not just guideline levels, they are limits prescribed to protect the quality of the environment so that it can continue to support designated beneficial uses. The first of the five beneficial uses listed to be protected in Part III of SEPP (AQM) is human health and well-being. The knowledge that the proponent's modelling forecasts exceedances of SEPP objectives as an inevitable corollary of the Project's proceeding is a powerful factor in the assessment of the significance of effects and their acceptability. Indeed it is a reasonable conclusion to draw that direct effects on air quality that do not protect human health are very significant and should not be permissible.

The health impact assessment in the EES has characterised the Northern Grampians community as relatively disadvantaged in health terms compared to the broader Victorian population²⁰. In particular, incidences of avoidable diseases and the avoidable death rate are both statistically elevated. Medical conditions associated with respiratory diseases are implicated in the health of the community, which is relatively low. It is also noted that the community's age profile includes a relatively high proportion of elderly people who tend to be more susceptible to relevant diseases and health conditions than the broader population.

The recent Board of Inquiry appointed to consider the Hazelwood coal mine fire, which occurred in early 2014, was particularly concerned about the community health impacts of exposure to PM₁₀ and PM_{2.5} resulting from that fire. Although there are clear points of difference between the acute impacts of a fire in a coal mine and the less intense but more prolonged impacts that could result from open-cut mining for gold, there are parallels in the relevance of particulates as key pollutants of concern and in the similar socio-economic and health settings. The relative vulnerability of the respective affected communities is noted by both the Hazelwood Mine Fire Board of Inquiry (Hazelwood Inquiry) and the Big Hill EES Inquiry. In the light of the Hazelwood Inquiry's findings and recommendations (which have been accepted by the Government), it is particularly important in making this assessment that the potential for elevated particulate levels, as well as other air pollutants, to compromise the health of the local community, is considered in light of current conditions and trends in that community. This is especially the case when the local community has been already been identified as in some way susceptible or disadvantaged in that regard.

It is also noted that the National Environment Protection Council (NEPC) has signalled its intention to review the NEPM, and has exhibited a draft variation on which public comments closed on 10 October 2014. The NEPM sets standards for identified pollutants which must then be given effect through relevant statutory instruments (such as SEPP) in each jurisdiction (including Victoria) represented on the NEPC. The proposed variation foreshadows a possible tightening of the maximum daily level for PM₁₀ to a value between 40 and 50 µg/m³ and proposes introducing a new annual average level of 20 µg/m³. It is also proposed to convert the current "advisory reporting standards and goal" for PM_{2.5} to mandatory standards and goal²¹. While the outcome of the review is not yet known, the draft variation exhibited for comment represents a seriously entertained proposal for change, and reflects the increasing scientific concern about the health impacts of fine particulates, which is relevant to this assessment.

Noise in relation to health

While noise can contribute to adverse health impacts, the likely noise impacts (although at times predicted to exceed the noise limits derived from NIRV) are primarily an amenity issue, especially in the absence of any proposed mining work at night. Noise as an issue is therefore addressed in Section 4.3 of this assessment.

¹⁹ Ibid.

²⁰ EES Main Report, pp. 8-319 – 8-323

²¹ Supported by Hazelwood Mine Fire Board of Inquiry (Recommendation 6)

Social impacts

With respect to assessment of social impacts, it is noted that social impacts of the Project may be both positive and negative. Ongoing employment for several years, which would be enabled if the Project were to proceed, could have beneficial social results through the continued income for employees, maintenance of enrolments at schools, participation in sporting clubs and other “critical mass” community services and facilities.

Also of note is the divisive impact on the community which can arise from the assessment process itself for a contentious development proposal such as the Big Hill Enhanced Development Project. While this adverse effect is acknowledged, especially in the context of the previous EES process for the earlier proposal, it is a proponent's prerogative to seek approvals for a development proposal in accordance with the statutory framework that applies. Likewise, it is the community's right to participate in the process through the formal and informal mechanisms that exist. Although this can be stressful and even polarising, on balance it is preferable that community members should be able to inform themselves about development proposals which may affect them, and should be able to participate in the statutory processes to which such proposals are subject.

The EES did not explicitly address the end-use of the rehabilitated Big Hill, for reasons discussed elsewhere in this assessment. However, the resultant uncertainty contributed to some extent to the adverse social impacts arising from the proposal, at least for some submitters. Even if the proposal does not proceed, rehabilitation of MIN 5260 will be required before the public land is returned to public management. As current underlying land manager, the Department of Environment and Primary Industries (DEPI) should lead the master-planning process for the subsequent use of the land, in collaboration with potential future managers of part or all of the land such as Northern Grampians Shire Council (NGSC), with support from SGM. Collaborative community engagement will be integral to the success of such a process.

The level of engagement with the EES process by the community has been very significant, including both supporters and opponents of the project. All parties should be commended, including the proponent, for the open and interactive engagement which has been a feature of this EES process. While some criticisms have been levelled with respect to community engagement, I understand that SGM implemented a wide range of activities under its EES Consultation Plan. SGM did all that would be reasonably expected of a responsible proponent to inform and consult with the community.

If the present proposal is refused in accordance with this assessment, the option remains for the current proponent, or a future holder of the mining licence, to initiate a new approvals process for a revised proposal to extract the gold resource under Big Hill. The Inquiry has recommended that if the current proposal is refused, no further proposal should be put forward, in the light of the impacts that the public assessment process itself has on social cohesiveness and individual relationships. There is no power under legislation to prohibit the initiation of a further revised proposal. However, given that two attempts have been unsuccessful, and noting the social impacts that have resulted from the processes to date, any such attempt should be pursued only if preliminary engagement with relevant statutory authorities, especially the Environment Protection Authority (EPA), the Department of Health and the Department of State Development, Business and Innovation (DSDBI) Earth Resources Regulation (ERR), indicates a strong degree of confidence that the objective air quality and resultant health issues which underpin this assessment have been resolved.

Conclusion

Having regard to the Inquiry Report, the EES and submissions, it is my assessment that:

- There is no discretion to relax statutory objectives put in place to protect air quality and associated beneficial uses, including the fundamental values of human health and well-being.
- The Project as proposed is predicted to impact on air quality, given predicted levels of PM₁₀, PM_{2.5}, RCS, arsenic, and PAH at a number of locations at various stages during the Project's proposed five year duration, including exceeding the PEM annual average assessment criteria for arsenic, RCS and PAH, including for arsenic at 23 receptors in Year 2, thus impacting on beneficial uses.
- There is no reasonable expectation that the Project as proposed could operate without directly causing or largely contributing to periodic exceedances of statutory environmental objectives at a number of locations and/or on a significant number of days, even with planned mitigation measures implemented.
- The proposed cessation of mining operations on predicted days of high background levels of air quality indicators has not been shown to be an effective and feasible way of preventing exceedances of relevant statutory air quality objectives.

- In the context of the known community health circumstances in Stawell, risks to air quality and related human health should not be exacerbated, which is considered likely even with the application of identified best practice mitigation measures for this proposal.
- Accordingly, the project as proposed represents an unacceptable risk to the health of the neighbouring community.

Further, it is my assessment that:

- Any further changes to the design of the mining proposal that might be proposed are to be considered with a level of scrutiny comparable to that applied to the exhibited project during the EES process.
- DEPI as current underlying land manager, lead an end-use master-planning process in collaboration with potential future managers of part of the land, such as NGSC, with support from SGM, to which collaborative community engagement is integral.

4.3 Amenity

Evaluation Objective – *To minimise adverse noise, vibration and other amenity effects on nearby residents and local communities.*

Key Issues

The key amenity-related issues associated with construction and operation of the mine are:

- Periodic and on occasions prolonged exceedances of noise standards derived from NIRV;
- Ground vibration and air-blast impacts resulting from blasting;
- Potential emissions of visible dust affecting air clarity and visibility; and
- Duration over which adverse amenity impacts may be experienced.

Discussion and Findings

Noise

Since the Minister's Assessment of the EES for the previous mining proposal at Big Hill was released in November 2000, revised EPA documents relevant to noise have come into effect, including:

- *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1*, October 2001
- EPA Publication 1411: *Noise from industry in regional Victoria, guidelines*, October 2011

The proposed mine would give rise to elevated noise levels in the vicinity of the works, especially at key stages of operations such as stripping of vegetation and topsoil and the initial opening of each pit, and the closing stages of reinstatement of the modified original landform for each pit. For most other work phases, natural and constructed shielding could be used to mitigate noise impacts to a substantial degree²². A range of management measures would also be available to reduce noise impacts, including most significantly the proposed limitation of mining work to daylight hours.

Noise limits derived from the former EPA publication *Information Bulletin N3/89 Interim Guidelines for control of noise from industry in country Victoria*²³ apply to SGM's existing underground mining and processing operations. The current limit is 50dB(A). The north-western edge of the proposed north pit would be located up to 1400 metres from the existing underground mine portal, and further from the processing plant, so most of the residents likely to be most affected by noise from the proposed open cut operations are barely if at all exposed to noise from the existing operations²⁴. The NIRV-derived limit for those residents of 46 dB(A) (4dB(A) lower than the limit in the present approved work plan) is already exceeded periodically due to ambient sources unrelated to mining. However, the EES predicts that

²² EES Main Report, pp. 8-70 – 8-71

²³ Replaced by NIRV in October 2011

²⁴ EES Main Report, Fig 8-40

exceedances resulting from mining would occur for prolonged periods while unavoidable Project works are conducted at the surface.

As noted above, the proposed Project would conduct all mining operations during day-time, avoiding noise impacts on the night-time period when most people sleep. However, at particular stages during the Project, and for some receptors, day-time noise levels are predicted to exceed the limit derived from NIRV by margins of up to 12 dB(A)²⁵. Although NIRV is a guideline, noise limits derived from NIRV can be, and are usually, given statutory effect through approved work plans under the MRSD Act (as is the case for the existing mining operation)²⁶.

Elevated day-time noise levels are more likely to affect amenity rather than human health, although noise can contribute to adverse health outcomes for certain individuals in some circumstances. Due to work situations, some people need to sleep during the day. Noise can also affect the learning capacity of children, noting that school campuses are located within a few hundred metres to the south-west of the project site. Predicted exceedances of NIRV-derived noise limits during the day are therefore of concern, and potentially could contribute to health impacts as well as amenity impacts. The Inquiry has concluded that Project outcomes in terms of noise would be unacceptable due to "the projected non-compliance with NIRV limits potentially for some six months".²⁷

Varying background noise levels might lead to measured noise levels above NIRV-derived limits, which are not influenced by noise from mining operations. If the proposal were to proceed, it would be expected that a technical solution should be available, such as fitting noise monitors with automated recording devices that are activated whenever a pre-set noise level is exceeded. It would then be possible for SGM and/ or ERR to review the recording to determine whether a given episode of elevated noise levels was mine-related or not.

The community is entitled to expect that noise limits will be calculated on a consistent basis, using the appropriate guideline (and noting that Stawell is not an atypical regional situation where it would be reasonable to depart from the guidelines). It is also reasonable to expect that if limits are imposed through a statutory instrument such as an approved work plan, those limits will be consistently met (while acknowledging that NIRV itself provides for limited exceedances during specified project stages). However, the information available from the proponent through the EES and presented to the Inquiry indicates that more frequent and prolonged exceedances than allowed for by NIRV are likely to transpire, to the significant detriment of the amenity of neighbouring residents.

Vibration

The main source of potential vibration impacts would be blasting, which is proposed to be used in the lower levels of both pits where digging or ripping are unlikely to be effective or economic. The pit profile is therefore likely to provide a significant degree of shielding between the areas where blasting is proposed and nearby sensitive land uses²⁸. The proponent has also proposed a modified blasting program intended to reduce potential offsite impacts of airblast or ground vibration in parts of the site where modelling indicated off-site impacts might otherwise exceed or closely approach relevant guideline limits²⁹.

The guideline limits for airblast and ground vibration are designed to protect amenity, and significantly higher levels would be required to cause material damage to houses or other structures. However, blasting in compliance with the guideline limits can still be perceived, and the point at which people find the perceptible impacts of blasting acceptable or disturbing is usually subjective. Most of the complaints that have been recorded relating to SGM's existing mining operations are due to underground blasting³⁰.

Operational measures to ensure compliance with guideline limits for airblast and ground vibration are available. While the levels within the pits at which blasting might be used could serve as a design control measure, other methods for controlling off-site vibration impacts of blasting to less than the guideline limits are essentially operational. The limits could be specified through an approved work plan variation.

²⁵ Ibid., Tables 8-18 and 8-22

²⁶ Ibid., p. 8-62

²⁷ Inquiry Report, p. 67

²⁸ EES Main Report, pp. 8-100 – 8-102

²⁹ Ibid., p. 8-107

³⁰ EES Main Report, Table 8-123

Flyrock has been raised as a potential off-site impact of blasting. With the application of routine best practice blast management measures, flyrock should not occur, with all fractured material retained within the pit³¹.

Air quality (amenity)

Unlike other air quality parameters, the SEPP (AAQ) environmental quality objective related to impacts of visible dust on air quality, expressed as visibility, is intended to protect amenity rather than health. Coarse dust can cause irritation, soil neighbours' washing and detract from the visual attractiveness of the environment through haziness. However, in the case of the Big Hill Enhanced Development Project there has been little concern expressed through submissions about the impacts of dust on visibility or other non health-related values.

Project timeframe

The current proposal differs from the proposal rejected in 2000 in that it is proposed to be completed in a significantly shorter timeframe, with the benefit of reducing the period over which neighbours would be exposed to adverse impacts on amenity. However, I understand that it is not standard practice in work plans to apply time limits to the completion of mining projects, as in principle it is considered preferable to take longer if necessary to make efficient use of a resource by completing extraction, rather than to close an operation prematurely simply because a predetermined sunset date has been reached. Indeed it is common for a mine to take longer than the original work plan foreshadows the project will take, with work plan variations being more or less inevitable. Therefore, the achievement of this timeframe-related benefit, if the Project were to proceed, would be dependent on both the proponent's good will and its ability to respond to external drivers as well as managing its own affairs, and could not practically be ensured by any statutory mechanism. While this is not of itself a reason to conclude that the Project should not be permitted to proceed, it does cast a degree of doubt on the practical implementation of the time related aspect of enhancing the Project.

Conclusion

It is my assessment that:

- The Project is likely to cause prolonged exceedances of NIRV-derived noise limits as a result of mining activities, to degrees and/ or for intervals greater than the specific allowances provided for in NIRV, which are likely to cause effects on as many as 30 sensitive receptor premises. While such effects are more likely to impact neighbours' amenity rather than cause health risks, more effective solutions than those proposed through the EES process would be required to ensure noise-related effects are acceptable, if the Project were to proceed.
- Vibration and non-health-related air quality impacts should be able to be managed within the relevant guideline limits, and would not in their own right constitute barriers to the Project's proceeding.
- Limiting the duration of the Project's impacts as proposed, relative to the proposal described in the previous EES, might be beneficial if achievable, but could not be given statutory weight in line with current approvals practices.

4.4 Resource Development and Economic Effects

Evaluation Objective - *To enable an economically viable mining project that makes the best use of available gold resources.*

Key issues

The key issues to consider regarding resource development are:

- The availability of proposed work plan variation information through the EES process;
- The relevance or otherwise of proposed use of existing, approved mine infrastructure elements for the proposed Project, and potential impacts of that proposed use;
- Whether the Project would provide a net benefit to the community in terms of employment and other economic outcomes relative to its costs; and
- Whether costs or other economic factors could impact adversely on the proposed delivery of overall Project benefits.

³¹ Ibid., pp. 8-113 – 8-114

Discussion and findings

Draft work plan (variation)

While it is not expected that an EES would be exhibited with an endorsed draft work plan (or variation) - this is required when a planning permit application for a mining proposal is advertised - it would seem appropriate for a well developed (but unendorsed) draft work plan to be included within the exhibited documents appended to a mining EES. Under the MRSD Act, the EES process obviates the need for a planning permit, given it provides the technical examination and public review of mining and extractive industry proposals that would otherwise occur for proposals requiring a planning permit.

The benefit would be to provide clarity about the statutory controlling instrument if the project is to proceed (while recognising that adjustments to the draft work plan are likely in the light of the Minister's Assessment). This would complement the information about key environmental impacts and risks provided in the EES and would provide transparency about the context within which the proponent's environmental management commitments and additional controls arising from consideration of submissions would be given statutory effect.

Proposed use of existing mine infrastructure

As acknowledged by the Inquiry, approved elements of the existing mining operation proposed to be used for the Project include the processing plant and TSF no. 2, and were not under review through the EES process. However, it is also worth noting that in 2013 DSDBI and EPA served notices to SGM regarding aspects of the performance of TSF no. 2, in particular leakage of thiocyanate to groundwater, which require actions that are yet to be completed. Lifting of TSF no. 2 by three metres, which would accommodate the tailings that would be generated by the project, had previously been approved, some years before the notices were served. It is not yet known how effective the current remedial actions will be, or whether the addition of further weight on top of the current deposits of tailings might influence the problem or cause a change to remedial actions. These concerns were raised in some submissions.

Exclusion of approved operational elements and facilities from the assessment process did not only recognise that they had already been approved (and therefore the assessment through the EES would not inform decision-making because the relevant decisions have already been made). It also assumed that in general terms those facilities were operating sustainably within the terms of their approvals. Given that in the case of TSF no. 2 this has been shown not to be the situation, it is appropriate to take into account the extent to which the proposal might influence adverse environmental outcomes associated with existing facilities that are fundamental to the Project's implementation.

The issues with TSF no. 2 would not in isolation lead to an assessment that the proposed Project has unacceptable effects or risks to groundwater quality. The nature of the notices that have been issued indicates an expectation on the part of the relevant regulatory authorities that a technical solution can indeed be found without unacceptable environmental impacts occurring before it is implemented.

Economic effects

The EES presented detailed economic analysis³² of the predicted benefits of the Project with respect to aspects such as direct job retention as well as indirect employment. The proposal would directly employ fewer people than recent underground mining operations, and while some former underground workers might be retrained to undertake work connected with the proposed open cut operations it is not possible to be definitive about how many mine employees would be local resident members of the Stawell community. However, in terms of employment alone, the proposal would be expected to deliver a net economic benefit to Stawell.

The economic analysis in the EES did not fully address short-term and longer-term costs arising from adverse environmental impacts of the proposal, in particular health-related impacts. Some of those costs may be difficult to quantify in simple dollar terms, compared to the economic value of jobs created or retained for a given period, or indeed the value of the gold resource itself. However, excluding those costs from the economic assessment detracts somewhat from its overall conclusions.

The proponent's expectation (commercial perspective) is that the Project would generate a financial return to the company. Such an economic outcome would generate flow-on benefits to the local and regional economy as a result of the employment created (or maintained) for the period the mine would operate, as well as the indirect employment resulting from the mine's purchase of goods and services over its lifetime. However, the economic benefits of the

³² EES Main Report, Section 8.17

Project should be calculated in net terms with due allowance for costs on the local or regional economy resulting from the project.

Rehabilitation cost

Some objecting submitters expressed concern about the possibility that rehabilitation might not proceed as proposed if financial returns from mining declined, for example due to a fall in the price of gold. This matter is addressed in Section 4.5.

Conclusion

Having regard to the EES, submissions and the Inquiry Report, it is my assessment that:

- The project would provide economic benefits in terms of jobs retained, directly and indirectly, over the project lifetime, as well as flow-on effects to the local and regional economy.
- The economic costs which the project is likely to impose on the local and regional economy, including in relation to adverse effects and health risks, were not sufficiently quantified through the EES.

Further, it is my assessment that:

- As a general principle, future mining EESs prepared for exhibition include a well developed (but not necessarily endorsed) draft of a work plan (or work plan variation if appropriate) to provide a transparent link between the consideration and management of environmental effects presented in the EES and the statutory instrument by which they would be controlled and managed if the project proceeds.

4.5 Landscape, Visual and Recreational Values

Evaluation Objective – *To minimise adverse effects on landscape, visual amenity and recreational values associated with Big Hill and environs.*

Key Issues

The key issues in relation to landscape, visual and recreational values are:

- The significance of the “loss” of the Big Hill landform and its landscape and community values for the duration of the Project;
- The likelihood that reinstatement of the landform, as proposed in the EES, will be successful, and the likely timeframe for effective success; and
- Post-mining responsibility for management of the site in relation to settlement of fill, vegetation management and land tenure, including “master-planning” for the end-use.

Discussion and Findings

Visual value of Big Hill

In the context of the general topography of Stawell, Big Hill is relatively dominant. It can be seen from much of the residential area of the town, and forms a backdrop to the town centre, which lies within a kilometre. The general profile of the proposed pits, with lips at lower elevations on the south-eastern (town) side, would accentuate the visual impacts of the Project during the working period, especially for the north pit, as the existing, visible land surface would be removed (along with the familiar structures located on it) and, to varying degrees according to viewing point, the opposite face of the excavation would be visible.

Many submissions expressed a personal connection with Big Hill, in particular the summit, with its car-park, rotunda, other memorials and views of the surrounding landscape. Big Hill provides a spectacular 360 degree lookout, over the town towards the Grampians and towards the Black Range. No other publicly accessible site in Stawell provides the same panoramic outlook. Access to the Big Hill lookout would be lost for the duration of the Project (proposed to be about five years) and for a further period, possibly up to an additional ten years, while waiting for fill material placed into the pits to complete settling to form the final landform.

Rehabilitation

Two concerns expressed in submissions regarding rehabilitation (as distinct from end-use – see below) were that the rehabilitation process to re-establish a topography broadly similar to the original Big Hill topography might not be within

SGM's technical capacity to deliver successfully, and that it might not be completed, due for instance to a fall in the price of gold.

With respect to the former, SGM's intention would be to use established earth-moving methods to place and compact fill material and to establish surface contours chosen for their long-term stability as well as for a general similarity to the original topography of Big Hill³³. Also the north-eastern lip of each pit would be markedly higher than the south-western lip, so little fill material would need to be placed higher than the highest remnant landform. Therefore, sound design followed by competent site works and supervision would be expected to lead to successful delivery of the design result.

For every mining project, as a matter of routine, DSDBI calculates and holds a financial bond which is intended to fund the completion of rehabilitation works if for any reason the licensee defaults. Funding should therefore be available at any time during the life of a mining licence and project to ensure that necessary rehabilitation works can be paid for, irrespective of fluctuations in commodity prices or other factors external to the licensee. If the Project were to proceed, it would be expected that the bond calculated and held by DSDBI (which can vary over the life of a project according to the outstanding rehabilitation task at the time) would be adequate to fund successful completion of rehabilitation of Big Hill (if the need arose).

End-use

It is important to understand clearly the distinction between "rehabilitation", as a statutory responsibility of the proponent under the MRSD Act, and the ultimate use of the rehabilitated site, which will be a matter for the ultimate land manager. The EES does not address end-use except in very general terms, because it is neither the responsibility nor the prerogative of the proponent (and therefore was not required to be addressed under the EES Scoping Requirements). This assessment therefore focuses on the rehabilitation issues arising from the Project, including the proposed reinstatement of the Big Hill topography, subject to modifications in the interests of stability, in the context of the requirement under the MRSD Act to establish a safe and stable site. However, the inter-related issues of subsequent land management, master-planning and end-use are clearly of concern and relevance to many stakeholders and are the subject of comment below.

Whether the Project proceeds or not, DEPI would need to lead a proactive process in collaboration with NGSC, and with support from SGM, to engage collaboratively with the community about the development of a master-plan for Big Hill and adjacent public land which also lies within MIN 5260.

Conclusion

It is my assessment that:

- The Project would have significant adverse social and recreational impacts resulting from loss of public access to Big Hill for the duration of the Project and an indefinite subsequent period and due to the visual impact of Project works. However, these impacts alone would not lead to an assessment that the Project should not be allowed to proceed.
- The successful reinstatement of the Big Hill landform (noting that in the interests of stability and erosion control it is not proposed to replicate exactly the original topography of Big Hill) could remain a matter of some concern, although I am satisfied that, if the proposal were to proceed, conditions could be applied which could be expected both to be complied with and to lead to a safe, stable and self-sustaining outcome, over time.

Further it is my assessment that:

- Whether the proposal is to proceed or not, DEPI, NGSC and SGM management should commence consulting on post-mining tenure and management arrangements, including responsibility for master-planning, funding, maintenance of rehabilitation works and vegetation management, and should ensure appropriate community engagement is undertaken with respect to end-use master-planning.

³³ EES Main Report, pp. 10-3 – 10-8

4.6 Water

Evaluation Objective – *To ensure that surface water and groundwater quality and potable water supply are adequately protected from adverse impacts arising from the Project.*

Key Issues

The key water-related issues associated with construction and operation of the mine are:

- The proposed decommissioning of two GWM Water storages, Reservoirs no. 4 and 6, for the duration of mining and rehabilitation works in the north and south pits respectively, and resultant implications for the Stawell township water supply;
- Implications for the quality of water in GWM Water Reservoir no. 7 resulting from dust fallout from mining operations, including the TWRS proposed to be located immediately south-east of the reservoir;
- Implications for residents relying on household water tanks within the area of potential dust fallout from the proposed Project;
- Management of contaminated stormwater run-off from disturbed surfaces within the Project works footprint; and
- Provision of adequate water supply for Project needs, including dust control.

Discussion and Findings

GWM Water has expressed confidence that the temporary decommissioning of Reservoirs no.4 and 6 would not detract from the security of water supply for the town of Stawell, although it might lead to some higher level of pumping from Lake Fyans because of the reduced capacity to store gravity-supplied water from Fyans Creek. GWM Water has also noted that water stored in Reservoir no. 7 is treated before it is supplied to customers through the reticulation system, and the nature and levels of additional contaminants which could be deposited through dust fallout from the adjacent TWRS would be within the routine capacity of the treatment plant to manage³⁴.

The exact locations of residences dependent on tank water were not mapped as part of the EES. If the Project were to proceed, all such properties that could potentially be affected by dust fallout from the project would need to be identified, and monitoring arrangements put in place with the agreement of the residents. Contingency plans to provide an alternative water supply to those residents if monitoring showed the need to do so would have to be prepared.

The Project would create extensive areas of disturbed ground, including the open pits, the TWRS and both sealed and unsealed road surfaces, from which run-off would have to be captured and treated. The EES described the proposed system of catch drains and sedimentation ponds, with water directed to SGM's existing operational storages. That water would then be available for dust suppression and other operational purposes. In the event that its own supply of water was insufficient, SGM has a commercial arrangement with GWM Water to purchase water as required for operational use.

Conclusion

It is my assessment that water management issues, while being potentially complex, could be managed appropriately in the context of the Project as proposed, and are unlikely to result in significant effects.

4.7 Cultural Heritage

Evaluation Objective – *To avoid or minimise adverse effects on Aboriginal and historic cultural heritage values, sites and places.*

Key Issues

The key issue to be considered for this section is whether the Project would have a significant effect on Aboriginal or non-Aboriginal cultural heritage sites and values.

Discussion and Findings

Aboriginal cultural heritage

Due to its disturbance history, the Project site supports no known physical evidence of Aboriginal cultural heritage, although the EES identified some indications of likely use of the site by Aboriginal people prior to or during the early

³⁴ GMW Water EES submission. No. 342

stages of its post-contact mining period. As mentioned above, a CHMP (which is required for the Project under the *Aboriginal Heritage Act 2006* because an EES was required) has already been approved for the Project.

Historic cultural heritage

The site and the broader Big Hill precinct contain extensive physical evidence of its early and more recent mining history, including shafts, tunnels, machinery footings and excavations. However, neither individual sites nor the broader historic heritage precinct which would be affected by the Project are identified as being of State or higher heritage significance. There is no Heritage Overlay applying to all or part of the Project site in the Northern Grampians Planning Scheme³⁵. Heritage Victoria has not expressed any objection to the development of the Project as proposed³⁶. Consent for the disturbance or destruction of possible archaeological values would however be required under section 129 of the *Heritage Act 1995*.

While Big Hill contains a variety of relics of historical mining, these have not been found to be of high significance. Loss of the relics if the Project proceeded would be regrettable but would not warrant an assessment that the Project should not be allowed to proceed.

Historic cultural heritage values could be appropriately addressed by extensive documentation and photography (augmenting as necessary the work which was done in the course of preparing the EES) and lodgement of the documentation in a publicly accessible facility such as the Stawell Library. There might also be merit in providing an historical interpretation facility on Big Hill as part of the final rehabilitation of the site, but this would be a matter for the consideration of the ultimate land manager through the end-use master-planning process.

Big Hill also holds a number of memorial structures which relate to the history of the area but which are not of heritage significance in their own right. The proponent proposed that the structures would be removed and stored in the course of site preparation, and reinstated following restoration of the land. The detail of such a proposal would require engagement with the ultimate land manager and ideally with the community.

Conclusion

It is my assessment that:

- Aboriginal cultural heritage issues are not likely to be significant and would be appropriately managed under the approved CHMP.
- Known historic cultural heritage values, as well as potential effects on as yet unidentified cultural heritage values, are largely of local significance and would be acceptable if the Project were to proceed, providing the proposed management approaches were implemented.

4.8 Biodiversity

Evaluation Objective – *To avoid or minimise adverse effects on native vegetation and listed flora and fauna species and ecological communities and address opportunities for offsetting potential losses consistent with relevant policy.*

Key issues

In the context of the relevant legislation and statutory policy, the evaluation of potential effects on biodiversity and native vegetation needs to address the following issues:

- The projected loss of native vegetation and habitat which would result from the Project;
- The capacity for proposed losses to be offset in accordance with the Permitted Clearing Regulations; and
- Whether the potential direct and indirect effects on listed species of flora and fauna and their habitat, as well as on listed ecological communities, are significant and/ or acceptable.

³⁵ EES Main Report, pp. 8-47 – 8-49

³⁶ Heritage Victoria EES submission no. 354

Discussion and findings

Native vegetation and habitat

No species or communities listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) are known to occur in the Project area. In 2013 the Project was referred to the Commonwealth under the EPBC Act and following consideration of requested additional information was found not to be controlled action. Therefore no further assessment or approval under the EPBC Act is required.

The Project would result in the loss of about 15 hectares of native vegetation, almost all of which is Box Ironbark Forest, the remainder being Grassy Woodland. One State-significant plant species, Small-leaf Goodenia, and two State-significant fauna species, Brown Treecreeper and Bearded Dragon, have been identified within the area which would be cleared. No species listed as threatened under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act) is expected to occur within the area³⁷.

Assessment of the vegetation to be removed found that generally it is in poor to good condition, with an average habitat score a little over 0.5 (where pristine native vegetation would score 1.0)³⁸. Although degraded, the remnant vegetation within the Project area would perform habitat functions for a range of native fauna species.

The Project site also includes planted vegetation in two arboreta, which feature a number of non-indigenous tree species, including trees native to other parts of Australia. The arboreta, although they have not been ideally maintained, also provide habitat values for a range of common native fauna species, especially birds.

Compared to the proposal presented in the previous EES, the current proposed Project avoids permanent impacts on nearby high quality Box Ironbark Forest, which was then proposed to be removed for a permanent waste rock storage. The current Project proposes replacement of all waste rock into the pits, with temporary storage on land which has previously been cleared.

Loss of the native vegetation, if the Project were to proceed, would both directly reduce the available habitat in the broader area and potentially contribute to further fragmentation of the remaining remnant vegetation. Lack of continuity between habitat patches can contribute to the local decline of many fauna species, especially those of limited mobility. While it might be possible at the conclusion of mining for native vegetation to be re-established on the site (and the technical feasibility of this option was explored in the EES), the decision about the detailed end-use of the site would be made through a master-planning process discussed elsewhere in this assessment, and might not result in reinstatement of native vegetation across the site.

Offsets

Under the Permitted Clearing Regulations (PCR), provisions are set out for calculating required offsets for native vegetation permitted to be cleared. The offset requirement for the Project would equate to 4.743 biodiversity equivalence units, which must be located within the Wimmera Catchment Management Authority area or the Northern Grampians Shire. The offset site must have a minimum strategic biodiversity score of 0.421³⁹.

Nearby land owned by the proponent could potentially meet the offset requirement, although this has not been fully assessed. Under the PCR, the proponent must secure the offset site before permitted clearing may commence. While as an ecological vegetation class (EVC) Box Ironbark Forest is considered Depleted at a catchment level, it is relatively widespread in the vicinity of Stawell and, if necessary, alternative offset sites meeting PCR requirements should be identifiable.

Conclusion

It is my assessment that the likely impacts on biodiversity values arising from the proposed project are of minor significance, would fall within acceptable limits under government policy and would be able to be managed and offset.

³⁷ EES Main Report, p. 8-4

³⁸ *Ibid.*, p. 8-15

³⁹ *Ibid.*, Table 8-4

4.9 Environmental Management Framework

Evaluation Objective – *To provide a transparent framework with clear accountabilities for managing environmental effects and hazards associated with construction, operation, decommissioning and rehabilitation phases of the Project, in order to achieve acceptable environmental outcomes.*

Discussion and Conclusion

As indicated above, I have concluded that the Project presented through the EES process has significant and unacceptable environmental effects, in particular on air quality and resultant community health risks, in light of which it should not proceed. I do not consider that an environmental management framework, however comprehensively crafted or diligently managed, would be able to mitigate the likely impacts to the point where they would be acceptable. Indeed the proposed management and mitigation of effects on air quality are incorporated into the modelling, which predicted the exceedances and likely impacts that are considered to be unacceptable.

In the event that the primary advice of this assessment is not accepted by the principal decision-maker, it would be imperative that the most rigorous environmental management framework should be put in place to mitigate adverse impacts on the environment and on the community to the maximum extent practicable. In that situation, the decision-maker should undertake meaningful consultation with the Minister for Planning as well as key agencies and regulators, particularly regarding the secondary recommendations of the Inquiry, and in the light of the proposed environmental management framework documented in the EES. This would form the starting point for setting environmental performance standards to which the Project should be bound, but would need to be carefully examined and refined to ensure such requirements are fully reflective of statutory standards relevant to the project, especially quantitative requirements in relation to air quality and health risks.

4.10 Sustainable Development

Evaluation Objective – *Overall, to demonstrate that the Project would achieve an appropriate balance of economic, social and environmental outcomes that contribute to ecologically sustainable development and provide a net community benefit.*

This section focuses on the overall acceptability of the environmental outcomes of the Project, relative to the economic and social outcomes, including in the context of the principles and objectives of ESD. The Ministerial Guidelines made under section 10 of the EE Act specifically require the assessment of the effects of a project to consider the principles and objectives of ESD and principle of environment protection. The Project's overall consistency with the following principle of ESD is particularly pertinent:

- Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equity considerations.

Environmental and socio-economic outcomes

In summary, this Assessment has identified the following primary environmental and socio-economic outcome:

- The Project is predicted to cause repeated exceedances of statutory air quality objectives and criteria (including objectives for Class C indicators) at various neighbouring receptors on a significant number of days and on average over different years of the project life, leading to unacceptable effects on air quality and adverse health risks for residents.

Balance of environmental, social and economic outcomes

The Inquiry has highlighted that the likely risks to the community resulting from elevated levels of air pollutants, especially PM₁₀ and arsenic, are critical to the assessment of the Project and is not satisfied that the proposed operational management regime involving cessation of mining work on days predicted to lead to exceedances of statutory standards provides confidence that unacceptable adverse air quality effects will be avoided.

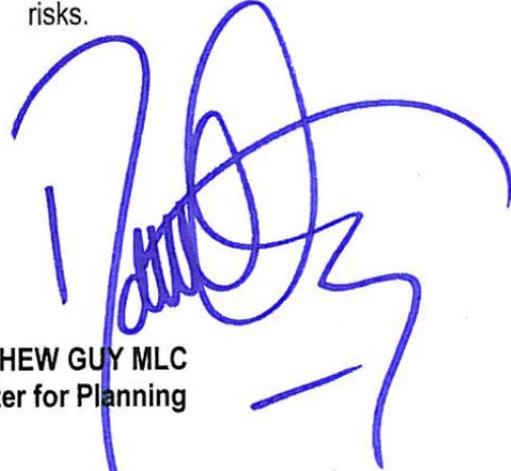
The air quality modelling based on locally collected background air quality and meteorological data, in accordance with PEM, has predicted significantly more extensive exceedances than were predicted by the modelling reported in the exhibited EES. Although it is unfortunate from a process perspective that the PEM-compliant modelling was not available until the first week of the Inquiry hearing, the conclusions drawn by the Inquiry have been reached in the light of adequate scrutiny and discussion of the model outputs during and after the hearing.

While other potential adverse impacts of the Project would probably be manageable within acceptable limits, the need to protect the community from predicted exceedances of air quality parameters which have been mandated primarily to protect human health is paramount.

Overall Conclusions

Having regard to the Inquiry Report, the EES and matters raised in submissions, it is my overall assessment that:

- The Project as proposed would generate unacceptable effects on air quality and risks to human health for the Stawell community, especially but not only those living in close proximity to the proposed works.
- The predicted economic benefits of the project do not outweigh the adverse impacts on air quality and community health risks resulting from predicted exceedances of statutory air quality criteria (discussed in Section 4.2).
- The Project would not provide a net community benefit to the State of Victoria, having regard to both long-term and short-term economic, environmental and social considerations.
- The Project as proposed should not proceed in light of the significance of the above mentioned effects and risks.



MATTHEW GUY MLC
Minister for Planning

29.10.14