

Report by the Mining and Petroleum Gateway Panel
to accompany a Conditional Gateway Certificate
for the Glendell Continued Operations Project

24 July 2019

Report by the Mining and Petroleum Gateway Panel to accompany a Conditional Gateway Certificate for the Glendell Continued Operations Project© State of New South Wales through the NSW Mining and Petroleum Gateway Panel, 2019.

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Executive Summary

The Mining & Petroleum Gateway Panel (the **Gateway Panel**) has determined an Application for a Gateway Certificate by Glendell Tenements Pty Ltd (the **Applicant**), for its proposed Glendell Continued Operations Project in the Upper Hunter Valley region of New South Wales. The Gateway Panel finds that the Application does not meet all the Relevant Criteria and consequently issues the Applicant with a Conditional Gateway Certificate. This report provides both the opinions and the reasoning of the Panel.

The Glendell Continued Operations Project (the **GCOP**) proposes to extend open cut mining operations north from the existing Glendell Mine, a component of the Mount Owen Complex. The GCOP is located approximately 24 kilometers southeast of the township of Muswellbrook. The GCOP is present within the Singleton Shire Council Local Government Area.

The proposed extension to the existing mine would utilize existing infrastructure and undertake an extension of open cut mining operations north from the existing Glendell Mine. The GCOP would extract an additional 135 Mt of total run of mine (**ROM**) coal and would extend the mining operations until approximately 2044.

With regard to verified Biophysical Strategic Agricultural Land (**BSAL**), it is the opinion of the Gateway Panel that:

- The GCOP will notably Impact upon most of the project area by the excavation of a significant surface mine and the distribution of waste spoil. The effect is that much of the project area will be either excavated and or covered in mine spoil such that a new final landform will be generated.
- The GCOP will significantly decrease the area of BSAL and significantly impact upon verified BSAL
- The reduction in the area of BSAL and the bifurcation of the verified BSAL by the proposed road re-alignment will fragment productive agricultural land.

With regard to Critical Industry Clusters (CIC):

- There is no CIC land located inside the Gateway Certificate Application Area (**GCAA**) or proximal to it.

The Gateway Panel has concluded significant additional information is required to establish the nature and extent of likely impacts to BSAL and water resources. This includes, but is not limited to:

- Additional studies are required to provide a conceptual final landform, together with potential conservation areas and wildlife corridors. Geotechnical considerations (stability risk) should be preeminent in the foundation part of the GCOP Environmental Impact Statement.
- Additional studies, including the development of a numerical groundwater flow model, are required to establish the extent, duration and significance of any potential impacts on 'highly productive' aquifers within the meaning of the NSW Aquifer Interference Policy.
- Additional studies and assessments setting out the avoidance, mitigation and rehabilitation of areas of highly productive agricultural land likely to be directly and indirectly impacted by the GCOP.

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1. Purpose and Methodology

In accordance with the Section 17H(2)(b), Part 4AA Mining and Petroleum Development on Strategic Agricultural Land, State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 (the **Mining SEPP**), this report states the Mining & Petroleum Gateway Panel's (the **Gateway Panel**) reasons for the opinions expressed in the Gateway Certificate issued on this day to the Glendell Continued Operations Project (**GCOP**).

1.1 Terms of Reference

The Mining SEPP provides the Gateway Panel's Terms of Reference.

The Gateway Panel must determine an Application and issue a Gateway Certificate in accordance with Section 17H of the Mining SEPP.

Section 17H(4) provides the following relevant criteria for the Gateway Panel's determination and recommendations.

(a) in relation to biophysical strategic agricultural land- that the proposed development will not significantly reduce the agricultural productivity of any biophysical strategic agricultural land, based on a consideration of the following:

- (i) any impacts on the land through surface area disturbance and subsidence,*
- (ii) any impacts on soil fertility, effective rooting depth or soil drainage,*
- (iii) increases in land surface micro-relief, soil salinity, rock outcrop, slope and surface rockiness or significant changes to soil pH,*
- (iv) any impacts on highly productive groundwater (within the meaning of the Aquifer Interference Policy),*
- (v) any fragmentation of agricultural land uses,*
- (vi) any reduction in the area of biophysical strategic agricultural land,*

(b) in relation to critical industry cluster land-that the proposed development will not have a significant impact on the relevant critical industry based on a consideration of the following:

- (i) any impacts on the land through surface area disturbance and subsidence,*
- (ii) reduced access to, or impacts on, water resources and agricultural resources,*
- (iii) reduced access to support services and infrastructure,*
- (iv) reduced access to transport routes,*
- (v) the loss of scenic and landscape values.*

Section 17H(5) states that in forming an opinion as to whether a proposed development meets the relevant criteria, the Gateway Panel is to have regard to:

- (a) the duration of any impact referred to in subclause (4), and*
- (b) any proposed avoidance, mitigation, offset or rehabilitation measures in respect of any such impact.*

1.2 Methodology

1.2.1 The Gateway Panel

The Members of the Gateway Panel that evaluated this Application are:

- Professor Snow Barlow, Chairperson – agricultural discipline;
- Dr Ian Lavering – mining discipline; and
- Mr. George Gates PSM – hydrogeology discipline.

1.2.2 Referrals

In accordance with Section 17G of the Mining SEPP, this Gateway Application was referred to the Commonwealth Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (IESC) and the NSW Minister for Primary Industries.

- On 25th June 2019, the Gateway Panel received advice from IESC (IESC, 2019).
- On 8th July 2019, the Gateway Panel received advice from NSW Minister for Planning and Public Spaces.

1.2.3 Gateway Panel teleconference meetings

The Gateway Panel held the following teleconference meetings in relation to this Application.

- 1st July 2019 by teleconference, to progress initial assessment and workplans.
- On 10th July 2019 by teleconference, to progress this report and finalise work plans.

Delete 1.2.3 1.2.4 Document review

The Gateway Panel has reviewed the following documentation provided by the Applicant as their submission for the panel to assess.

Umwelt, 2019a. *Glendell Continued Operations Project Gateway Certificate Application Technical Overview*, 276 p.

The Gateway Panel has also reviewed the following Referral Agency advice relevant to this Application.

Department of Planning and Public Spaces 2019. Schedule of Lands for Glendell Continued Operations Project Gateway Certificate Application. <https://www.planningportal.nsw.gov.au/major-projects/project/10976>.

Minister for Planning and Public Spaces, 2019. Letter to Mining and Petroleum Gateway Panel. Advice to the Mining and Petroleum Gateway Panel on the Glendell Continued Operations Project.

IESC, 2019. Advice to the Mining and Petroleum Gateway Panel within the NSW Independent Planning Commission on coal mining project: Glendell Continued Operations Project (IESC 2019-104).

The Gateway Panel has reviewed the following publications relevant to Gateway Application.

DPIE, 2012, *NSW Aquifer Interference Policy*, 34 p.

DPIE, 2013a. Strategic Regional Land Use Policy, Guideline for Gateway Applicants, Fact Sheet, (the Guideline). State of New South Wales through the Department of Planning & Infrastructure, September 2013.

DPIE, 2013b. Agricultural Impact Statement technical notes: A companion to the Agricultural Impact Statement guideline. State of New South Wales through the Department of Primary Industries, April 2013.

NSW Government, 2007. State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007, Part 4AA Mining and Petroleum Development on Strategic Agricultural Land (the Mining SEPP). NSW Legislation, State of New South Wales, 2007.

OEH and OAS&FS, 2013. Interim protocol for site verification and mapping of biophysical strategic agricultural land (BSAL). State of New South Wales through the Office of Environment & Heritage and the Office of Agricultural Sustainability & Food Security.

Umwelt, 2019b. *Glendell Continued Operations Project – Preliminary Environmental Assessment*. Glencore, April 2019.

2. The Proposed Project

Glendell Tenements Pty Ltd (the **Applicant**), a subsidiary of Glencore, is the Applicant for an extension of an existing open cut mining operation (Glendell Mine) in the Upper Hunter region of New South Wales. The Applicant operates the Glendell Mine on behalf of Glencore and its joint venture partners. The Glendell Mine is a component of the Mount Owen Complex (**MOMC**), which also includes mining operations at the Mount Owen Mine (North Pit) and Ravensworth East Mine (Bayswater North Pit) as well as coal handling and preparation plant (**CHPP**) and transport infrastructure.

The Glendell Continued Operations Project (**GCOP**) is located approximately 24 kilometers southeast of the township of Muswellbrook (Figure 1). The GCOP is present within the Singleton Shire Council Local Government Area. The proposed extension to the existing mine would utilize existing infrastructure and undertake an extension of open cut mining operations north from the existing Glendell Mine (Figure 2).

The existing Glendell mining operation is conducted within a number of mining tenements, including Coal Lease (**CL**) 538, CL 382, Consolidated Coal Lease (**CCL**) 708, Mining Lease (**ML**) 1410, ML 1476, ML 1629, ML 1673, ML 1694, MPL 343 and Exploration Lease (**EL**) 8184. The Gateway Certificate Application Area (**GCAA**) extends north into CCL 708, EL 6594, EL 8184 and ML 1629 (Figure 3). The agricultural land use near the existing Glendell Mine and the proposed GCOP is dominantly devoted to sheep and cattle grazing. Areas of higher soil fertility within the GCAA have the potential to be used for cropping but have only been used for pasture production in recent history. The secured biodiversity conservation sites for the MOMC are located to the northeast of the GCAA.

No land mapped as equine and viticulture critical industry cluster, as identified in Mining SEPP, is present within the GCAA, or proximal to it.

The Applicant of the Project is required to make a Gateway Application because:

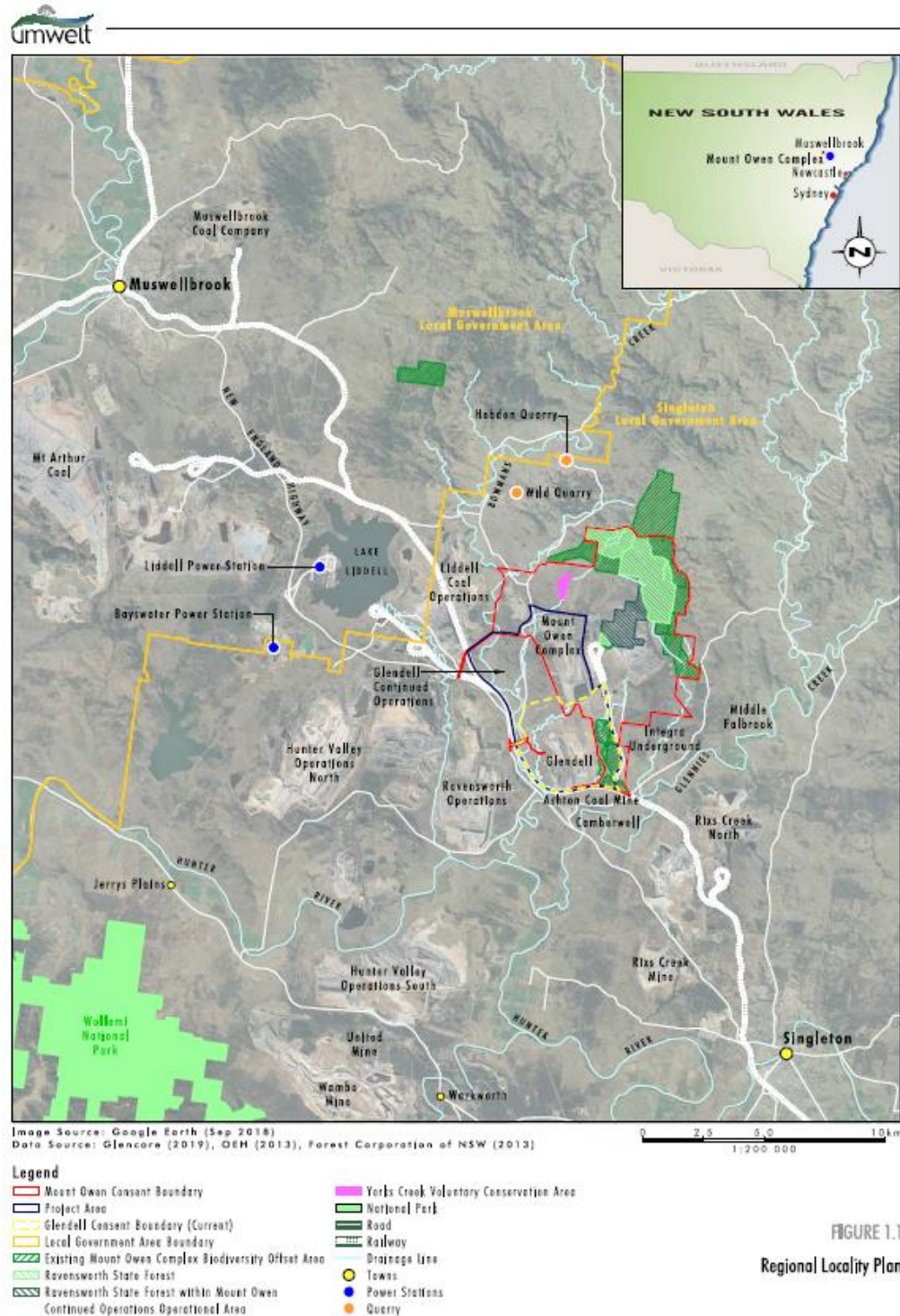
- The Project is a proposed development specified in Clause 5 (Mining) of Schedule 1 to State Environmental Planning Policy (State and Regional Development) 2011 that a mining lease under the *Mining Act 1992* is required to be issued to enable the development to be carried out because a new or additional mining lease in relation to the proposed development; and,
- The proposed development is in part on land which the Applicant has verified as being, or is potentially Biophysically Strategic Agricultural Land (**BSAL**).

The GCOP includes areas which are inside existing mining lease areas; these aspects of the GCOP are not subject to the Mining Gateway Certificate process. The Project involves the northern extension of the existing Glendell open cut mine, in the area of CCL 708, EL 6594, EL 8184 and ML 1629. The Project intends to develop and extract additional and deeper coal seams, including all seams down to the Hebden Seam. Current mine life is approved until 2024. The proposed extension would extract an additional 135 Mt of total run of mine (**ROM**) coal and would extend the mining operations until approximately 2044.

3. Strategic Agricultural Land Verification

3.1 Biophysical Strategic Agricultural Land (BSAL) verification

For the identification of BSAL in the GCAA the Applicant has applied the *Interim Protocol for Site Verification and Mapping of Biophysical Strategic Agricultural Land* (BSAL Protocol) (OEH & OASFS, 2013).



3.2 Critical Industry Cluster (CIC)

There are no viticulture or equine industry businesses within or proximal to the proposed GCOP.

4. Assessment of Mining Disturbances

The Mining Gateway process requires that the potential impact on BSAL and/or a CIC is evaluated as either:

- A direct mining effect whereby part or all of BSAL or a CIC is either relocated, worked upon or subsided, or
- An indirect mining effect whereby the state of either the surface water or sub-surface water is significantly altered by mining which then has a direct impact on BSAL and/or a CIC.

The assessment of mining disturbance must consider both direct and indirect impacts as defined above. The Applicant has committed to undertaking additional work to assess the potential impacts that the mining process could have in the GCAA and will report the results in an EIS.

4.1 Direct mining disturbances

The GCOP mining operation will produce an additional area of 46 ha of disturbance and will result in the presence of a single void in the north of the Glendell Mine but will not increase the number of final voids in the region compared to current approved operations.

The process of open cut mining means that all BSAL identified within the mine disturbance area will be subjected to stripping of soil and landform rehabilitation following the mining procedure.

The process of removal is expected to have a significant impact on the identified BSAL within this disturbance area. There are no expected subsidence impacts but there remains the risk of surface stability in the open pit and also in the mine spoil landform(s).

The Project will permit access to mining of all coal seams above the Hebden seam in the Whittingham Coal Measures (Umwelt 2019, Fig. 5.2), including those seams uppermost in this geological unit, the Leamington C, D and Bayswater Seams. Conceptual mining sequence undertaken during the project includes a progressive northward migration of the active mine pit with overburden emplacement immediately to the south, followed by shaping of the final landform and a zone of rehabilitation on the southernmost limit of the project area. (Umwelt, 2019 Figs. 4.1-4.3).

4.1.1 Removal or working upon verified BSAL

The Applicant proposes to relocate the Mining Infrastructure Area (**MIA**) and re-align Hebden road to the North-western area of the GCAA where extensive verified BSAL exists along Bowmans Creek (Figure 4). This BSAL will be stockpiled and reconstituted in the rehabilitation phase of the mine. The fragmentation of the agricultural area centered on the area of BSAL by the re-alignment of Hebden Road will remain at the completion of mining.

The following specific mining-related issues arise as a consequence of the GCOP in the GCAA region.

- There is potential for the development of geotechnical instability features to occur during the excavation and overburden emplacement parts of the project. The application has not provided sufficient information to assess the risks associated with the conceptual mining sequence. It requires detailed description and development of site-specific management methods to minimize these risks.

Given the above, the Gateway Panel believes the potential impacts on the GCAA, and the verified and potential BSAL, requires additional investigation and documentation which the Applicant has stated will be supplied in an environmental impact statement (**EIS**).

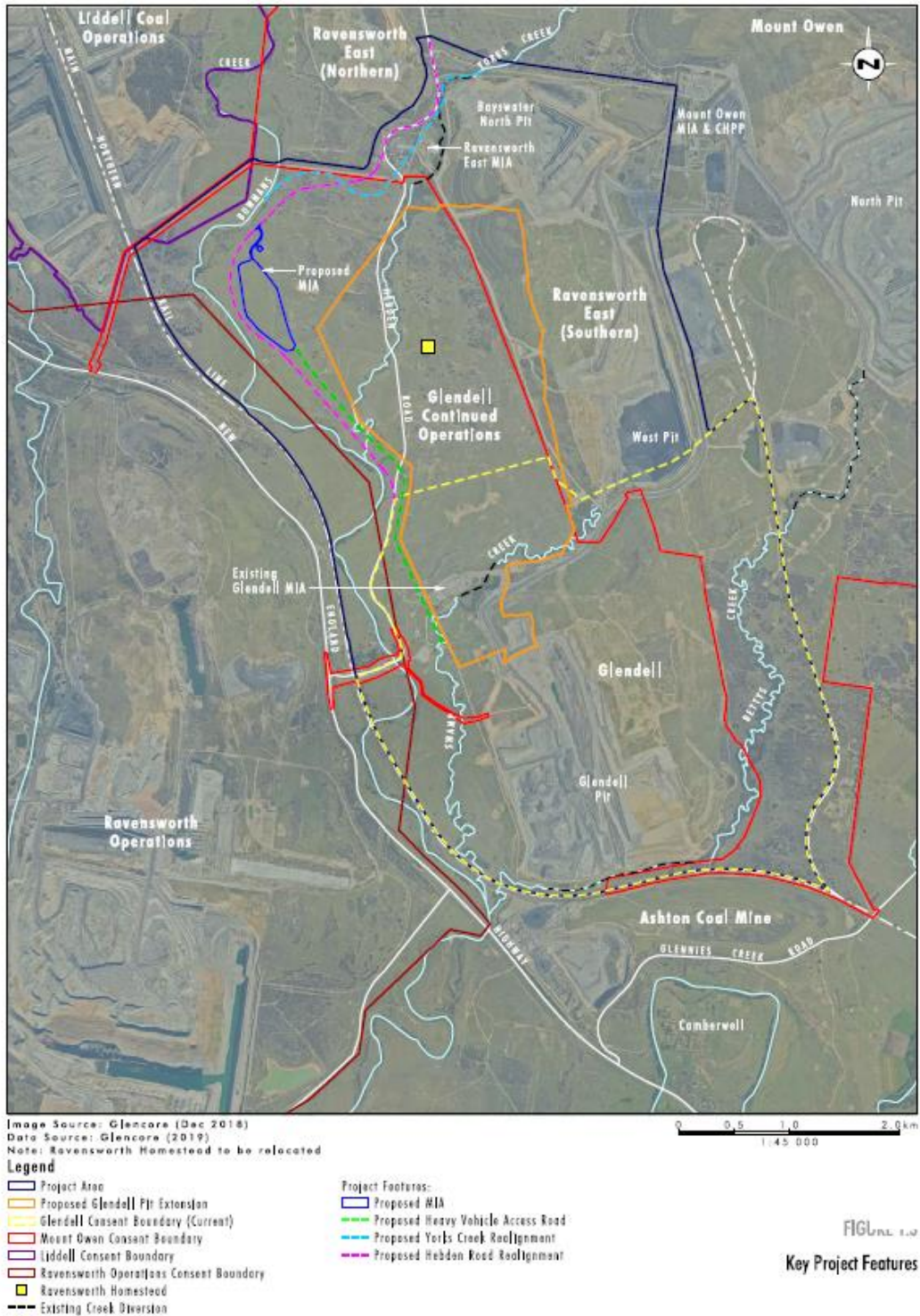


Figure 2. Key features of the GCOP and the existing MOMC. Source: Umwelt 2019a

4.1.2 Duration of impacts, mitigation and rehabilitation measures

The impacts of disturbance will progressively increase through the life of the proposed mining process. Geotechnical stability will be a major issue in the working pit area, as well as in the stockpile of excavated overburden. Those risks will be remediated once the final landform shape has been achieved and

rehabilitation is in progress. As such it is noted that the stability risk will remain and increase until it will begin to decline when the entire project is well into its mature stage.

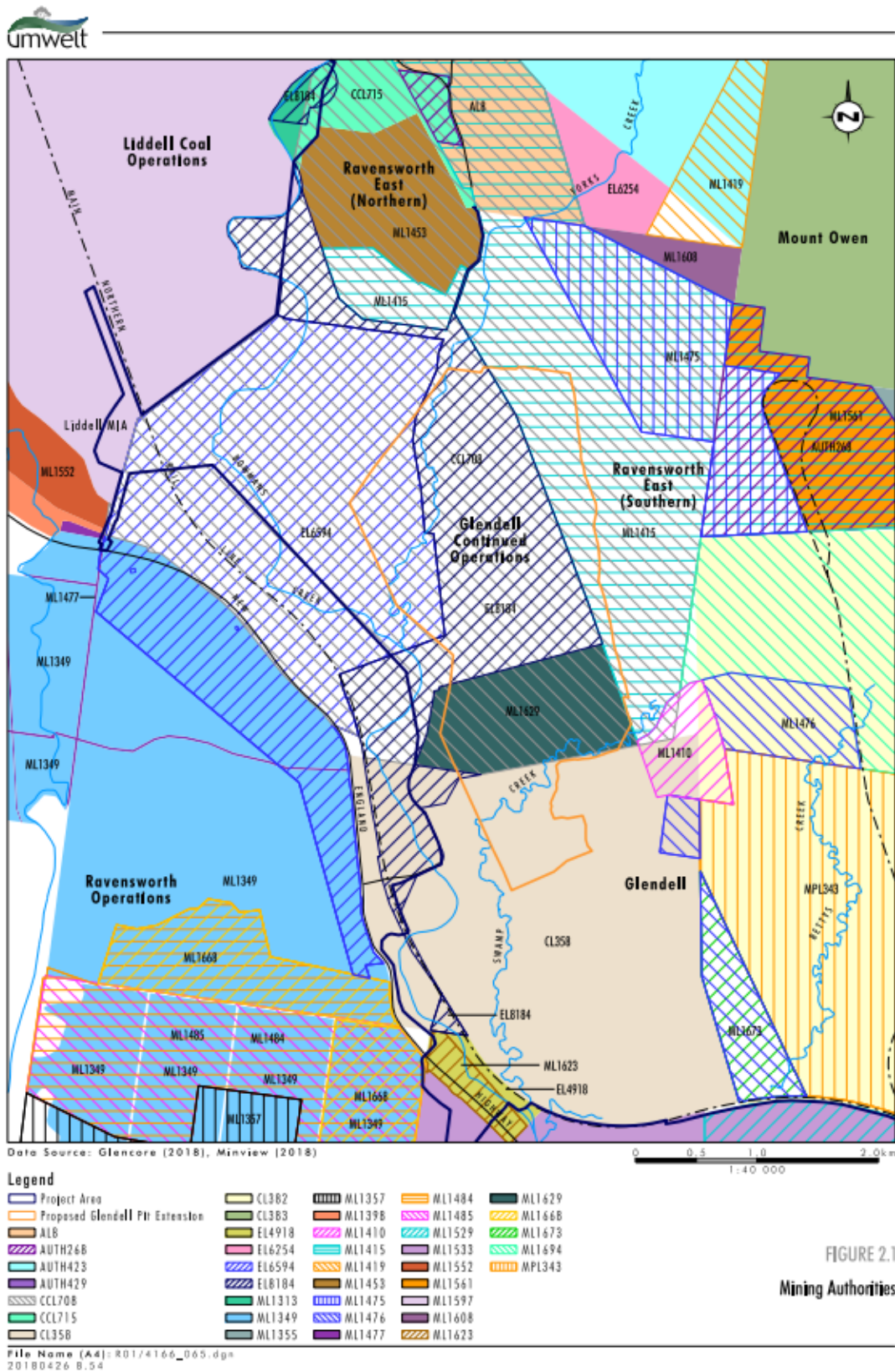


FIGURE 2.1
Mining Authorities

Figure 3: Combined mining authorities for the GCOP and surrounding areas. Source: Umwelt 2019b

The forms of any diverted segments of existing creeks are likely to lack the surface roughness, and natural ponding depressions typical of natural creek channels during low water flow stages. Their form will serve to reduce dwell time for any volume of water within them and thus isolate both biota and surface vegetation patterns within the channels. It may take a decade of variable flow patterns before these features are restored by natural processes.

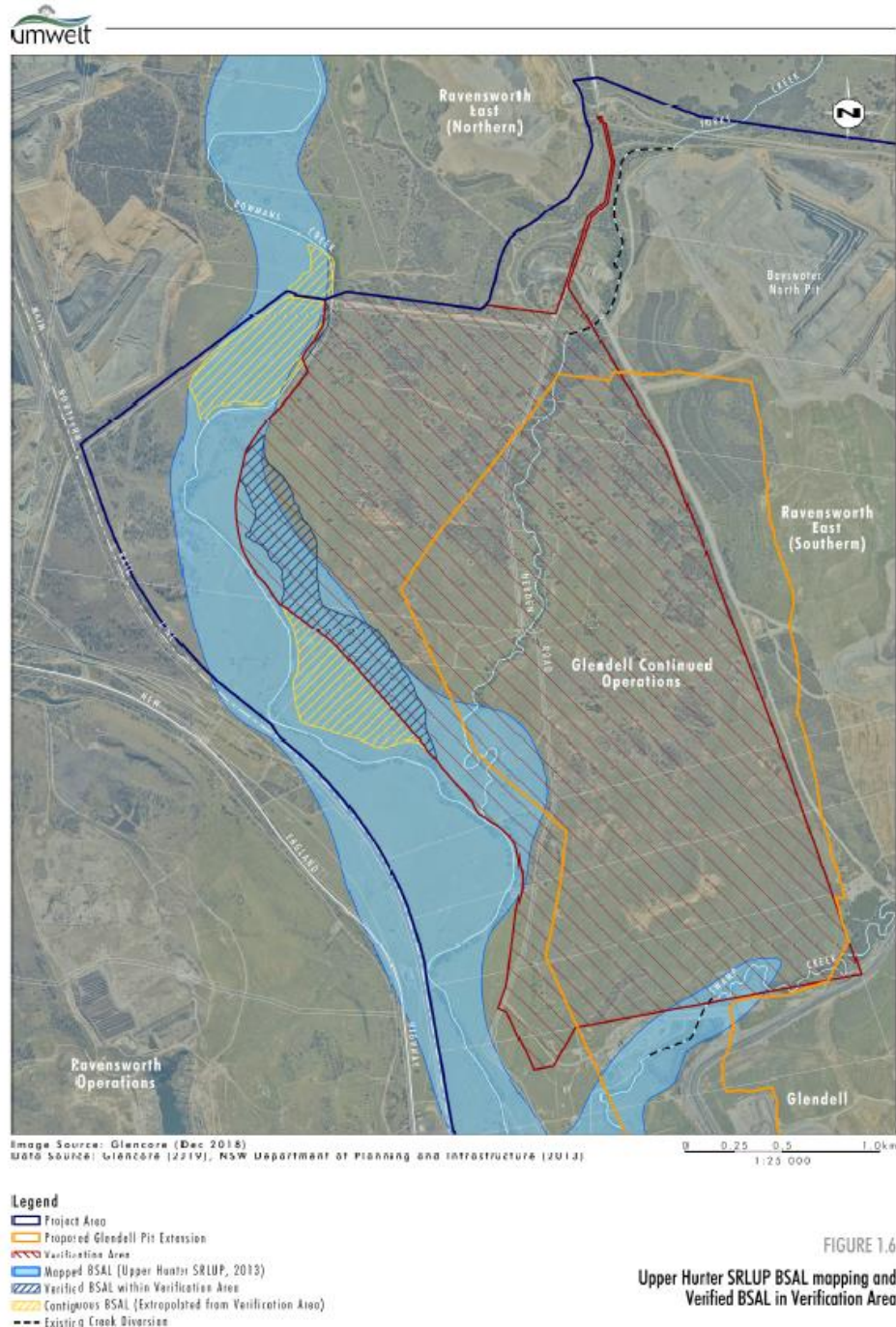


Figure 4. Location of verified BSAL in GCAA. Source: Umwelt 2019a

The Applicant has provided only indicative conceptual details with regard the actual mining sequence to be undertaken over this prolonged and significant mining project. There is an indication that the height of current overburden areas will have to be increased to accommodate the volume of material to be

excavated. While the proposed management of overburden appears to be logical and consistent, the lack of details does not remove the possibility of local radical variation.

The redirection of several creeks and the variation associated with their current forms are noted. Of concern would be any reduction in natural diversity of form within these channel systems. This involves changes in basal low flow channel form and a tendency for an overall reduction in surface roughness within redirected channel systems. The overall impact is that newly redirected channels lack the low-water complexity and natural meander patterns evident in natural channel systems. In addition, they also lack the diversity of natural bedload material which would tend to reduce flow velocity and ensure the flow rates follow typical patterns of moderated throughput. Instead redirected channel systems are characterized of rapid peak flow patterns and minimal ponding or low water stage retention pools.

4.2 Indirect mining impacts

In the following assessment, the Gateway Panel has considered the advice from the Independent Expert Scientific Committee (IESC, 2019) and the Minister for Water, Property and Housing (DPIE Water, 2019).

The *NSW Aquifer Interference Policy (AIP)*, see DPIE (2012), includes a set of minimal impact considerations for assessing the impacts of all aquifer interference activities, including mining. All NSW groundwater sources have been categorized as being either ‘highly productive’ or ‘less productive’, based on the general character of the water source meeting or not meeting the criteria of 1500 mg/L total dissolved solids and a bore yield rate of greater than 5 L/s. This categorization applies to a whole groundwater source as it is defined in a water sharing plan (**WSP**), not to the specific groundwater conditions at a particular location.

Impact considerations relate to impacts on the water table and aquifer pressure, as well as to groundwater dependent ecosystems and to groundwater and surface water quality. Applicants are required to provide estimates of all quantities of water that are likely to be taken from any water source during and following the end of the activity, and to make predictions of all impacts associated with the activity.

Due to the limited information supplied, the Gateway Panel has not been able to properly assess this application against specific criteria in the AIP, which includes assessing the impacts on aquifers, connected rivers with reliable flows and associated water dependent assets (including the environment). It also requires accounting for water take through a licensing regime.

4.2.1 Impacts on highly productive groundwater (within the meaning of the Aquifer Interference Policy)

The GCAA is situated within the Permo-Triassic Sydney Basin. The hard rock geology both within and surrounding the proposed mine pit extension area is reasonably well known, from decades of coal investigation drilling. Less well known is the geological makeup of the shallow alluvial sediments associated with the ephemeral creeks that pass through the area.

As stated above, the project proposes the extension of mining at Glendell Mine to the north of the current Glendell Pit. Mining operations will extend the existing open cut operations, mining down to the Hebden Seam.

It is noted that there has already been extensive depressurisation of the hard rock aquifers within and surrounding the MOMC, as a result of previous and current approved mining operations. This depressurisation is likely to have some effect on reducing groundwater inflows to the mine extension pit, and may have already induced some drawdown in the Bowmans Creek, York Creek, Swamp Creek alluvium.

The broad conceptual model of groundwater flow outlined in Umwelt (2019a) is considered to be realistic. The hydrogeological framework consists of two main hydrogeological features:

1. The unconsolidated Quaternary alluvium along the ephemeral; Bowmans Creek, Yorks Creek and Swamp Creek. The alluvium near the mine extension site is of limited depth, generally less than 10 meters, and consists of clay, silt, sand and gravel. The sand and gravel layers, where saturated, are considered to be unconfined aquifers with some potential as a water supply aquifer. The alluvium associated with Bowmans Creek, York Creek and Swamp Creek has been designated as 'highly productive' by DPIE Water. The Applicant argues that only Bowmans Creek alluvium has some potential to be 'highly productive' and the Panel agrees that this is the most important aquifer, close to verified BSAL, and requires appropriate protection. It is reported that both Yorks Creek and Swamp Creek alluvium contain brackish to saline groundwater and are likely to be low yielding; and
2. The Permian strata which consists of sandstones, siltstones, shale and coal seams which contain minor aquifers which are said to be semi-confined. These aquifers have a low permeability and would yield water to bores in small quantities (say 0.1 to 1 L/s), suitable for stock watering and limited domestic uses. In addition to having a limited ability to transmit groundwater they contain brackish to moderately saline water. They have been designated as 'less productive' aquifers by DPIE - Water.

The proposed mining extension will add to the depressurisation of the Permian strata which in turn will encourage groundwater to flow towards the mining pit, drawing groundwater from the adjacent water sources. The potential connectivity between the shallow alluvium (Bowmans Creek, Yorks Creek and Swamp Creek alluvial aquifers) and the pit extension will be governed by the permeability of the alluvium and the regolith/fresh rock, and the potentiometric head difference between the two water sources.

Again, due to the limited hydrogeological information supplied it has only been possible to assess broad possible impacts on local groundwater resources and connected surface waters. The development of an appropriately calibrated and independently reviewed groundwater flow model is required to quantify the impacts that will occur on both groundwater, surface water and environmental assets in the area. See 5.1.4 below for details of the Gateway Panel's modelling requirements and criteria to be assessed.

5. Panel Assessment of Impacts on Strategic Agricultural Land

The Gateway Panel has assessed and determined the potential impacts of the proposed Project on BSAL as follows (findings are summarized in Table 1).

Table 1. Summary of Gateway Panel determination of impacts on BSAL.

17H(4)(a) BSAL	Determined Impact
(i) any impacts on the land through surface area disturbance and subsidence,	Significant
(ii) any impacts on soil fertility, effective rooting depth or soil drainage,	Significant
(iii) increases in land surface micro relief, soil salinity, rock outcrop, slope and surface rockiness or significant changes to soil pH	Significant
(iv) any impacts on highly productive groundwater (within the meaning of the aquifer interreference policy	May be significant
(v) any fragmentation of agricultural land uses,	Significant
(vi) any reduction in the area of biophysical strategic agricultural land.	Significant

5.1 Significance of the project's potential impacts on BSAL

5.1.1 Any impacts on the land through surface area disturbance and subsidence

The GCOP will impinge on significant areas of verified BSAL. This land is largely situated to the east and north of Bowmans Creek where the new MIA is to be located. The proposed relocation of Hebden Road to a route which is west and north of the proposed MIA will also traverse significant areas of BSAL along Bowmans Creek.

Despite very little detail in the Gateway Application, there appears to be a plan to re-establish the BSAL impacted by the MIA as part of the end of mine rehabilitation. The proposed re-alignment of Hebden Road across verified BSAL adjacent to Bowmans Creek appears to be permanent and will result in loss and fragmentation of BSAL in perpetuity. These matters need to be addressed in the EIS.

5.1.2 Any impacts on soil fertility, effective rooting depth or soil drainage

The proposal to deconstruct verified BSAL impacted upon by the construction of the MIA and then reconstitute the soil profile during end of mine rehabilitation will inevitably impact on soil fertility, effective rooting depth and soil drainage. Detailed plans for the procedures to be used in this process should be outlined in the EIS for this project. As these soils are located in high fertility locations adjacent to Bowmans Creek the internal drainage of the reconstituted soil profile will be critical.

5.1.3 Any increases in land surface micro-relief, soil salinity, rock outcrop, slope and surface rockiness or significant changes to soil pH

The reconstituted soil profiles and land surfaces following the decommissioning of the mine and the rehabilitation process will may have some increases in soil micro-relief. It is also possible that the pH of individual soil profiles may alter in the protracted stockpiling process prior to re-constitution. These possibilities and the steps to be taken to avoid them should be addressed in detail in the EIS.

5.1.4 Any impacts on highly productive groundwater (within the meaning of the Aquifer Interference Policy)

It is reported in Umwelt (2019a) that a numerical groundwater flow model has previously been developed for the local region for previous environmental assessments of mining projects at Mount Owen, Integra Underground, and Liddell Coal Operations. The model was developed with the purpose of estimating the extent of the zone of influence and the volume of groundwater taken from affected water sources. It is stated in the Gateway Application that this numerical groundwater flow model will be updated and refined to reflect improved knowledge of the local hydrogeological conditions and the estimates of impacts and water inflows predictions will be provided in the EIS, which is currently under development.

The Gateway Panel requires that for the EIS the groundwater flow model should include:

- The location of water assets such as private bores/wells and groundwater dependent ecosystems (GDE);
- time series climate and creek flow data;
- spatially distributed hydraulic parameters based on local data;
- local geological structure (faults, fracturing, volcanic intrusions, etc.) that may affect groundwater flow;
- a range of climate change scenarios;
- the cumulative impacts of mining in this local area; and
- A sensitivity and uncertainty analysis to increase confidence in the predictions.

As the Gateway Application provides only general information on groundwater and surface water systems. The Gateway Panel requires detailed information on the following to be provided in the EIS:

- estimates of all quantities of water that are likely to be taken from any water source on an annual basis during and following cessation of the activity;
- a strategy for obtaining appropriate water licences for maximum predicted annual take;
- establishment of baseline groundwater conditions including groundwater depth, quality and flow based on sampling of all existing bores in the area, any existing monitoring bores and any new monitoring bores that may be required under an authorization issued under the *Mining Act 1992* or the *Petroleum (Onshore) Act 1991*;
- a strategy for complying with any water access rules applying to relevant categories of water access licences, as specified in relevant water sharing plans;
- estimates of potential water level, quality and pressure drawdown impacts on nearby water users who are exercising their right to take water under a basic landholder right;
- estimates of potential water level, quality and pressure drawdown impacts on nearby licensed water users in connected groundwater and surface water sources;
- estimates of potential water level, quality and pressure drawdown impacts on GDEs;
- estimates of potential for increased saline and contaminated water inflows to aquifers and highly connected river systems;
- estimates of the potential to cause or enhance hydraulic connection between aquifers;
- estimates of the potential for river bank instability, or high wall instability or failure to occur; and
- outline of the method for disposing of water inflows to a mine.

The Gateway Panel accepts the advice received from the IESC (2019) and DPIE – Water (2019), and supports further work to be reported in the EIS in the following areas:

- investigations into the mine spoil with respect to saline/acid leachate;
- predictions of water level recovery in the backfilled pit/final void and salinity concentrations;
- investigations of the hydraulic connection between Bowmans Creek alluvium and the pit;
- investigations into the significance of potential impacts of the project on GDEs where groundwater drawdown is predicted;
- A comprehensive mine water balance that includes a range of climate change predictions; and
- provision of the full suite of monitoring data collected in the existing monitoring program updated to include the most recent data. This includes spatial and temporal variation in baseline conditions for both groundwater level and quality.

5.1.5 Any fragmentation of agricultural land uses

The establishment of a new MIA and the relocation of Hebden Road to an area of highly productive BSAL adjacent to Bowmans Creek will result in some fragmentation of agricultural land uses. The relocation of the Hebden Road will remain a permanent feature of the area and therefore the fragmentation of these agricultural areas will also be of a permanent nature. This is not acknowledged by the Applicant in their Gateway Application.

The panel considers that in their final ML application and EIS consideration should be given to avoiding the fragmentation of agricultural land and the permanent loss of BSAL by moving the proposed site of the MIA and realigned Hebden Road to a more Easterly position. This would avoid the fragmentation of agricultural land, the permanent loss of BSAL and the need to remove, stockpile and reconstitute BSAL soil profiles

5.1.6 Any reduction in the area of biophysical strategic agricultural land (BSAL).

Further to the discussion in 5.1.5, the verified BSAL is largely located adjacent to the Western and Northern extremities of the proposed project verification area (Figure 2.1). The current re-alignment of Hebden Road traverses much of this Verified BSAL thereby reducing the area of BSAL on a permanent basis. As outlined above, this permanent loss of BSAL could be minimized rerouting the re-alignment of Hebden Road to avoid traversing the verified BSAL and also reducing the rehabilitation costs of the disturbed BSAL in the MIA.

6. Conditional Gateway Certificate

The Gateway Application for the proposed GCOP proposes extending open cut mining of the Glendell Mine within CCL 708, EL 6594, EL 8184 and ML 1629. The GCAA contains 34 ha of presently verified BSAL and an undefined area of potential BSAL which may have will have direct impacts caused by extending the open cut and infrastructure placement and possibly indirect impacts through.

It is the opinion of the Gateway Panel that:

- the Project could have direct significant impacts on the agricultural productivity of verified BSAL within the GCAA;
- the GCOP has the potential for indirect impacts and additional fragmentation of agricultural operations in the area by further fragmenting the high-quality agricultural land in this intensely mined area.
- the GCOP may have significant impacts on ‘highly productive’ aquifers within the meaning of the AIP (DITRIS, 2012), but will require significant additional evaluation to establish the extent, duration and significance of any potential impacts; and
- additional hydrogeological detail and baseline water data is required to be reported and used in an appropriate groundwater flow model so that the impacts of mining on water resources/environment can be fully assessed. The groundwater modelling work should be independently peer reviewed and include cumulative impact studies of any nearby mining project(s).