



Planning &  
Environment

***Hawkins-  
Rumker  
Resource  
Assessment  
Summary  
Report***

*Coal Resource  
Identification Program –  
A286*

*May 2018*

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# Executive Summary

The Hawkins-Rumker coal resource, north of Rylstone, contains an inventory resource of ~ 900Mt. The resource is separated into two distinct adjacent resource areas, Hawkins (286Mt) and Rumker (624Mt). These resources would be predominantly extracted as longwall operations with minor bord and pillar extraction. They meet export thermal coal benchmarks and would also be suitable for use in domestic coal fired power generation.

The Hawkins-Rumker project has the potential to be a commercially viable long-life underground coal operation, dependent primarily on coal prices. Capital cost estimates and production rate estimates both impact on the Net Present Value (NPV) of Hawkins-Rumker, however project viability is most affected by long-term coal price forecasting.

The long-term forecast coal price used in assessment of this project of US\$65/tonne equates to a slightly negative NPV for Hawkins-Rumker. The project becomes NPV positive at US\$75/tonne if conservative capital cost contingencies are applied. Current coal prices over the last 12 months to April 2018 have been increasing with an average price of US\$94/tonne with a high and low of ~US\$75 and US\$107/tonne respectively but may reflect a temporary supply-demand imbalance.

Only one potentially significant non-price constraint to the development of Hawkins-Rumker has been identified. Coal product is proposed to be railed through Mudgee to Port Newcastle. If this option is not feasible, coal product could be railed southwards through Lithgow and Sydney to either the Newcastle Port or Port Kembla. Both options require further investigation should a Preliminary Regional Issues Assessment (PRIA) be instigated for the region.

A review of possible environmental constraints shows that there are no Biophysical Strategic Agricultural Lands (BSAL), Critical Industry Clusters (CIC), surface infrastructure (electricity transmissions lines, rail corridors etc.), rivers, cliff lines or high value ecological features that would likely materially impact any resource extraction.

## Context

Coal is an important part of the NSW economy. It is the State's single largest export earner, earning more than \$18 billion of export revenue in 2016-17 or 35% of merchandised goods exports. Coal supports around 100,000 direct and indirect jobs in both mine and non-mine related services, particularly in regional areas. The coal industry provides around 80% of NSW's electricity needs.

The NSW coal industry plays a significant role in the State's economy and is the State's single largest export earner, earning more than \$18 billion of export revenue in 2016-17 or 35% of merchandised goods exports. Coal supports around 100,000 direct and indirect jobs in both mine and non-mine related services, particularly in regional areas. The coal industry provides around 80% of NSW's electricity needs. In 2016-2017 198Mt of saleable coal was produced, delivering around \$1.47 billion in royalties.

NSW is endowed with good quality thermal and metallurgical coal. Currently, about 80% of coal produced is exported, primarily to Japan, South Korea and Taiwan. The remainder is used for domestic power generation and for local steel and cement manufacturing. Of the coal exported, about 80% is thermal and about 20% is metallurgical.

In December 2015, the NSW Government enacted legislation - *Mining and Petroleum Legislation Amendment (Grant of Coal and Petroleum Prospecting Titles) Act 2015* establishing the Strategic Release Framework. The Government also established the Advisory Body for Strategic Release to co-ordinate whole of Government assessments and make recommendations to the Minister for Planning & Environment, Resources & Geoscience about where, when and how coal and petroleum resources are to be released for exploration to suitably qualified companies.

Ongoing Strategic Releases of new coal areas are required to maintain current production levels in NSW in the coming decades

## Strategic Release Framework

The Strategic Release Framework makes provision for the competitive selection for the granting of prospecting titles for coal and petroleum. The framework provides cross-agency input and community consultation to enable the assessment of known regional geological, social, environmental and economic factors before any areas are released for exploration.

The ABSR will provide recommendations on:

- Areas to be released for exploration: This will be based on a preliminary assessment of potential areas including geological factors, social, economic and environmental issues.
- The method of allocation to use: The Advisory Body will recommend the most appropriate competitive allocation process for each release area. This will consider factors such as knowledge of the resource and likely competition levels.

## Purpose of the Coal Resource Assessment Program

The Coal Resource Assessment Program is implemented by the Division of Resources and Geoscience, Strategic Resource Assessment & Advice (SRAA) and funded by the recoupment of costs from industry for the Department's pre-competitive data acquisition programs which are predominantly coal exploration drilling programs. The assessment program aims to;

- Encourage regional development & employment
- Increase export revenue & royalty payments
- Provide feedstock for domestic power generation
- To meet industry demand for steel & cement manufacture

The Hawkins-Rumker area lies within Authority 286 held by the Department of Planning and Environment. Authority 286 is one of the 14 coal titles currently held by the Department.

Following pre-competitive data acquisition programs, SRAA may conduct modeling on potential resource areas to define coal resource quality, quantity and whether the resource may support a stand-alone mining operation. SRAA will inform the ABSR with up to three reports (

Table 1), depending on the nature of the resource, and a completed Resource Assessment template (Appendix A). These reports are tailored to the resource type, size and data availability. Where appropriate, Resource Assessments will be prepared in accordance with the *Australian guidelines for the estimation and classification of coal resources*. This will typically be done for potential stand-alone tender areas and major mine additions.

**Table 1. List of reports prepared for the Strategic Release Advisory Group for the Hawkins-Rumker area.**

Report	Prepared	Purpose
Resource Assessment Summary Report	For areas where a Commercial Viability Assessment has been completed or at the request of the ABSR.	To provide a summary of the Inventory Resource and Commercial Viability Assessments and to accompany the Resource Assessment template.
Commercial Viability Assessment	For areas under consideration with potential to support a stand-alone mining operation.	To provide information about the likely feasibility of developing a new mine.
Inventory Resource Report	For all areas under consideration. The length and content of this report will reflect the size of the potential and availability of data.	This is the main report and it provides the input data to undertake Commercial Viability Assessments.

# ***Hawkins-Rumker Resource Assessment Summary Report***

## **Introduction**

This Resource Assessment Summary Report for Hawkins-Rumker provides context for the Coal Resource Assessment Template (Appendix A) and has been compiled with reference to the two companion reports;

- *Hawkins-Rumker - Inventory Resource Report*. A detailed geological report and resource assessment. Prepared by SRAA.
- *Hawkins-Rumker Commercial Viability Assessment*, a high-level assessment of potential economic viability of the resource. Prepared by independent consulting firm Geos Mining Pty Ltd.

## **Location**

Hawkins-Rumker is located from 6-20 kilometres north of Rylstone, N.S.W, which is 240km by road from Sydney in the Western Coalfield of the Sydney-Gunnedah Basin. The Western Coalfield currently has six operating coal mines. Three mines (Moolarben, Wilpinjong and Ulan) are situated ~35km north of the Hawkins-Rumker area and three mines (Clarence, Springvale and Angus Place) are situated ~75km to the south (Figure 2 and Figure 3).

The coal operations to the north of Hawkins-Rumker all operate large open cut pits extracting the Ulan Seam. The Ulan and Moolarben coal mines also operate underground longwall operations extracting from the Ulan Seam.

The coal operations to the south of Hawkins-Rumker all extract coal via underground longwall or continuous miner methods. The operations extract coal from the Ulan, Lithgow and Katoomba seams.

The township of Rylstone lies 80km and 90km respectively from the Mt. Piper and Wallerawang Power Stations (currently closed) in the Lithgow area.

## **Coal Resources**

Coal resources are suitable for underground extraction only. Two adjacent resource areas were defined with a small area of overlap. Both resource areas comprised a working section from the Lidsdale Seam. The Lidsdale Seam is up to ~10m thick, comprising 6 main plies which are further broken down into sub-plies. Coal plies are denoted by letters. At Hawkins this was the Upper D Working Section (UDWS) working section and at Rumker this was the Upper G (UG) working section (Figure 1). No other coal seams were considered of sufficient thickness, quality and continuity to present potentially commercially viable resources. The most appropriate

mining methods for the Hawkins-Rumker project are longwall and Bord & Pillar mining, with longwall mining providing the best opportunity for a viable operation.

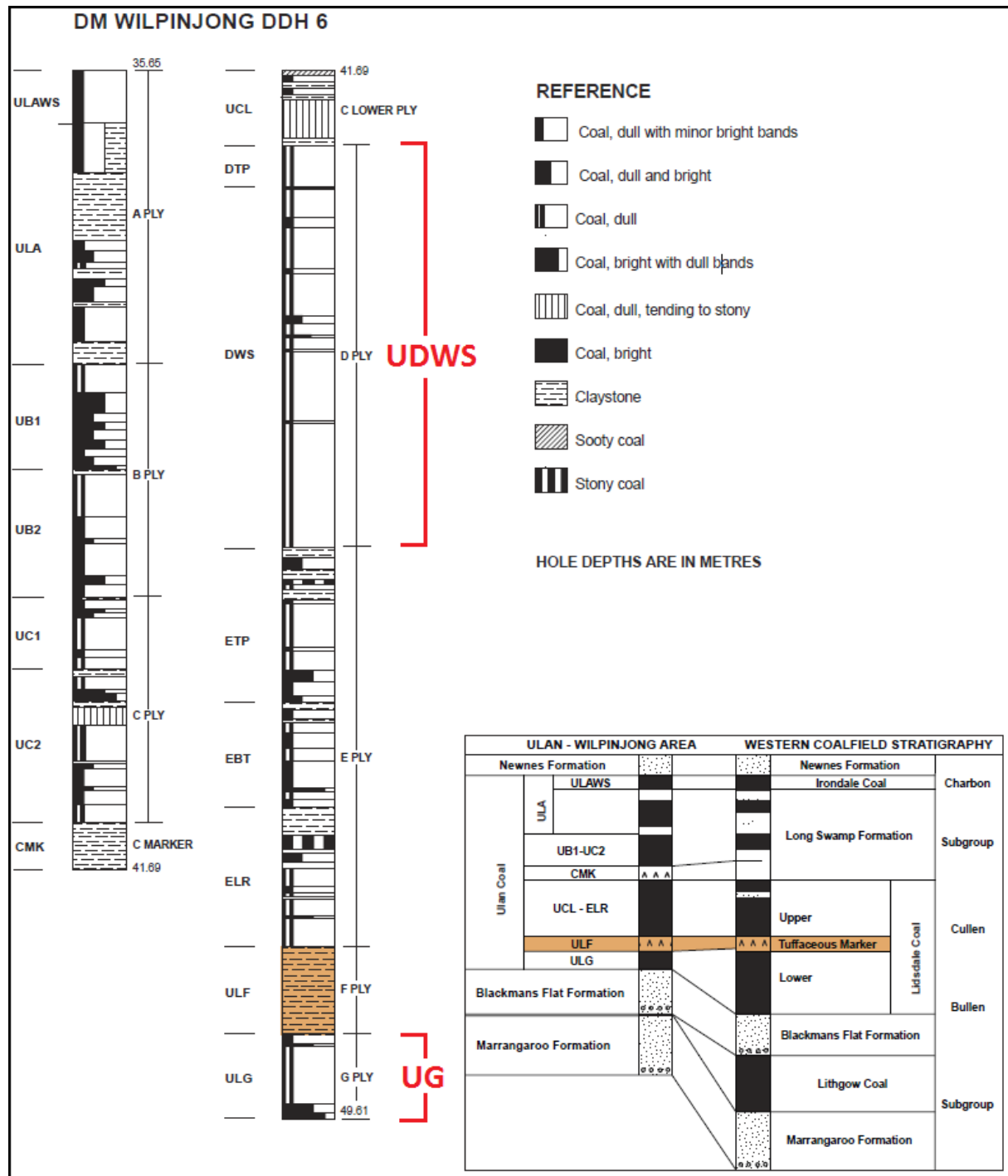


Figure 1 - Typical lithological log of the Lidsdale Seam at Wilpinjong Mine

An underground inventory resource of 910Mt run-of-mine (ROM) coal was estimated at Hawkins-Rumker, 286Mt from the UDWS (Hawkins) and 624Mt from the UG (Rumker).

Underground inventory UDWS ROM resources are categorised as a high-ash content export thermal coal. The ROM product would be sold into FOB Newcastle, NAR 5,500 kcal/kg markets which have an ash content range of 17-23%.



Underground inventory UG product resources are categorised as low-medium ash content export thermal coal. The product coal would be sold at a discount to the FOB Newcastle, GAR 6,300 kcal/kg market, which has a maximum ash content of 14%.

## Economic Viability

A number of discounted cash flow models have been developed, which look at the UDWS (Hawkins) and UG (Rumker) operations in isolation, plus a mining scenario where the UG seam operation follows on from the UDWS. The models are in real (today's) dollar terms, and assume a long-term benchmark thermal coal price of US\$65/tonne (FOB), and an A\$/US\$ exchange rate of 0.76.

The base models show a negative NPV, which improves with increasing production rate. The UDWS operation improves from negative \$86M at the Mid Case production rate of 4.6Mtpa, to negative \$33M at 6.8Mtpa (High Case). The conceptual UG operation financial models similarly improve from negative \$191M at 4Mtpa product, to negative \$118M at 6.1Mtpa.

Coal price is the main determining factor influencing a negative NPV for all models, with capital expenditure also very significant. Annual revenue (post royalties and tax) at the long-term price of US\$65/tonne, is too low to provide sufficient return on initial capital investment at the preferred discount rate of 10%.

Sensitivity analysis shows that NPV becomes positive at a range of long term coal prices from US\$67/tonne to US\$81/tonne for the UDWS resource, and US\$69 – US\$85/tonne for the UG resource, depending on production rate and whether capital expenditure contingencies are applied. NPV is significantly worsened after applying the conservative capex contingencies recommended by MEC Mining, but even these models break-even at coal prices within the range from about US\$75 – US\$85/tonne. We note current benchmark thermal spot prices are around US\$100/tonne, but this is due to a temporary demand/supply imbalance.

The Commercial Viability Assessment (CVA) concluded that “subject to coal price, the Hawkins-Rumker area does contain coal resources that could support a viable mining feasibility and development project.”

Most logical use of the resource would be as a single strategic release area, where the long-term mine life is of strategic importance. However, the resource size could support two separate operations. Hawkins-Rumker contains sufficient resources for an 83-year mine life in the ‘mid-case’ scenario outlined in the CVA. This is a significant long-life underground resource that may offer strategic value beyond the NPV outlined to end-users such as international or domestic electricity providers.

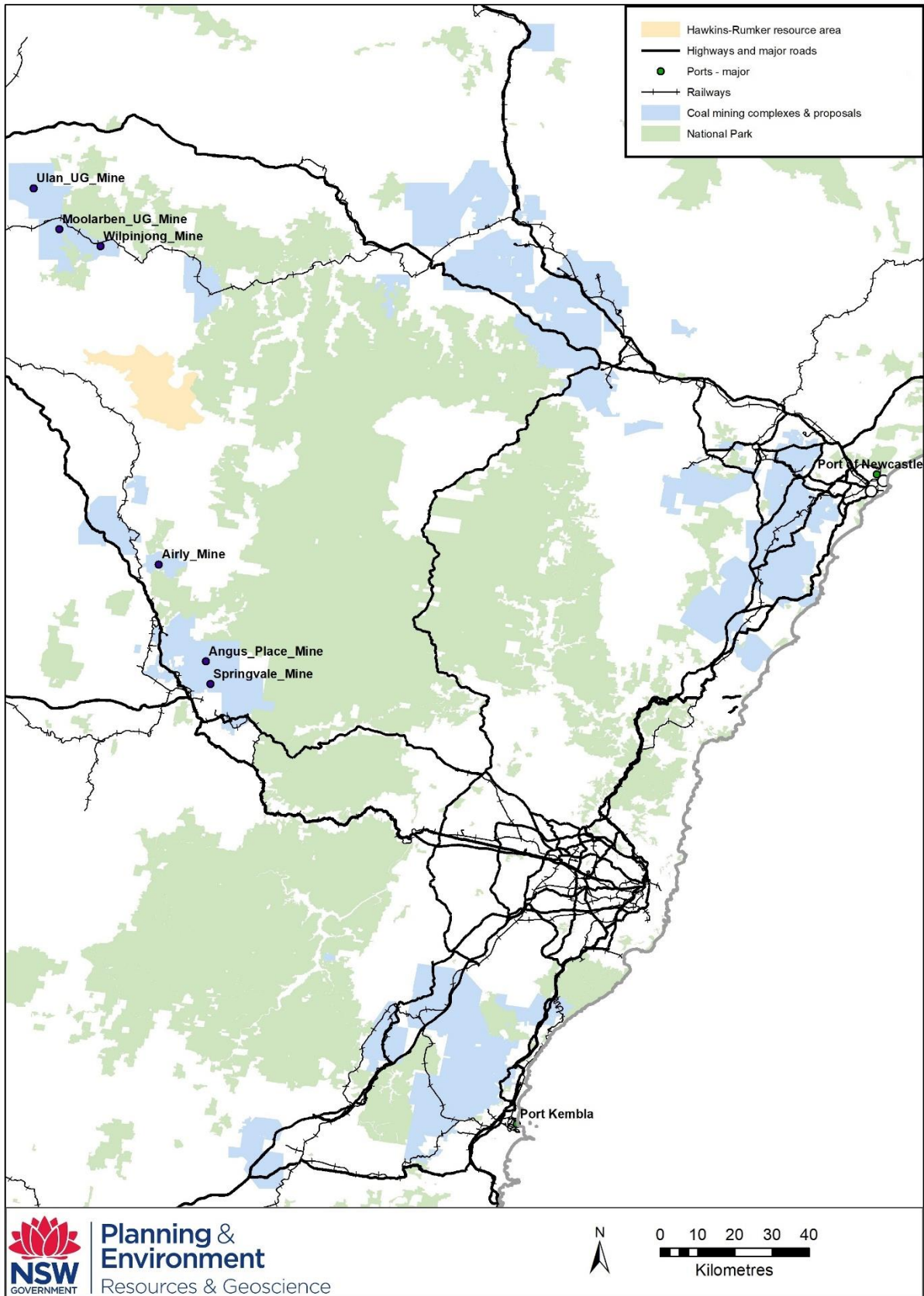


Figure 2 – Hawkins -Rumker general location.

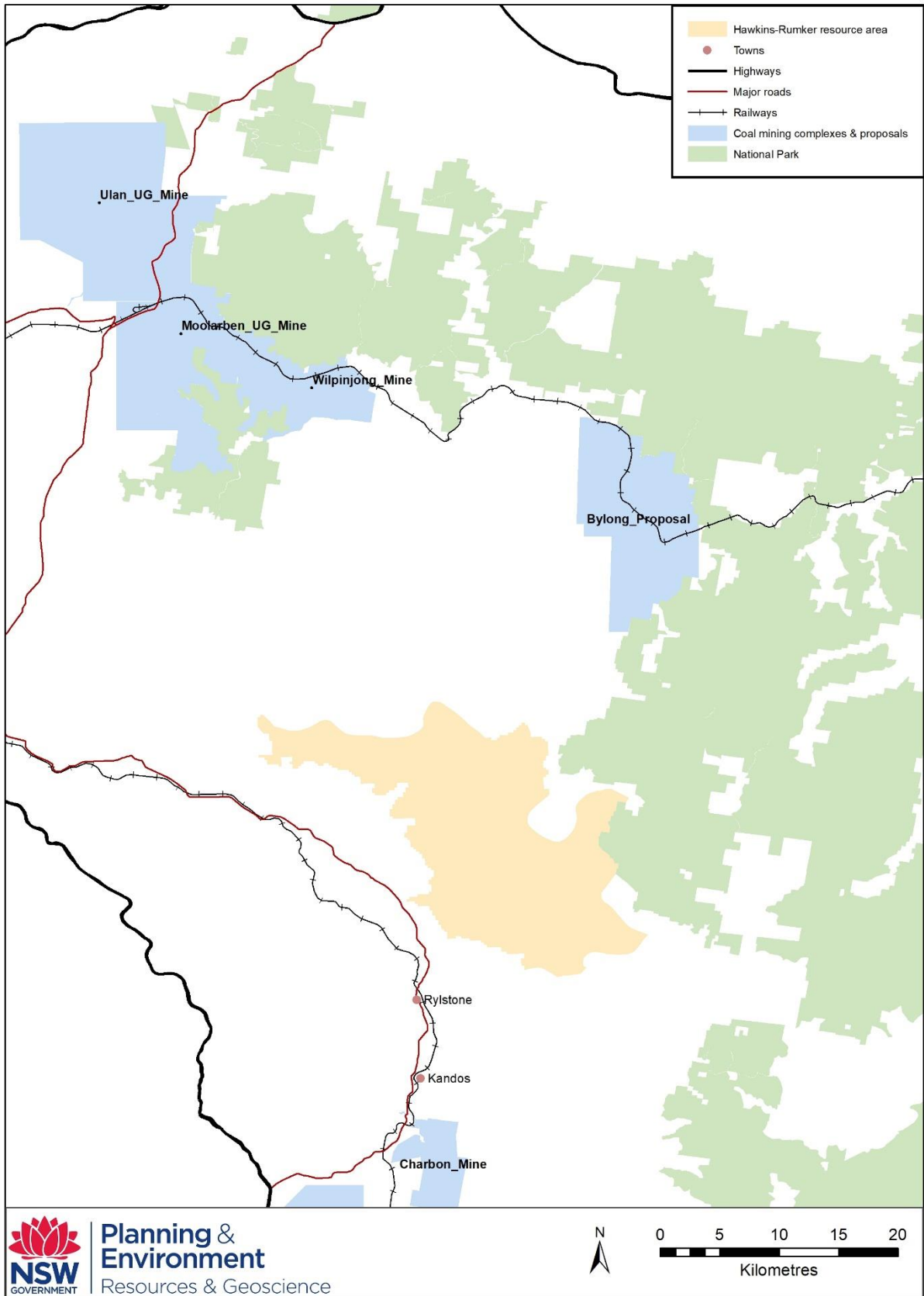


Figure 3 - Hawkins-Rumker area showing nearby coal operations and resource areas

***Appendix A – Hawkins Rumker Resource  
Assessment Template***

Factor	Issue	Considerations	Rating [DRE to tick one in each column]	Comments
Data	Data density and veracity	Is the data sufficient to define the resource and inform decision making?	<input type="checkbox"/> Data is sufficient. <input checked="" type="checkbox"/> Data is sufficient in most areas. <input type="checkbox"/> Data is insufficient. <input type="checkbox"/> No resource potential exists.	<ul style="list-style-type: none"> <li>The further exploration work required presents some exploration risk that would be factored into potential tender applications.</li> </ul>

**Continue Resource Assessment if 'data is sufficient'.**

Resource body characteristics	Resource type	What is the likely market/utilisation?	<input type="checkbox"/> Majority export metallurgical/PCI coal. <input checked="" type="checkbox"/> Majority export thermal coal. <input type="checkbox"/> Majority domestic thermal coal.	<ul style="list-style-type: none"> <li>Suitable for 100% export thermal coal. Could also meet domestic thermal coal markets if necessary.</li> </ul>
	Resource quality	Does quality meet the likely market/utilisation?	<input checked="" type="checkbox"/> Coal quality would meet market specifications (nominate specifications). <input type="checkbox"/> Coal quality would unlikely meet market specifications. <input type="checkbox"/> Majority domestic thermal coal.	<ul style="list-style-type: none"> <li>Two products are viable that meet Newcastle export thermal coal specifications.</li> <li>For the Hawkins deposit this is the Newcastle 5500 GAR High Ash export thermal coal benchmark (direct ship/Run-of-mine product). For the Rumker deposit this is the Newcastle 6300 GAR Low Ash export thermal coal benchmark as a washed product.</li> </ul>
	Resource size	What is the resource size?	<input checked="" type="checkbox"/> Likely sufficient to support multiple stand-alone operations. <input checked="" type="checkbox"/> Likely sufficient to support a stand-alone operation. <input type="checkbox"/> Unlikely to support a stand-alone operation. Viability dependent on adjoining coal operations/resources.	<ul style="list-style-type: none"> <li>Sufficient resources for an 83-year mine life for the 'mid-case' scenario. This is a significant long-life underground resource.</li> <li>Most logical use of the resource would be as a single strategic release area, where the long-term mine life is of strategic importance. However, the resource size could support 2 separate operations.</li> </ul>
	Geological resource constraints	Do other geological considerations impact the potential development of the resource?	<input checked="" type="checkbox"/> No significant resource constraints identified. <input type="checkbox"/> Resource constraints are identified. <input type="checkbox"/> Resource constraints indicate significant hurdles must be overcome if mining were to proceed in the future.	

Ease of access	Existing infrastructure	Suitability of roads, power, water and outbound logistics (rail or road)	<input type="checkbox"/> Would require little or no change to existing infrastructure. <input type="checkbox"/> Would require some upgrade to existing infrastructure or minimal/moderate new infrastructure. <input checked="" type="checkbox"/> Would require provision of new infrastructure with high capital cost.	<ul style="list-style-type: none"> <li>• ~7 km rail spur required to join the Rylstone-Mudgee rail line.</li> <li>• Significant capital costs associated with water and electricity supply to the mine.</li> </ul>
	Proximity to existing operations	Ability to share or leverage infrastructure of existing operations	<input type="checkbox"/> Yes. Within trucking or conveying distance for run of mine or sequential operations. <input checked="" type="checkbox"/> Possibly. Established mining district with local labour and service industry. <input type="checkbox"/> No, or a new mining district.	<ul style="list-style-type: none"> <li>• No synergies with adjacent operations. The Charbon mine to the south is now closed and the Ulan, Moolarben and Wilpinjong mines to the north are not sufficiently close to offer infrastructure synergies.</li> <li>• This region hosts an established work-force with underground coal mining experience</li> </ul>
	Capital costs	What style of operation would the resource support and what are the likely capital costs and lead times?	<input type="checkbox"/> Potential open cut operations with surface coal seams or underground operation with easy access, low capital and earliest product to market. <input type="checkbox"/> Potential open cut operations starting with shallow coal seams or underground operations requiring medium capital outlays and a 3 to 5 year lapse before product to market. <input checked="" type="checkbox"/> Potential open cut operations with deep coal seams, so would incur large pre-strip, or underground operations that would require significant capital outlays and over 5 years lapse before product to market.	<ul style="list-style-type: none"> <li>• Minimal development costs to access the shallow coal resources.</li> <li>• Significant capital costs associated with developing a new resource area without adjacent mining operations.</li> <li>• Estimated ~6 years development timeframe from project approval.</li> </ul>
	Distance from port or domestic market	How far is the resource from port or a domestic market?	<input type="checkbox"/> Close and established. <input checked="" type="checkbox"/> Medium and/or mostly established. <input type="checkbox"/> Far and/or not yet established.	<ul style="list-style-type: none"> <li>• Newcastle Port is ~350km via the Rylstone-Mudgee then Sandy Hollow-Gulgong then Main North Railway line.</li> <li>• ~7 km rail spur required to join the Rylstone-Mudgee rail line.</li> </ul>

Market characteristics	Customer demand		<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Customer demand for coal of this quality is high.</li> <li><input type="checkbox"/> Customer demand for coal of this quality can be generated.</li> <li><input type="checkbox"/> Customer demand is low.</li> </ul>	
Preliminary commercial viability assessment	Likely commercial viability as a stand-alone operation	At long term consensus prices is the resource likely to support a commercially viable stand-alone operation?	<ul style="list-style-type: none"> <li><input type="checkbox"/> Project is financially robust.</li> <li><input checked="" type="checkbox"/> Project is marginal.</li> <li><input type="checkbox"/> Project is not commercially viable.</li> </ul>	<ul style="list-style-type: none"> <li>• Economically viable at current coal prices. Long term prices at US\$65/tonne show negative NPV at a 10% discount rate.</li> <li>• Long term mine life could be of strategic importance to potential investors.</li> </ul>
Other strategic matters	Existing land uses (to be further considered by DPE in its strategic issues assessment)	Are competing land uses likely to impact on the resource?	<ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Existing land uses would not impact extraction of the resource.</li> <li><input type="checkbox"/> Existing land uses would have some impact on extraction of the resource but could be managed.</li> <li><input type="checkbox"/> Existing land uses would likely prohibit extraction of the resource.</li> </ul>	<ul style="list-style-type: none"> <li>• Most land is owned by the Crown. No CIC present. Mostly small acreage farming.</li> <li>• Limited subsidence sensitive infrastructure.</li> </ul>
<i>Note that some of these issues will be further or more fully considered in DPE's strategic issues assessment</i>	Environment/hydrology	Are there any environmental/hydrological constraints to the resource and are they likely to prohibit resource extraction?	<ul style="list-style-type: none"> <li><input type="checkbox"/> Yes. Environmental constraints are likely.</li> <li><input type="checkbox"/> Some constraints that could be managed.</li> <li><input checked="" type="checkbox"/> No.</li> </ul>	<ul style="list-style-type: none"> <li>• No BSAL.</li> <li>• Limited subsidence sensitive environmental features such as rivers and cliff lines.</li> </ul>
	Accessibility to market		<ul style="list-style-type: none"> <li><input type="checkbox"/> Product can be delivered with no hindrance.</li> <li><input checked="" type="checkbox"/> Product can be delivered but with some issues.</li> </ul>	<ul style="list-style-type: none"> <li>• Established transport infrastructure and nearby port with capacity.</li> <li>• Potential issues with raiing coal through Mudjee.</li> </ul>

		<input type="checkbox"/> Product can only be delivered with major changes.
Other constraints and critical risks	Are there any other constraints that would prohibit or restrict further exploration or future extraction of the resource?	<input type="checkbox"/> Yes. <input type="checkbox"/> Possibly. <input checked="" type="checkbox"/> No.