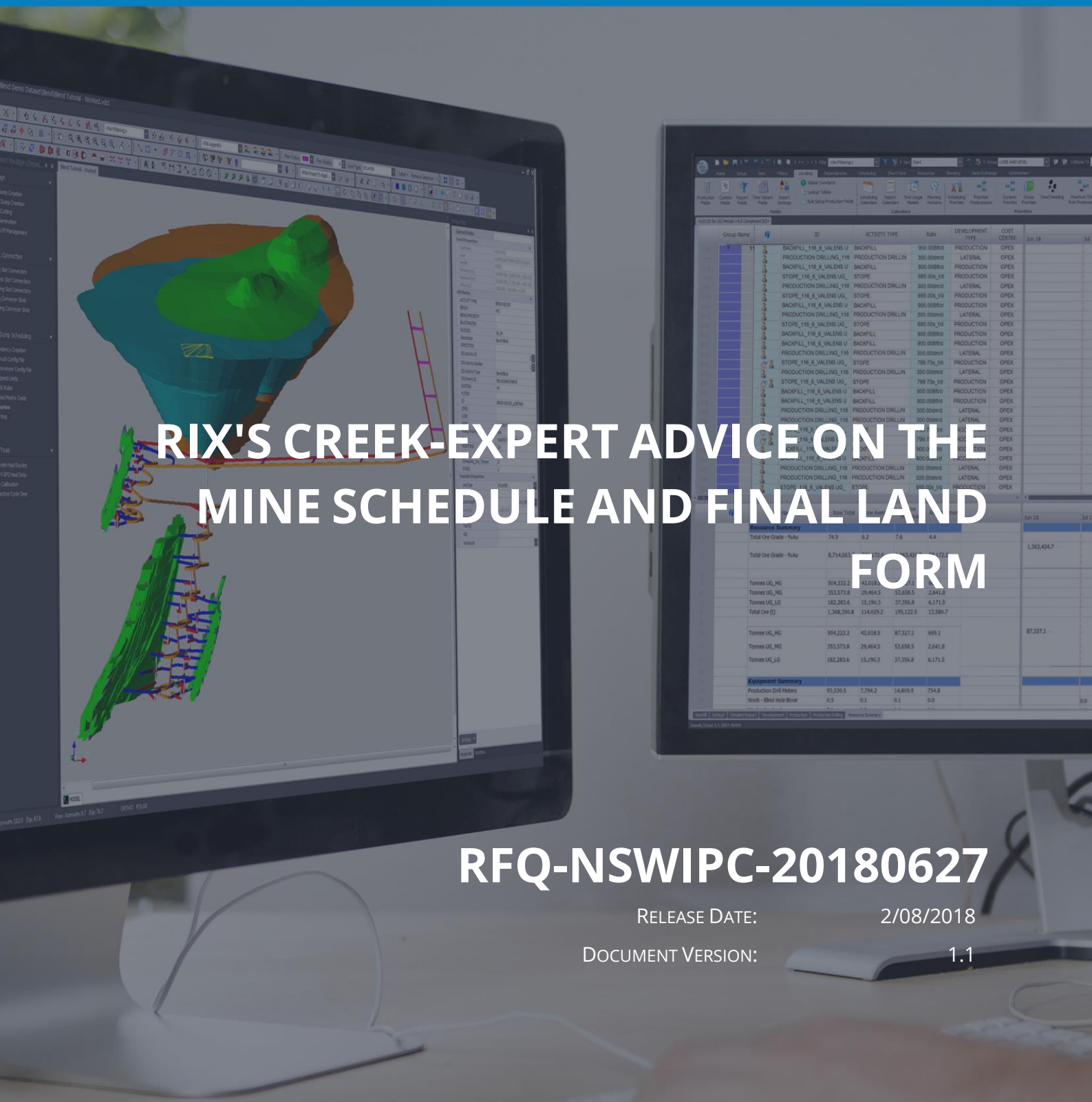




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NSW INDEPENDENT PLANNING COMMISSION



RIX'S CREEK-EXPERT ADVICE ON THE MINE SCHEDULE AND FINAL LAND FORM

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RELEASE DETAILS

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EXECUTIVE SUMMARY

On 12 December 2017, the NSW Minister for Planning asked the NSW Independent Planning Commission (IPC) to carry out a review of the Rix's Creek Coal Mine Extension Project and hold a public hearing during the review.

The Commission sought the services of a qualified consultant to provide expert advice on the mine schedule and final landform aspects of the project. The NSW IPC has subsequently asked Deswik to conduct an independent high-level review of the Rix's Creeks submission. An analysis was requested to assist the Commission in determining if the mine plan has achieved the following final landform objectives:

- minimise out-of-pit dump requirements, spoil re-handling and haulage
- minimise final pit void size
- planning for closure.

The analysis was conducted using data provided by The Bloomfield Group, and was comprised of:

- Block layout – Minescape blocks file containing reserving lines
- Constraints – polygons indicating exclusion/stand off areas
- Disturbance polygons – polygons indicating rehab and disturbance
- Final surface – rehabilitated surface
- Haulage – haulage strings
- Schedule – Excel schedule of quantities
- Structural geological model – coal structure grids
- Stage plans
- Topography surfaces
- Swell factor – 25% .

The analysis outcomes were:

1. Increasing the batter angle of the West Pit Out of Pit Dump from 10 degrees to an arbitrary maximum of 18 degrees would reduce the new land disturbance by 17ha.
2. The West Pit Out of Pit Dump is not required if the North Pit Dump height is increased from 145RL to 160RL and the South Pit Dump height is increased from 117RL to 140RL. Although this would re-disturb 110ha of previously rehabilitated land in the North Pit Dump, the new land area disturbed would reduce by 108ha.
3. No practical and economic means to significantly reduce the size of the final void could be identified.

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1. INTRODUCTION

Rix's Creek is an open cut mining operation located 5 kilometres northwest of Singleton. The first coal was produced in 1990 and the mine continues to produce both thermal coal and high quality, semi-soft coking coal for overseas and domestic customers.

The mining technique is a multi-seam bench system which mines up to nine seams and splits. The mine utilises a range of heavy earthmoving equipment for overburden removal and coal movement. Run of Mine (ROM) coal is processed by the onsite Coal Handling and Processing Plant.

On 27 October 2015, the Bloomfield Group (Bloomfield) lodged a State significant development application for the continuation of mining at Rix's Creek. The application seeks to extend open-cut mining at Rix's Creek Mine until approximately 2038 to facilitate the production of an additional 25 million tonnes (Mt) of product coal.

1.1. BACKGROUND

On 12 December 2017, the NSW Minister for Planning asked the NSW Independent Planning Commission (IPC) to carry out a review of the Rix's Creek Coal Mine Extension Project and hold a public hearing during the review.

The Commission sought the services of a qualified consultant to provide expert advice on the mine schedule and final landform aspects of the project. The NSW IPC has subsequently asked Deswik for a proposal to conduct an independent, high-level review of the Rix's Creeks submission to identify potential opportunities to improve the final landform outcome by minimising out of pit dump and final void outcomes.

2. SCOPE OF WORK

The analysis scope was to evaluate the *Rix's Creek Mining Options Strategy Review, June 2015* (Clark Davis Consulting), *Rix's Creek Mine West Pit – Free draining backfilled mine final landform, June 2018* (Clark Davis Consulting) and additional data provided, including:

- the mine design, production profiles and stage plans, and
- review of and comment on the options analysis provided in the two reports; and
- make recommendations for the Commission to consider.

The evaluation is to be high level, and should help the Commission to establish whether the mine has achieved its stated final landform objectives, which include:

- minimising out-of-pit dump requirements, spoil rehandling and haulage;
- minimising final pit void size; and
- planning for closure.

3. KEY CONSTRAINTS

The IPC provided key constraints for the analysis:

- Maximum dump height of RL160
- Final slopes <18 degrees arbitrary maximum, 10 degrees ideal
- Maintain extraction rates .

The conducted analysis did not exceed the provided constraints.

4. DATA RECEIVED

The following data was requested by Deswik and provided by Bloomfield:

- Block layout – Minescape blocks file containing reserving lines
- Constraints – polygons indicating exclusion/stand off areas
- Disturbance polygons – polygons indicating rehab and disturbance
- Final surface – rehabilitated surface
- Haulage – haulage strings
- Schedule – Excel schedule of quantities
- Structural geological model – coal structure grids
- Stage plans for:
 - 2023
 - 2026
 - 2030
 - 2035
 - 2042
- Topography surfaces:
 - 2012
 - 2018
- Swell factor – 25% .

5. OUT OF SCOPE ITEMS

The following items were specifically out of scope for this analysis:

- Geomorphic design
- Landform evolution modelling and erosion / deposition analysis
- Drainage analysis
- Slope stability assessment of any of the proposed waste landforms or pit walls
- Re-scheduling of pit production
- Sensitivity analysis of inputs
- Reconciliation or challenge of input assumptions around material swell or slope angles .

6. METHODOLOGY

An initial volume comparison was conducted to ensure the forecasted waste volume corresponded to the designated dump designs using the 25% swell factor. It was confirmed that sufficient dump volume was available, the next stage involved simulating the mine progression.

	Volume
Insitu Waste	274,425,422 (bcm)
Swelled	343,031,778 (lcm)
Designed Dump Volume	345,747,737 (lcm)
Available Dump Volume	+2,725,960 (lcm)

Table 1 - Volume Comparison

To simulate the mine progression, mining reserves were re-generated as representative solids. Using the supplied mining schedule, the West Pit and North Pit mining sequence was able to be visualised. The visualisation was used as the basis of the analysis and correlated to the provided stage plans.

The layout of the various pits and dumps is shown in Figure 1.

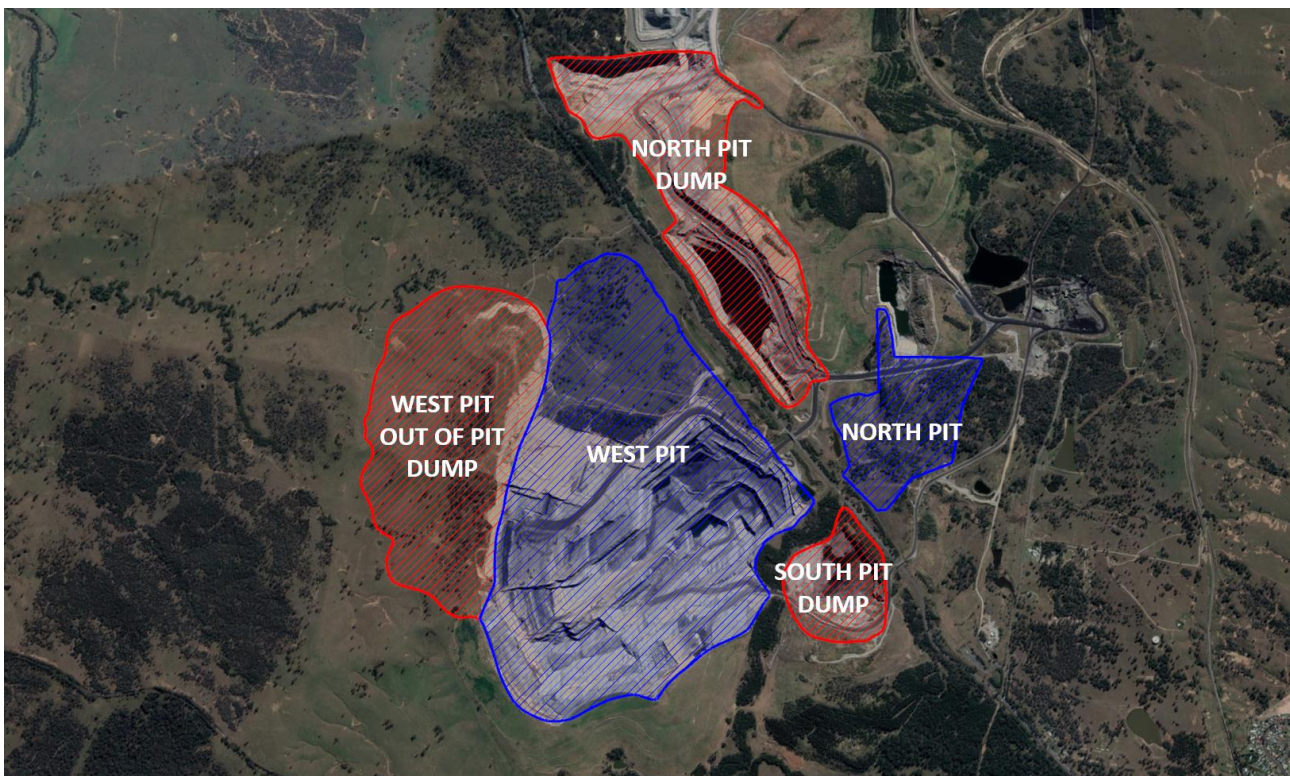


Figure 1 - Pit Layout

7. FINDINGS

7.1. DISTURBED AREA

The analysis assessed the current out of pit dump (OOPD) designs and the provided key constraints to identify opportunities to reduce the amount of land disturbed.

7.1.1. FINAL DUMP SLOPE ANGLES

The current West Pit OOPD is designed with a volume of 21M loose cubic metres (lcm) with a final slope angle of 10 degrees, which is defined as “ideal” in the provided key constraints. Increasing the final slope angle to 18 degrees while maintaining the current dump volume would reduce the footprint of the dump from 108 hectares (ha) to 92 ha, thereby reducing the total land area disturbed. Figure 2 shows the potentially undisturbed area (highlighted in yellow, 16 ha) if the final dump slope is increased to 18 degrees.

The proximity of Deadman’s Gully directly to the north of this dump, a range of controls would be required and are subject to further work (landform evolution modelling) to ensure a safe, stable landform is designed and achieved. This modelling was out of scope for our analysis.

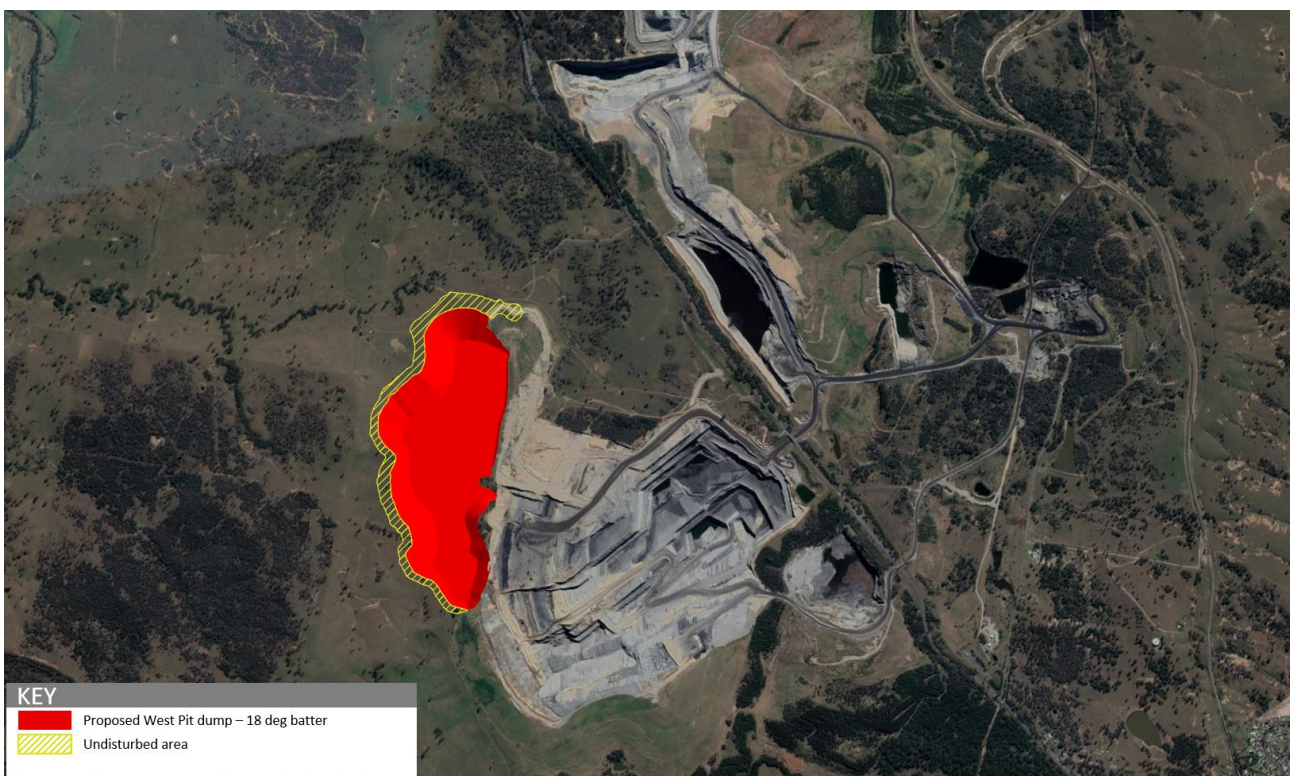


Figure 2 - Reduced Disturbed Area in West Pit OOPD

7.1.2. DUMP HEIGHTS

The North Pit Dump has been dumped to 140RL to blend in with local topography. Increasing the dump height to the permitted limit of 160RL would increase the capacity of the dump by 20Mlcm. The additional dump capacity would offset the extents of West Pit OOPD.

To increase the height of the dump, 110ha of previously rehabilitated area to the east of the dump would need to be re-disturbed (Figure 3). This option is therefore a tradeoff between disturbing undisturbed land and disturbing previously rehabilitated land. It is not anticipated that hauling to the North Pit Dump would increase haulage costs significantly but is recommended that this is evaluated in future work.



Figure 3 - Effect of Increasing Height of North Pit Dump

The South Pit Dump has been dumped to 117RL to blend in with local topography. Increasing the dump height to 140RL would increase the capacity of the dump by 2Mlcm. No additional disturbance would be incurred to increase the dump height as this is currently an active dump. The additional dump capacity would eliminate the need for the West Pit OOPD. The increased dump height in the South Pit Dump is shown in Figure 4.



Figure 4 - Increased Dump Height of South Pit Dump

7.2. FINAL VOIDS

The analysis found very limited opportunity to reduce the final void through changes to mine schedule or operations. It was identified that removing the following areas from the mine schedule would reduce the final void:

1. Final two strips in the West Pit – Strips 21 and 22
2. Hebden and Lower Barrett seams

It is found that the final void was not significantly reduced by removing these two areas. Further investigation is recommended to quantify the actual reduction in final void. Not mining the Hebden and Lower Barrett seams would have an adverse effect on the project extraction rates.

8. CONCLUSION AND RECOMMENDATIONS

The high-level analysis of the Rix's Creek Mine plan did not reveal any fatal flaw with the current plan.

Opportunities to reduce the amount of disturbed land were identified:

1. Increasing the final slope angle of the West Pit OOPD from 10 degrees to 18 degrees would reduce the new land disturbance by 17ha.
2. Increasing the North Pit Dump height to 160RL would re-disturb 110ha of previously rehabilitated land and offset 20M lcm of the West Pit OOPD.
3. Increasing the South Pit Dump height to 140RL in conjunction with the North Pit Dump height increase, would eliminate the requirement for the West Pit OOPD, resulting in 108 ha of undisturbed area.

No practical means to significantly reduce size of the final void were identified.

It is recommended that:

1. Landform evolution modelling is conducted to ensure a safe, stable landform is designed and achieved for the increased slope angle of the West OOPD.
2. A tradeoff study is conducted to evaluate the North Pit Dump height options with respect to re-disturbance of previously rehabilitated area and haulage costs.
3. Further investigation is conducted to quantify the actual reduction in final void by removing the two recommended areas from the mining schedule. The effect on the project extraction rates should also be assessed.