APPENDIX B

Mine Plan Justification

ASTON RESOURCES

Maules Creek Coal Project

Mine Justification

2011

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Executive Summary

The purpose of this Mine Plan Justification document is to describe the process utilised by Aston Resources' in determining the ultimate mine plan for the Project. The development of the preferred mine plan included the consideration of the following items:

- Resources definition - Pit limits and coal resource boundaries;
- Mine sequencing;
- Waste dump determination – Northern Overburden Emplacement Area (NOEA) and in-pit dumping; and
- Completion of mining – final landform.

The Final Mine Plan for the Project was developed utilising contemporary mine planning practices that were also influenced by key environmental and social objectives. For a project to advance to the approval stage, the checks and balances listed in the paragraphs below did take place.

RESOURCE DEFINITION

The first step in the process is resource definition. The resource is explored through a targeted drilling program that intersects geological targets and provides data for use in geological modelling. Geologists review the data collected from the drilling program and laboratory analysis of the geological samples is undertaken to complete an unconstrained geological model. This model describes a coal resource that can be then be used to confirm a coal reserve, which is a resource with a mine plan to enable it to be mined.

GEOLOGICAL MODEL

The geological model is then provided to a qualified mine planning engineer (Mine Planner). The Mine Planner develops a number of mining plans using different constraints to model different economic or predicted scenarios.

Each of these constraints is usually based on an economic variable or practical mining constraints such as the minimum mineable coal seam. Once the reserve has been determined commercially viable to the Joint Ore Reserves Committee (JORC) standards, a mine plan then can be developed.

MINE PLAN

Mine planning can then commence with the first step being determination of the overall pit limits. Once this has been identified the location of the commencement of the pit development is identified which is usually dependent upon stripping ratio, depth of coal, coal quality, proximity to infrastructure, environmental concerns, location of OEA's and water management.

Once the pit shape is designed based on the above findings, the location of the ancillary infrastructure can then be determined. Infrastructure placement is then checked against the pit limits to ensure that coal sterilisation is minimised by the construction of facilities such as the Coal Handling and Preparation Plant (CHPP), Mine Infrastructure Areas (MIA) and Overburden Emplacement Areas (OEA).

The Mine Planner will then establish how much material will be required to be removed from the proposed pit to recover the target resource. This is determined by looking at such constraints as:

- Wall stability of the proposed open cut mining area, including a consideration of the inherent strength of the geological material;
- Safe working areas and distances between mining activities and pit extents;
- Coal recovery strategy; and
- Length of haul routes and angle of pit ramps using safe operational factors of hauling the material.

The modelling steps through the mining sequence with consideration of the above constraints and determines when sufficient capacity is available to accommodate in-pit dumping. The volume of overburden material generated during the initial stages of the mine plan prior to there being sufficient in-pit emplacement capacity, will determine the amount of material needed to be removed and emplaced out of pit and therefore the resulting size of the OEA.

When the volume of overburden material to be emplaced out of pit has been calculated, the next step is to find a suitable place for this material. The most suitable place for an OEA at Maules Creek is to the north west of the pit, given the location of the economic coal resource within the lease area and the location of the existing water structures.

OEA

A number of other factors were taken into account by the Mine Planner when devising the OEA landform. These factors included:

- Located within the area where current mining authorities are held by Aston;
- Shaping to be undertaken consistent with current industry standards and practices;
- Consideration of emplacement practices to minimise noise impacts to receivers;
- The height of the OEA was to be similar in height to the surrounding environment and the natural topography;
- The types of vegetation that would be impacted by the placement of the OEA , with the main focus being on the minimal impact to the Critically Endangered Ecological Community (CEEC); and
- The avoidance of disturbance to prime agricultural land.

A number of OEA scenarios were developed that took into account all of these constraints. The preferred design for the OEA was version six (**Figure 20**), which achieved an ultimate reduction in impact upon 55ha of CEEC.

During the construction of the NOEA, overburden is also scheduled to be placed back in the mining void from the second year on, however activities on the NOEA are required to be maintained until around Year 10.

During the first ten years of operation, the NOEA is under progressive rehabilitation. As a portion of the NOEA is completed and no more emplacement of overburden is required to be undertaken out of pit, the NOEA will be topsoiled and vegetated to the standards in accordance with the Rehabilitation Management Plan. The steady state mining process sees that all waste materials generated from Year 10 onwards is dumped in-pit and rehabilitated progressively.

FINAL LANDFORM

Aston will maximise opportunities for a post mining landscape that is generally consistent with pre mining land use biodiversity. Rehabilitation will be designed to achieve a standard whereby rehabilitation lands can be classified as offset land. All mine areas will be rehabilitated except for the final void which will be shaped appropriately. Four key rehabilitation domains have been identified in the rehabilitation strategy based on the Project impacts, post mine landform, future land use and biodiversity values.

The conceptual final landform for the Project has been produced in realisation that mining would continue beyond 21 years as well with the consideration of the adjacent Boggabri Coal Mine and Tarrawonga Mine.

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1 Pit Limits and Coal Reserves

Key Points
• Large well defined coal resource; • Well understood coal deposit with extensive exploration works undertaken over the last 20 years; • Relatively flat and benign coal seams, devoid of significant dips and structures; and • JORC compliant Resources and Reserves statements.

The following sections describe the process used in initially defining the Coal Resources and then converting these into Coal Reserves. The order generally follows "Table 1 - Check List of Assessment and Reporting Criteria" in The Joint Ore Reserves Committee (JORC) Code. This process includes defining viable pit limits and applying various mining methods, cost, and revenue to the Coal Resources to estimate Coal Reserves. Please note that the Coal Resource estimates were undertaken by JB Mining and the Coal Reserves Estimates were undertaken by Minarco MineConsult (MMC).

1.1 Coal Resources Estimate

The Coal Resources estimate that is used as the basis for the Coal Reserves Estimate is documented in the JORC resources statement prepared by JB Mining Services (JBMS) (2011). The Competent Person who carried out the Coal Resources estimate is Mr. Phillip Sides (JBMS). The same geological model has been used for the JORC Reserves estimate, MMC (2011). Coal Reserves quoted in this Statement are included in Coal Resources (they are not additional to the Resources).

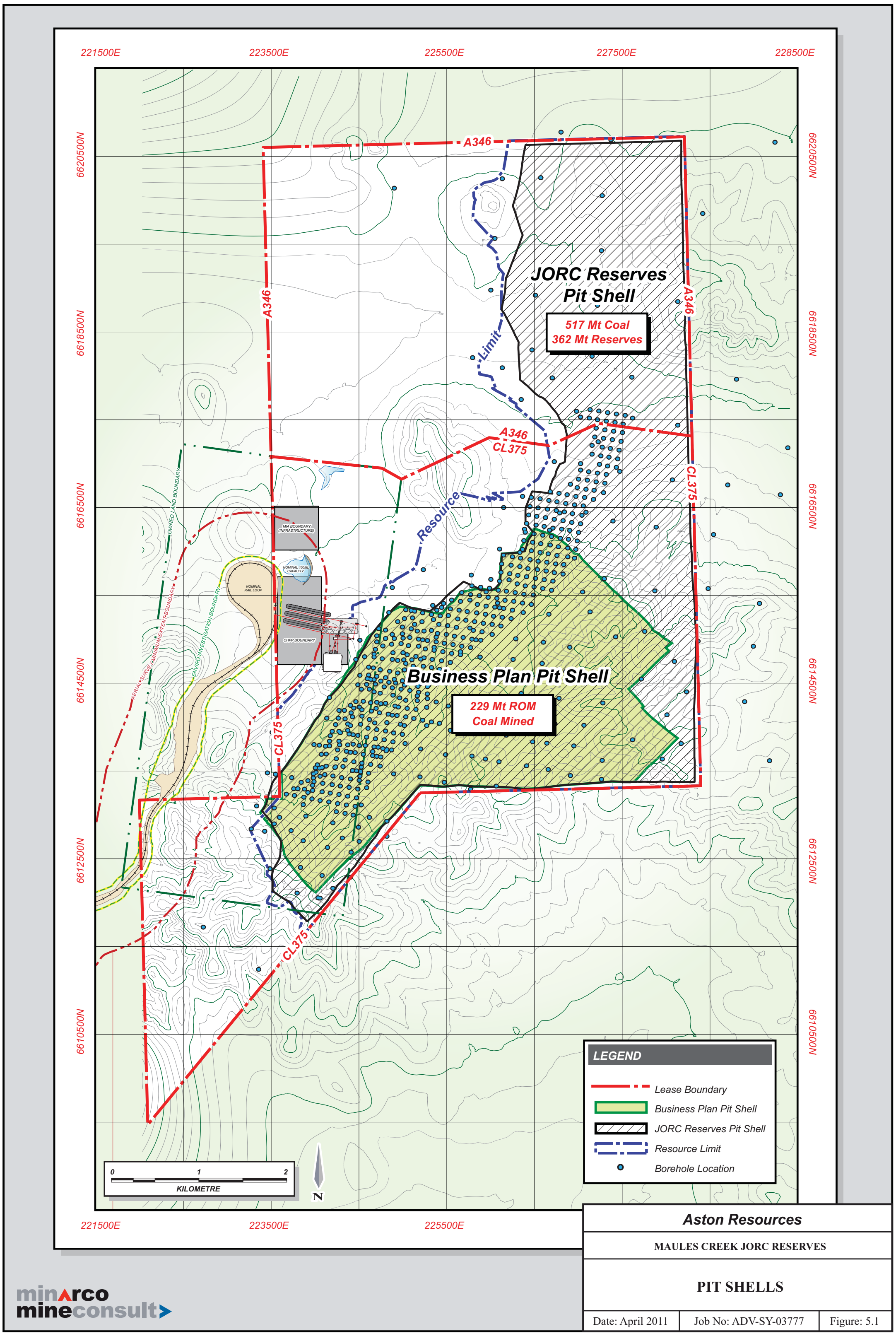
1.2 Study Status

As a result the most recent exploration works and the mine plan that was completed in April 2010. This schedule was generated using Runge XPAC, a mine database and scheduling software package. The pit shell used by Aston Resources for the 20 year mine plan (**Figure 1**) has been scheduled as follows:

- Commence waste removal in mid 2012;
- Peak production is reached in Year 5;
- 229 million tonne Run Of Mine (ROM) coal schedule;
- Average 13% ROM ash over the full mine plan; and
- Average stripping ratio of 6.4 bcm/t "insitu" ROM coal.

This JORC Reserves estimate uses similar modifying factors as the XPAC database but extends beyond the 30 year period and embraces the total lease and exploration area. Hence, the mine plan is a subset of the pit shell used for the overall JORC Reserves estimate. The 30 year mine plan concentrates on the area where there is the most economical coal which also coincides with the area of greatest Measured Resources. The 30 year Mine Plan developed by Aston Resources in April 2010 is represented by **Figure 2** to **Figure 5**, which depicts the development of the mine in five year stage plans. The JORC Reserves estimate is a much bigger pit shell which extends to the limit of economic coal. This provides information to the geologists for exploration drilling and also is part of the bigger picture strategic planning being undertaken by Aston Resources.

The Competent Person for Reserves has reviewed this mine plan and considers it to be technically achievable and viable. This has been done by reviewing all the modifying factors as well as the business plan.



Source: Maules Creek JORC Reserves, April 2011

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Figure 1 - Pit Shells

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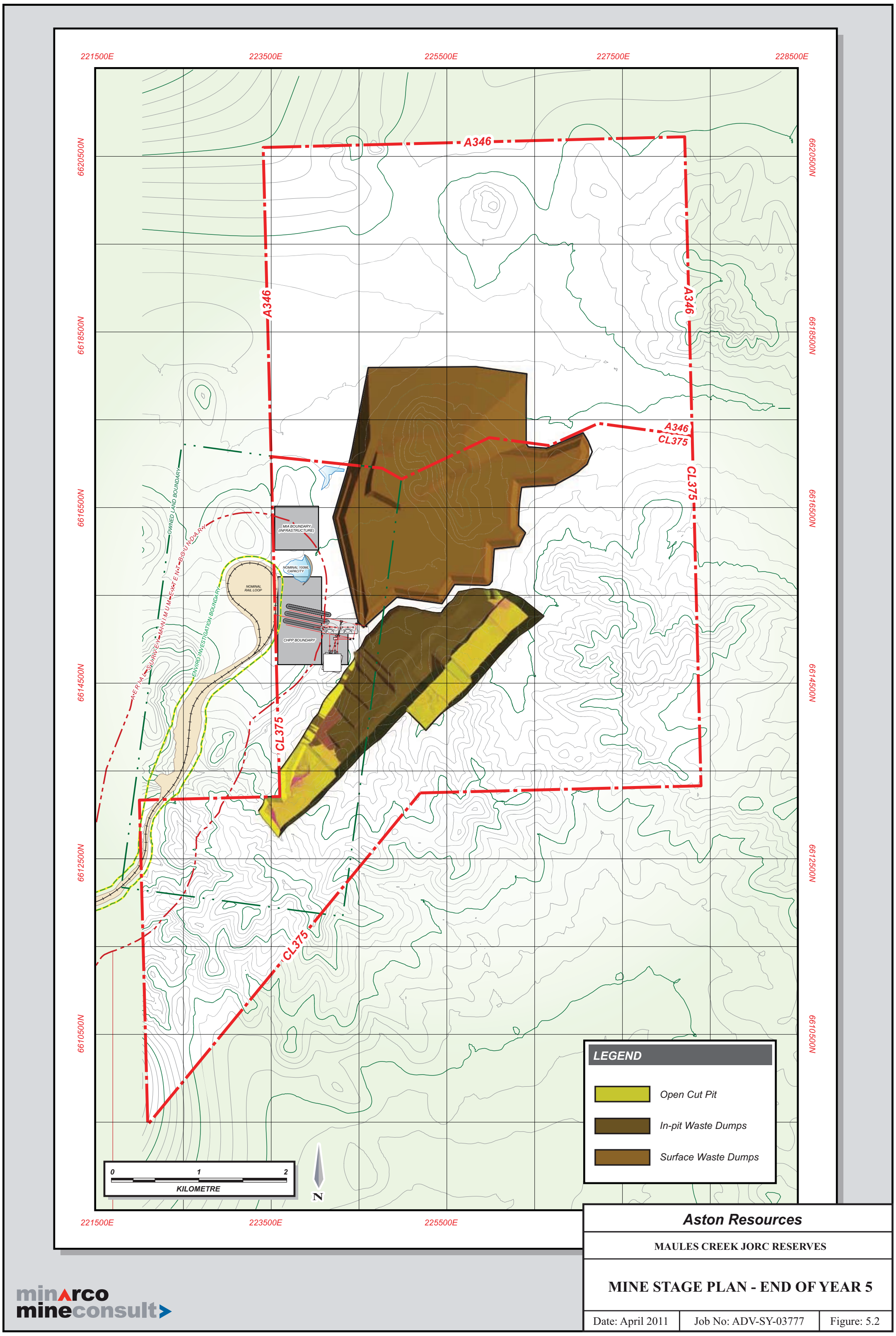

Source: Maules Creek JORC Reserves, April 2011

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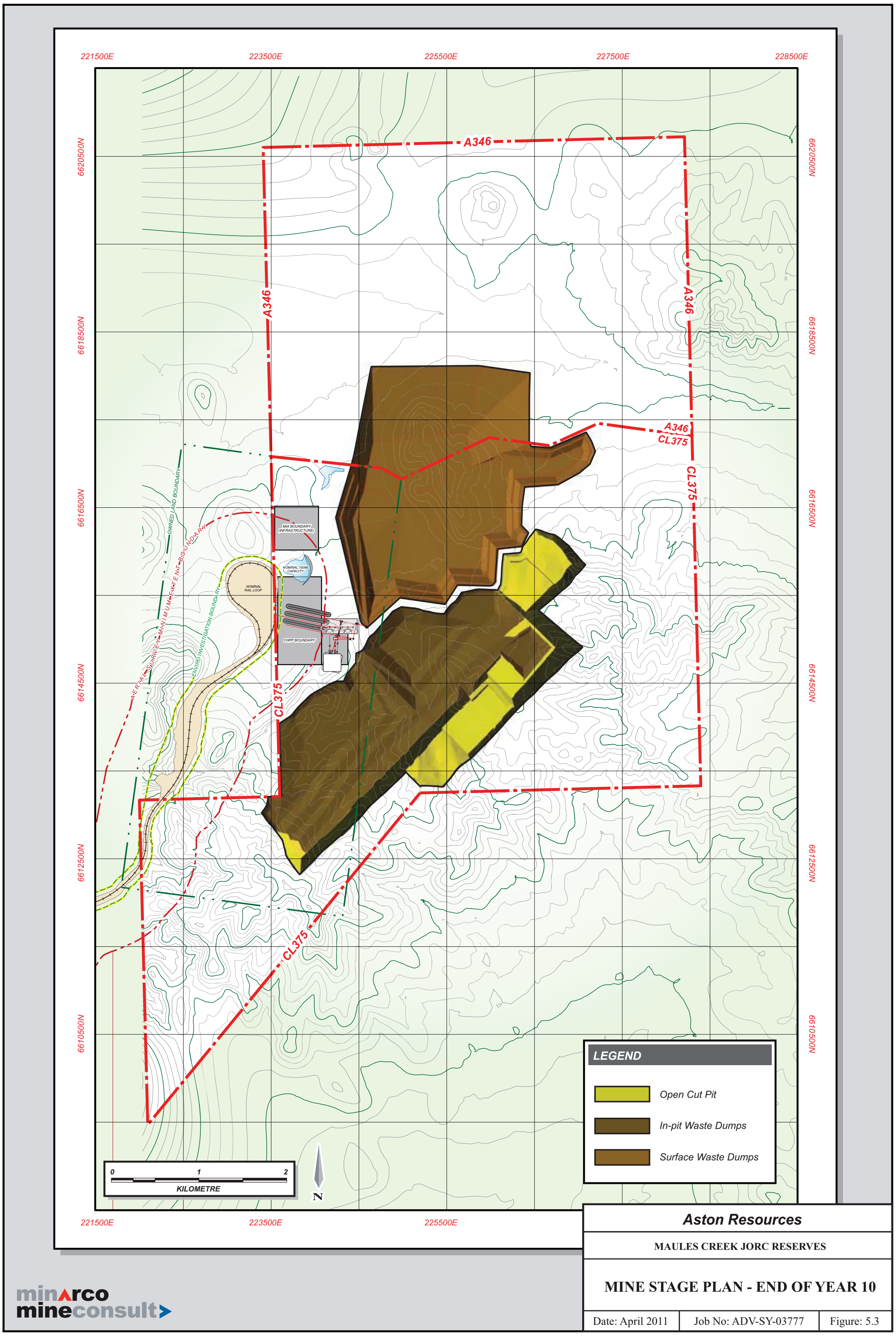
Figure 2 - Stage Plan Year 5



Source: Maules Creek JORC Reserves, April 2011

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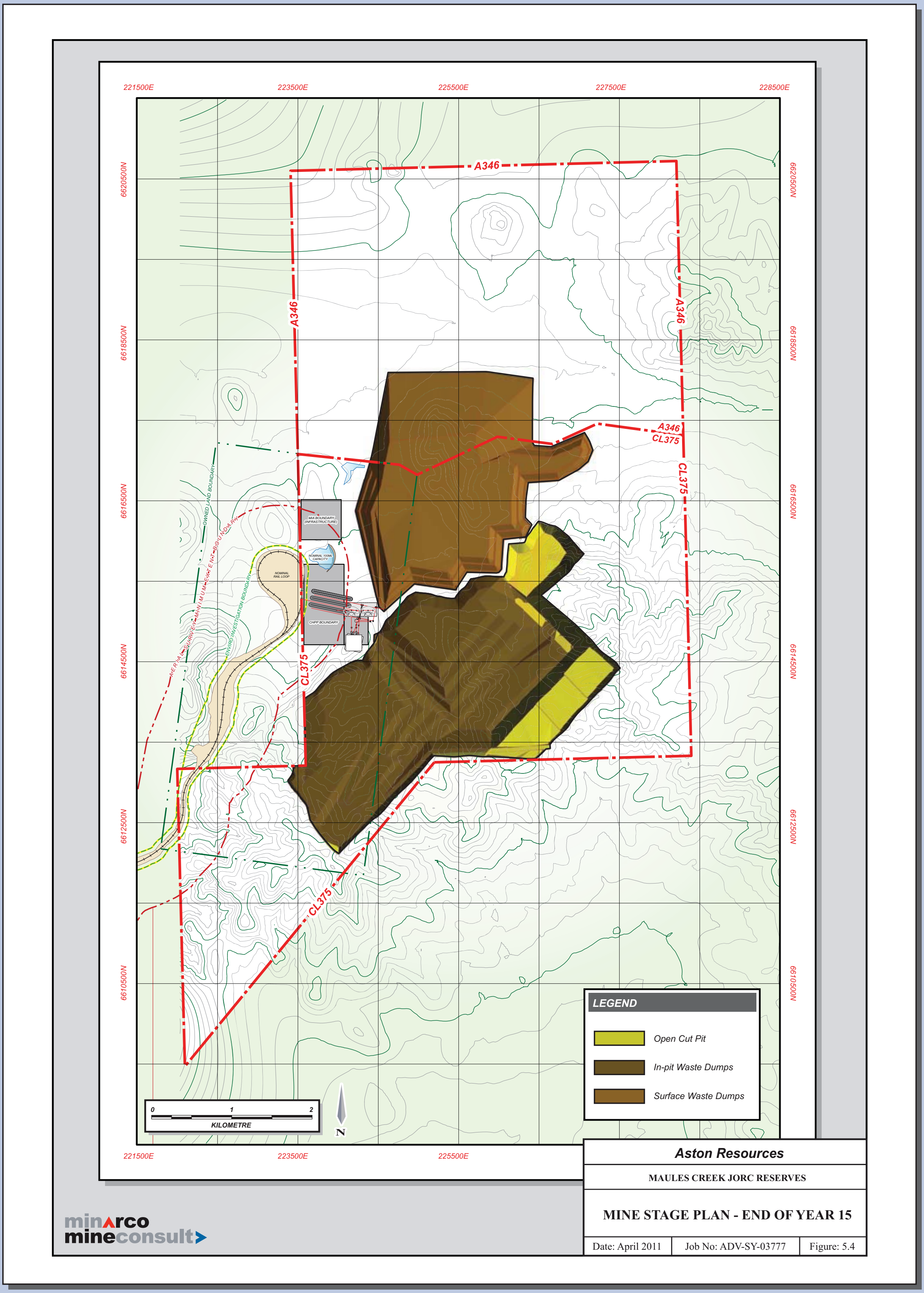
Figure 3 - Stage Plan Year 10



Source: Maules Creek JORC Reserves, April 2011

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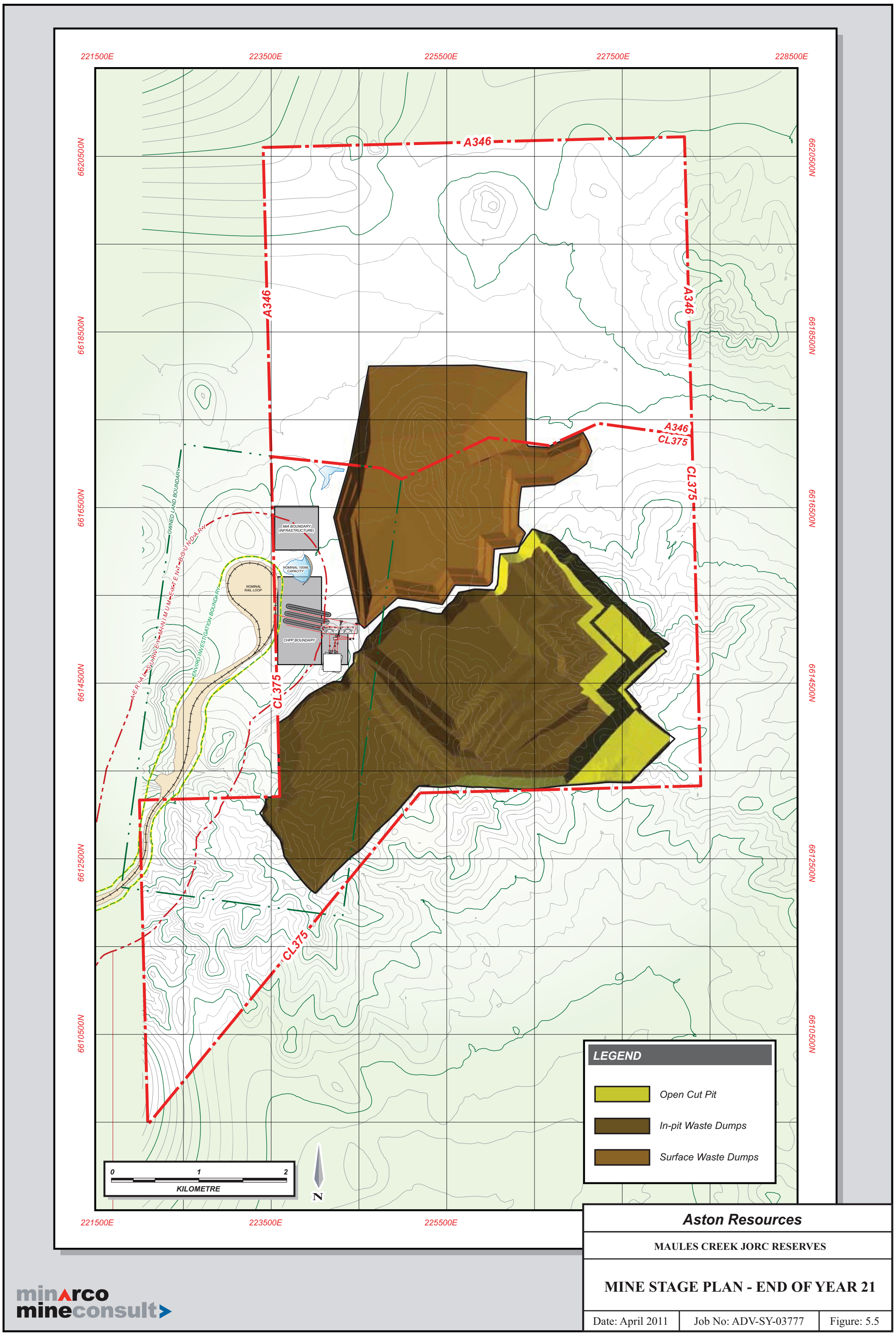
Figure 4 - Stage Plan Year 15



Source: Maules Creek JORC Reserves, April 2011

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Figure 5 - Stage Plan Year 21

1.3 Cut-off Parameters and Pit Limits

A breakeven strip ratio was estimated using costs and product assumptions as per the Aston Resources business model resulting in a strip ratio of more than 20 bcm/t ROM coal. A benchmark Thermal Coal price of $US80 per tonne at CV of 6,700 kcal/kg (gad) was used for the estimates at an exchange rate of $AUD = $USD0.75. A 3% premium was applied to the low ash thermal product and a 40% premium applied to the metallurgical coal.

A Minex Pit Optimiser was run on a more conservative energy weighted thermal revenue case to produce a set of nested pit shells and gave some clear conclusions as follows:

- Despite the lower revenues from a ‘thermal only’ case the pit limits are physical (lease boundary, subcrop and lowest seam) rather than economic. The proportion of metallurgical coal provides upside to the project but does not impact on the coal Reserves;
- The economic pit shell has 517 Mt and at an average strip ratio of 7.7 bcm/t ROM coal. All coal in the pit shell is economic as it is well below the 20 bcm/t ROM coal cut-off;
- The pit shell included all seams (down to the Templemore); and
- The pit shell included an area in the exploration lease on which there are currently no surface mining rights.

The theoretical pit shell was then adjusted to become a practical pit shell by integrating it with the 20 year mine plan and rationalising the lowwall within A346. The pit crest was offset 50 m from A346 boundary to the east and north and projected to the basal seam floor at 55 degrees. The selected pit shell is shown on **Figure 6** and labelled the “JORC Reserves Pit Shell”.

Through the application of mining factors (**Section 1.4** below), the Mineable Insitu coal within the pit shell was converted to ROM coal quantities which were then tested so that only Measured and Indicated Coal Resources were classified as Coal Reserves. The coal quantities within the Mineable Economic Pit Shell converted to a total of 517 Mt ROM coal after the application of mining factors such as loss, dilution and minimum seam thickness.

The average strip ratio is 7.7 bcm/t "ROM" coal. In the calculation of the average strip ratio, the Inferred Resources in the pit shell have not been converted to waste, which assumes that Inferred coal tonnes will be upgraded to at least indicated and will therefore become Reserves after additional exploration increases the resource confidence.

1.4 Mining Factors

Open cut mining by mining contractors, using truck and excavator is proposed. The mining method can be described as a multi-seam, moderate dip, open cut coal mine using truck and shovel equipment in a combination of strip and haulback operations.

The mining factors applied to the Coal Resource model for deriving mining quantities were selected based on the use of excavators and trucks.

1.5 Cost and Revenue Factors

Aston Resources provided a business model for the Maules Creek Project that is dated April 2010. MMC checked the mining and transport cost components for rationality against existing contracted unit rates and current known operational costs for similar size operations. These unit rates were then used to estimate the cost to deliver coal to a ship ("FOB vessel"). This allowed a breakeven strip ratio to be estimated. The following points summarise the cost and revenue factors used for the estimate:

- A benchmark coal price of $US80 per, a premium was applied to the low ash thermal product and a premium applied to the metallurgical coal. Royalty used was 8.2% of revenue, less allowable deductions;
- Variable costs for waste removal, coal mining, road transport and coal washing were derived from the April 2010 business model. The estimate took into consideration costs associated with transport, corporate and shipping;

- The breakeven strip ratio was estimated at approximately 20:1 bcm/t ROM coal for the current metallurgical and thermal coal product mix. Higher strip ratios than this would mean the mining cost is greater than revenue. The pit shell design is within this cut-off, therefore all tonnes are "economic"; and
- MMC has also completed the analysis of breakeven strip ratio based on an energy weighted export thermal revenue basis. Under these assumptions the breakeven ratio is estimated to be 14:1 bcm/t ROM coal indicating that there would be no change to the economic pit shell.

1.6 Other Relevant Factors

There are several items worth noting which may impact on the timing of the Maules Creek Project or the reserve estimate:

- CL375 needs to be renewed in 2012;
- Surface mining rights need to be obtained for Authorisation A346;
- The Maules Creek Project proposes the extraction of coal to the southwest of the current CL375 and will require a new mining lease for this additional area in this regard. For this estimate the pit crest extends beyond the current CL375 but no coal outside the CL has been included as reserves;
- An exploration drilling program has been completed in 2010 including 7 LD cores; however analysis of the results is ongoing; and
- Short Term Mine planning as part of the Feasibility Study is ongoing.

1.7 Classification

Only those portions of Measured and Indicated Resources that are within the pit shell are available for Reserves. In CL375 all coal Reserves have been classified Proved for the Measured Resources and Probable for Indicated Resources. As the level of understanding is reasonably high, there is confidence in the modelling accuracy. In A346 all Reserves are Probable due to the lack of Measured Resources and the limited mine planning that has been undertaken to date.

In the Marketable Reserves estimate only 90% of the Measured Resource has been allocated as Proved. Aston Resources has completed a drilling program in 2010 but the analysis of coal quality is ongoing. This is required to increase the confidence of the Proved Coal Reserves to be classified as Proved Marketable Coal Reserves. Inferred Resources have been excluded from the estimate of Reserves.

1.8 Audits and Reviews – JORC Code Checklist

The JORC Code provides guidelines which set out minimum standards and recommendations for the Public Reporting of exploration results, mineral resources and ore reserves. Within the code is a "*Checklist of Assessment and Reporting Criteria*". This checklist has been used as a system to undertake the review of JORC compliance.

The complete checklist is given in the JORC Reserves report, but not reproduced in this report.

A previous JORC Reserves Statement was prepared in March 2010 by Minarco Mine Consultants as the Competent Person signatory. This reported 151 Mt of Proved Reserves and 205 Mt of Probable Reserves for a total of 356 Mt of Open Cut Coal Reserves. This compares to 362 Mt of Open Cut Coal Reserves reported in this JORC Statement. Differences are due to:

- Resource polygons have changed as a result of new drilling and a review of the raw coal assay intervals. In CL375 there is both an increase in Resources and upgrading of Resources into Measured and Indicated categories;
- Adjustments to the economic pit shell design with a particular focus on the lowwall. A number of line of oxidation ("LOX") holes were drilled in 2010 to better define the western pit limit; and
- Washplant yields based on F1.60 data have been updated with data generated as part of the 2010 exploration program.

Table 1 summarises the reconciliation between the Resources estimate and the Marketable Reserves.

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Table 1 – Reconciliation between Resources and Reserves

	Million Tonnes
Resource Estimate	**679**
Losses and dilution and other modifying factors	49
Coal in batters and outside of practical pit shell	113
Economic Coal in Practical Pit Shell	**517**
Inferred coal in pit shell	155
Open Cut Coal Reserves	**362**
Coal lost in washplant process	33
Marketable Coal Reserves	**329**

Notes: Numbers have been rounded to reflect accuracy.
Moisture content varies in this Table – see text for specific details

1.9 Results

The purpose of the work was to provide an estimate of the Open Cut Reserves for the Maules Creek Project. These are presented in the following **Table 2** and **Table 3**. Reserves are rounded to reflect the accuracy of the estimates.

Table 2 – Total Open Cut Coal Reserves

	Coal Reserves (kt)		
	Proved	Probable	TOTAL
Coal Reserves	**171,100**	**190,600**	**361,700**
Marketable Reserves	**141,300**	**187,600**	**328,900**

Notes: Estimate has been rounded to reflect accuracy.
Coal Reserves are at 9% (ROM) and Marketable Reserves are at 11% (ar)

Table 3 – Open Cut Coal Reserves and Marketable Coal Reserves (kt)

	A346			CL375			TOTAL		
	Proved	Probable	Total	Proved	Probable	Total	Proved	Probable	Total
COAL RESERVE	**0**	**40,900**	**40,900**	**171,100**	**149,600**	**320,800**	**171,100**	**190,600**	**361,700**
Premium 7% Ash	0	16,200	**16,200**	70,900	81,200	**152,100**	70,900	97,400	**168,400**
Thermal 9% Ash	0	21,000	**21,000**	70,300	69,100	**139,500**	70,300	90,200	**160,500**
TOTAL Marketable	**0**	**37,300**	**37,300**	**141,300**	**150,400**	**291,600**	**141,300**	**187,600**	**328,900**

Notes: Estimate has been rounded to reflect accuracy.
Moisture is at 9% (ar) for Coal Reserves and 11% (ar) for Marketable Coal Reserves

2 Mine Plan

Key Points

- Full coaling sequence to be mined, minimising sterilisation of viable coal resource;
- Strip ratio used to determine mining sequence;
- Open cut mining methodology used;
- Efficient and contemporary diesel equipment to be used;
- Ultra class equipment being utilised where possible; and
- - Natural topography used for the placement of the ROM, MIA, CHPP and Rail facilities.

Note that in this section the words “reserves” and “reserving” are used when referring to “mineable quantities” and the “estimating of mineable quantities”. They do not refer to JORC Compliant Reserves, as reported in **Section 3** of this report.

2.1 Mine Development Strategy

2.1.1 *Approach*

Section 2.1 focuses on investigating the overall development strategy for the Maules Creel Project. The relative economics of the coal deposit are reviewed and understood in order to determine the best strategy for development. The process includes the conversion of insitu quantities within the geological model into estimates of mineable quantities after allowing for mining losses and dilution. Thereafter, the relative economics of recoverable coal quantities for the coal deposit are evaluated, taking into account process recoveries, product qualities, coal price forecasts and overall operating costs for the Maules Creek Project.

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Geological Model

Three geological models were evaluated during the initial planning process including:

- 10th July 2009 Model, prepared by JB Mining Services for Leighton Contractors;
- 14th August 2009 Model, prepared by JB Mining Services for Precision; and
- 13thNovember 2009 Model, prepared by JB Mining Services for Precision.

Precision has assumed that the models supplied by JB Mining Services represented all available coal for mining. No restrictions to coal mining have been made due to JORC compliance.

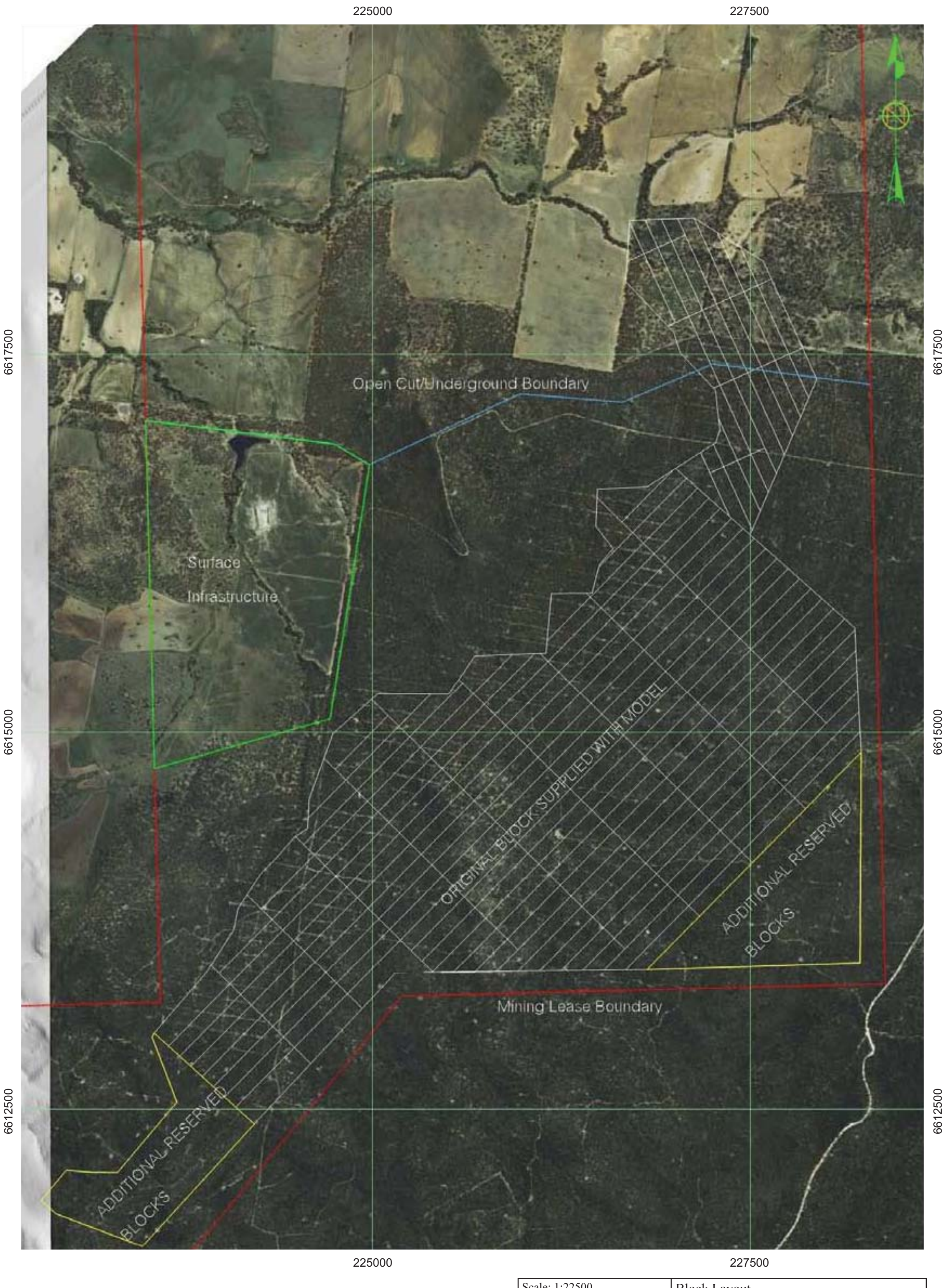
Block Layout

The block layout investigated for preliminary mine planning was adjusted by Precision to incorporate proposed additional reserves. **Figure 6** illustrates the block layout at the Braymont "E" Coal Seam floor level. In summary:

- White Blocks – Supplied with the 14th August 2009 model; and
- Yellow Blocks – Additional reserved areas based on strip ratio and discussion with Aston Resources.

2.1.2 *Block Ranking*

Block mineable quantities were developed by Precision using the block layout provided with the geological models supplied by JB Mining Services. The blocks supplied with the geological models were of dimensions 500 m long by 100 m wide. Precision reduced the length of the blocks from 500 m down to 100 m for the initial 5 strips and down to 250 m for the remaining strips. Mine reserves were completed based on these block assumptions. The block widths remained at 100 m. The purpose of this was to provide more accuracy in mine scheduling. Precision Mining supplied the Vulcan Mine planning software that was used for the generation of Mine Schedule.



Scale: 1:22500	Block Layout	
Date:	Provided + Extended	
Drawn By:	Maules Creek	Revision:
Approved By:	Aston Mining	Drawing:

Source: Mine Scheduling and Planning Report, by Precision Mining

MAULES CREEK COAL
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Figure 6 - Block Layout

2.1.3 *Pit Optimisation*

Key Points
• Utilise natural topography for sitting of facilities and disposal of wastes;
• Maximise coal recovery by mining the full coal sequence to basement;
• Commence mining at lowest possible cost and highest economic return;
• Maximise in-pit dumping effectively minimising surface waste dumping; and
• Investigate numerous waste options to minimise land disturbance footprint.

Aston Resources has used a standard mine planning approach to determining / optimising the overall mining layout and pit shell. This has involved the Vulcan Pit software to provide core guidance for establishing mining pit limits and development strategies for open cut coal mines. This software has utilised the following items:

- Maules Creek exploration data;
- Geological model:
    - Line of oxidised coal;
    - Seam limits; and
    - Waste / inter-burden sections and limits.
- Geotechnical pit wall designs;
- Strip ratio; and
- Waste dump designs.

Various mine planning scenarios have been investigated and economically evaluated.

Before Pit Optimisation, upon receiving the insitu geology model, a number of factors are applied to eventually estimate the ultimate mining pit shell. These include:

- Physical mining constraints; lease boundary, sub crop, land use and environmental impacts;

- Pit shape constraints; including primarily pit slope angles but also any possible pit floor constraints;
- Other mining factors; minimum mineable thicknesses and losses / dilutions;
- Metallurgical factors; calculation of coal products quantities and products types by applying washing yields and / or bypass rules;
- Cost factors; using project operating cost estimates (including all project costs to FOB delivery of coal if possible) and applying them as unit rates per bcm of waste and per tonne of coal, including cost adjustments for truck haulage profiles (depth and distance); and
- Revenue factors; coal prices and coal royalties.

The overall sequencing for mining at Maules Creek was undertaken by Precision Mining for Aston Resources. This was a block ranking exercise and provided guidance to define the economic pit limit and the overall sequence of the mining activity.

The following items are required to ensure the block ranking is effective. Initially the block by block analysis is done on a cookie cutter basis using the following information:

- Waste to be mined by block; and
- Coal to be mined by block:
    - Loss and dilution for the mining method associated with that block; and
    - Overall coal recoveries.

This data is then used to determine the strip ratio plots which determine the initial starting position of the pit and the overall pit shell. It should be noted that this initial stage also provides analysis for the selection and development of which mining horizon has been targeted, in the case of the Maules Creek Project, the initial strip ratios determined that the full 15 coal seams are suitable and economical to mine. It should be noted that to extract a lesser number of seams, shows a marked increase in strip ratios and therefore changes the pit economics accordingly.

Further analysis is done on the blocks such as:

- Inter-block relationships:
  - Overburden in advance – effective lay-back of the advancing face to allow safe and efficient operations;
  - Ramp placement – locality of long term ramping for efficient haulage of the 15 coal seams and associated waste materials;
  - NOEA placement – providing effective standoff to working areas, whilst providing operational room for the OEA placement;
  - Working faces – logical development of the 15 coal seams / waste mining intersections;
  - Working room – bench space required to enable safe and efficient operations; and
  - Pit development strategy – direction of working and development of overall in-pit ramping.

Only once these relationships are developed can the most efficient mining method and mining sequence be developed. From these optimal mining sequences, the respective yearly volumes of waste and coal are determined. Various mine planning options have been considered by Aston Resources for the Maules Creek Project to determine the optimal plan whilst delivering minimal impacts.

After selection of the pit shell and the mining sequence by Aston and JB mining, MMC uses the Minex Pit Optimiser software ("Optimiser") to provide two outcomes. One of which was the JORC Reserve Estimates and the second to determine total mineable Pit Shells. The Optimiser approach is to apply all the factors and constraints described and run the software to generate a graphical illustration of optimised mining pits and related tabulation of quantities and costs. The Optimiser determines the maximum size pit that can be mined until the final walls represent marginal or breakeven material.

Based on these inputs the Optimiser interrogates the geological seam model, or the adjusted mining working section model, on a block by block basis. Pit slope criteria are then applied to determine which blocks must be mined to uncover subsequent blocks and the Optimiser uses these block relationship rules to determine which blocks lie at the breakeven point for mining. These blocks then represent the maximum pit shell that can be mined, noting that no allowance is made for capital, financing, escalation, or similar non-cash cost drivers.

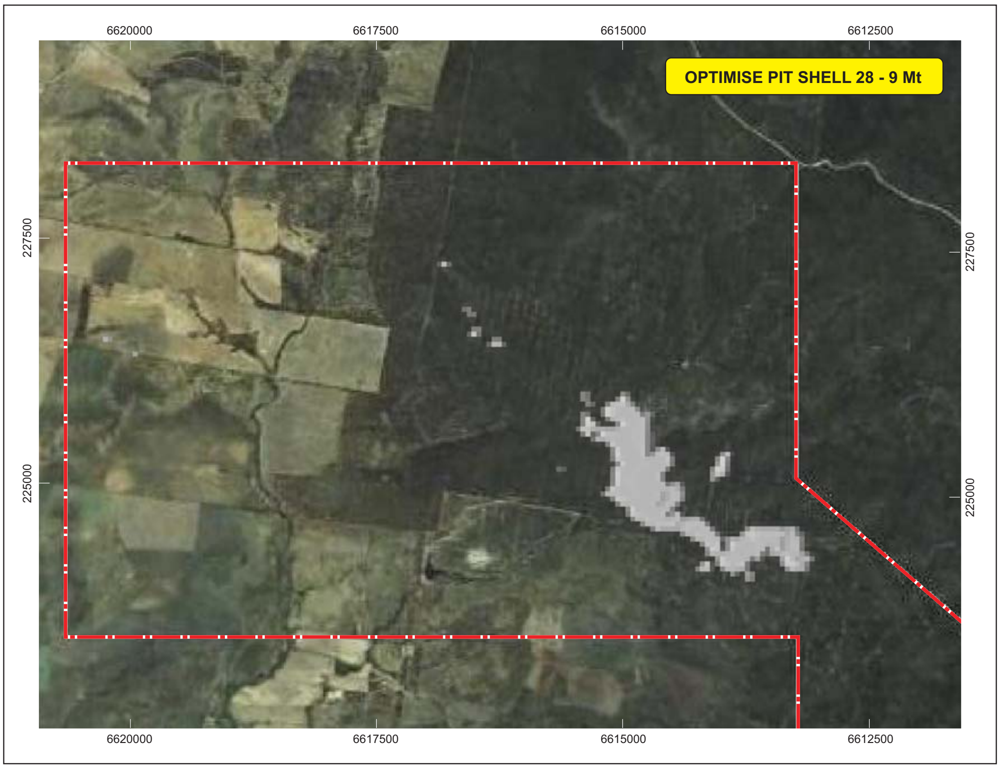
However, although the nested pit shells are a good indicator of the mine development strategy, other factors such as blending, dumping, mine drainage and mine production requirements also need to be considered. Similarly, the interaction with the proposed operations and infrastructure such as the railway, industrial area and township should be considered. In the case of Maules Creek, limited waste dumping space may also influence the development sequence.

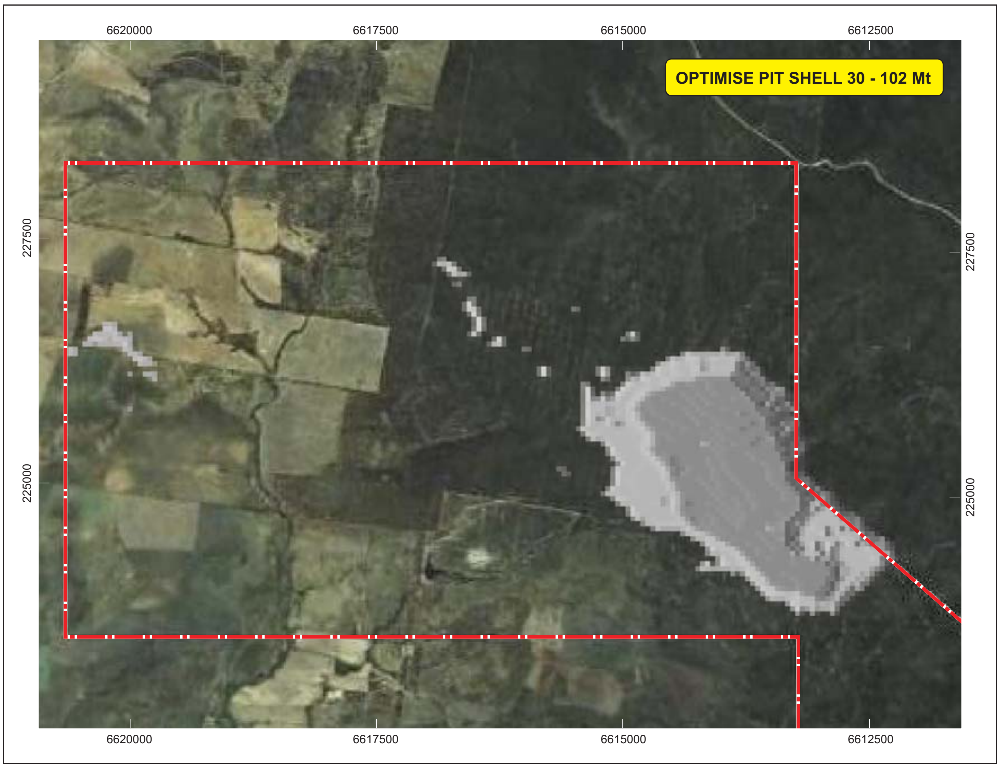
Optimiser Results

Figure 7 through **Figure 10** shows the sequence of pit shells during this process.

The key outcomes for the Pit Optimisation process are:

- The most economic coal appears where the mine is planned to commence, providing independent economic support for the block ranking outcomes and mine planning decisions;
- A significant quantity of ROM coal is at an incremental strip ratio of less than 20:1 bcm/t, which was the estimated breakeven strip ratio; and
- The vast majority of the economic coal appears at relatively low forcing factors, suggesting the Maules Creek Project has an economic robustness given the assumptions used.





PRECISION MINING

Source: Mine Scheduling and Planning Report, by Precision Mining

MAULES CREEK COAL
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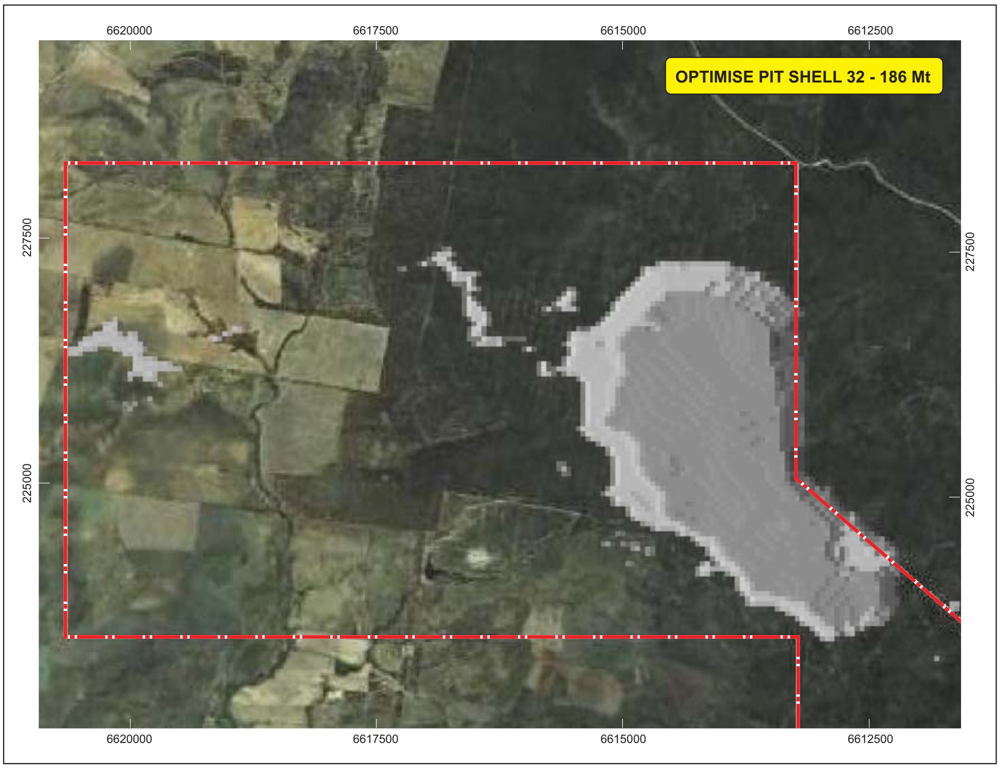
Figure 7 - Optimiser Pit Shells



PRECISION MINING

Source: Mine Scheduling and Planning Report, by Precision Mining

MAULES CREEK COAL
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Figure 8 - Optimiser Pit Shells

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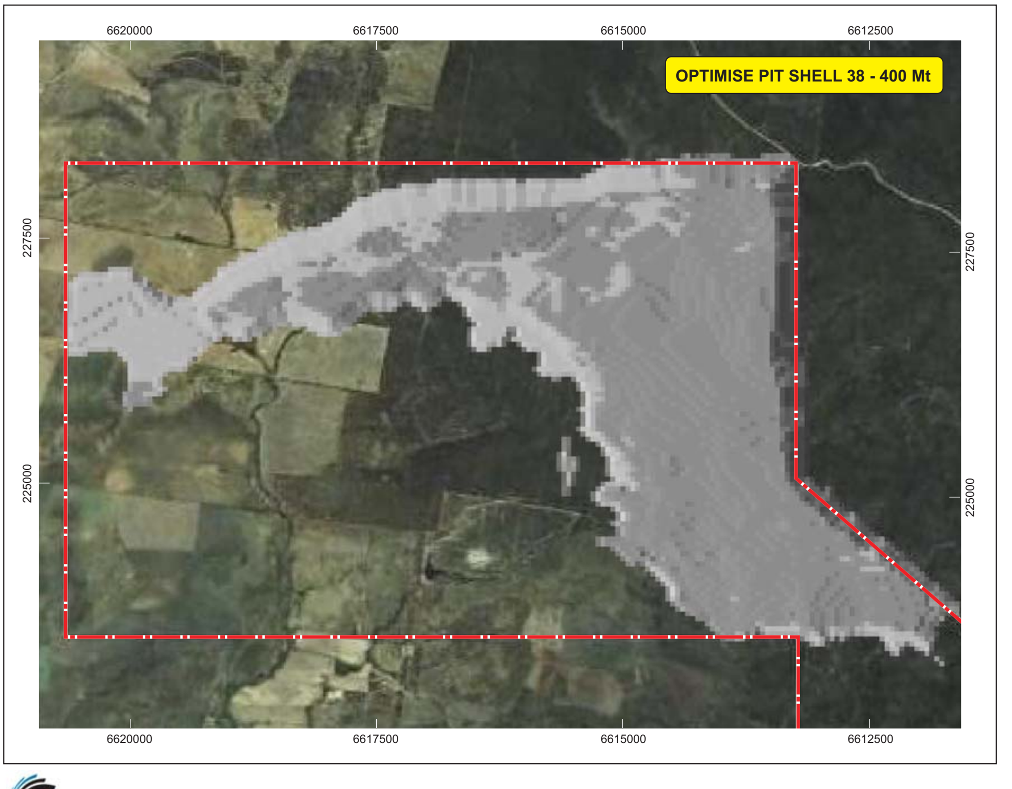

PRECISION MINING

Source: Mine Scheduling and Planning Report, by Precision Mining

MAULES CREEK COAL
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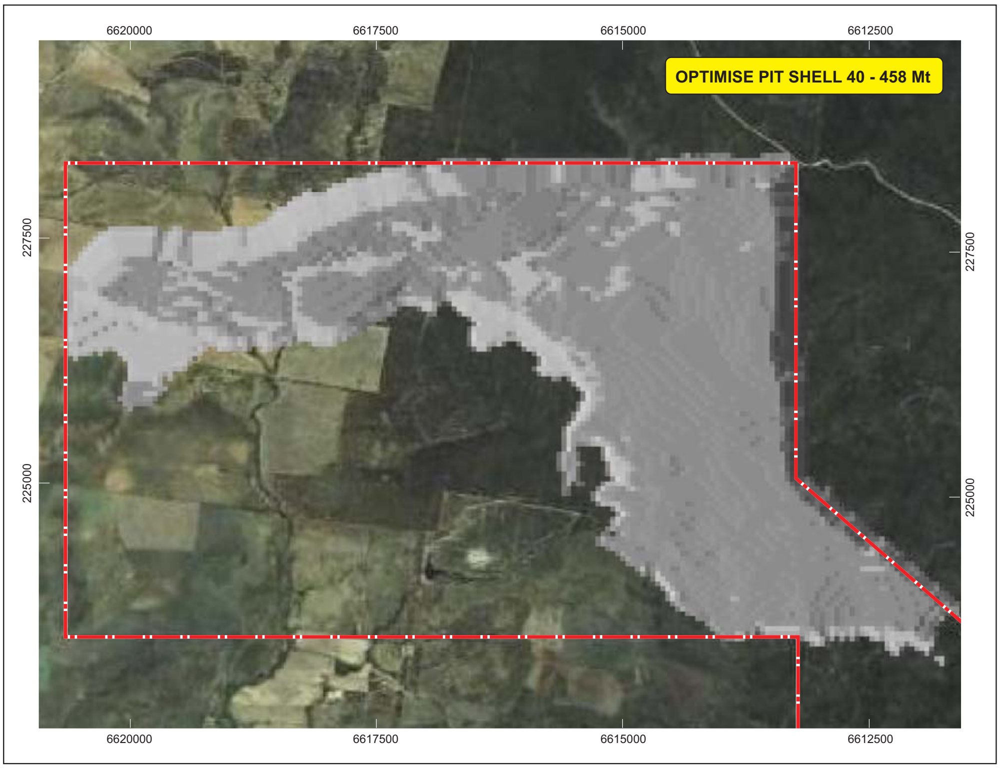
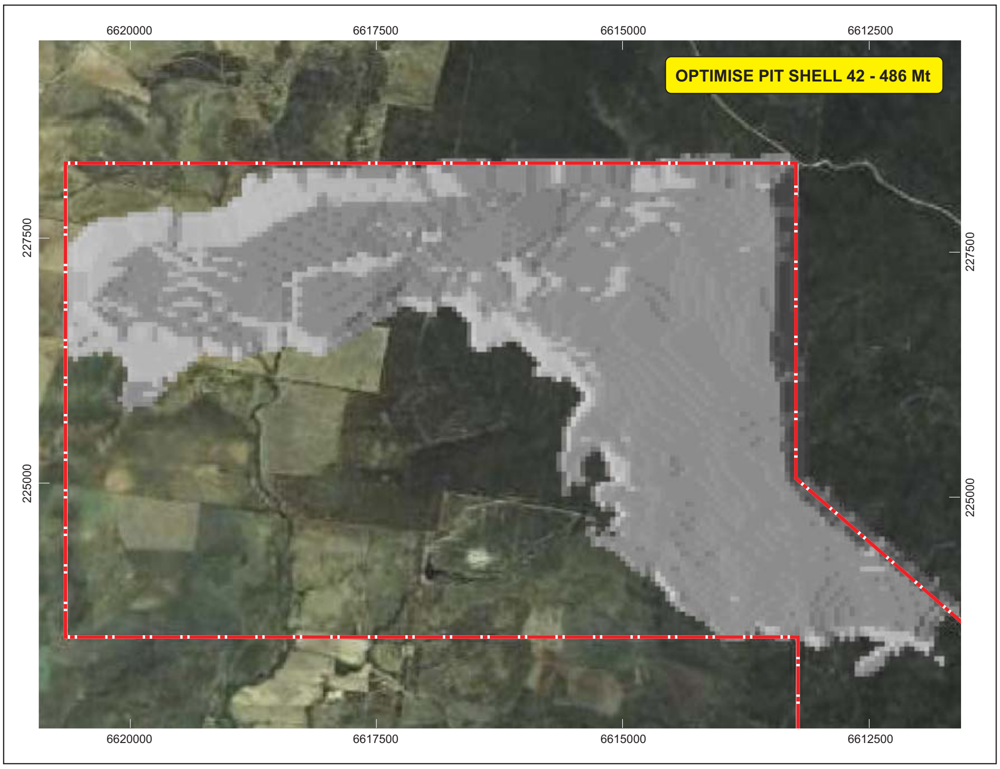
Figure 9 - Optimiser Pit Shells





PRECISION MINING

Source: Mine Scheduling and Planning Report, by Precision Mining

MAULES CREEK COAL
MANAGED BY ASTON RESOURCES LIMITED

Figure 10 - Optimiser Pit Shells

2.1.4 *Pit Development Options*

The strip ratio plots indicated that the full mining of all of the 15 coal mining seams is economic. By mining the entire coaling sequence Aston Resources is also ensuring that the full resource is mined and that minimal coal is sterilised in the process. These plots also derived the western pit limit of the mining pit shell. The other geographic boundaries are set by the mining lease boundary and associated adjoining mines.

It is important to note that both block ranking and optimiser outcomes provide the same result and therefore the only logical development options are to progress the pit along the lines of the economic strip ratio, with minor variations for natural drainage, long-term haulage considerations, ramping and waste dump considerations.

2.1.5 *Overburden Emplacement Options*

As with all mining related projects, it is the economic factors that drive the haulage of the waste materials. As such, as soon as the room is developed within the pit, materials are dumped within the mined out area as soon as practical. So the overall overburden emplacement options and strategy have been developed taking the following points into consideration:

- Minimise impacts on CEEC;
- Minimise impacts on prime agricultural land;
- Limit interaction with private land holdings;
- Develop in-pit emplacements as soon as possible;
- Utilise natural site drainage;
- Steady state pit development;
- To constrain the height of the OEA to be in comparison with neighbouring ridge lines, remove minimum material to expose lowest seams whilst;
    - Providing adequate working room for mining fleet; and
    - Providing access to all working seams.
- Dump limiting criteria based on existing topography;
- Utilise existing water management structures, hence restricting the footprint to the west;

- Minimise land holdings, requirements;
- Maximise utilisation of areas contained inside the mining authorities presently held by Aston Resources;
- Limit sterilisation of coal under emplacement area;
- Utilise natural topographic features for the placement CHPP and ROM facilities in conjunction with mining operations;
- Use of existing water infrastructure;
- Enable logical placement of other site infrastructure;
- Design of the outer slopes of the OEA to minimise visual impacts; and
- Minimise haulage distances - economic value.

The above points will be discussed in more detail in **Section 5.**

2.1.6 *Recommended Mine Development Strategy*

The open cut mine will be developed on a minimal strip ratio basis which progresses down dip utilising strip mining methodology. The initial pit develops in a south westerly direction from the pit access ramp. Once the pit is sufficiently developed in-pit dumping commences. It should be noted that the initial box-cut area (Year 1) is up to 150 m in depth to ensure the full extraction of the coal mining sequence.

This depth to coal in conjunction with the development of adequate mining room for the coal working sections drives the volume of material for the out of pit emplacement area. The higher strip ratio areas will be introduced as the pit is developed, however some low wall areas which are required to maintain the current drainage regime will remain unmined, until later in the program.

2.2 Mining Method

2.2.1 *Approach*

This section of the report outlines the approach to selecting the most appropriate mining method for the Maules Creek Project.

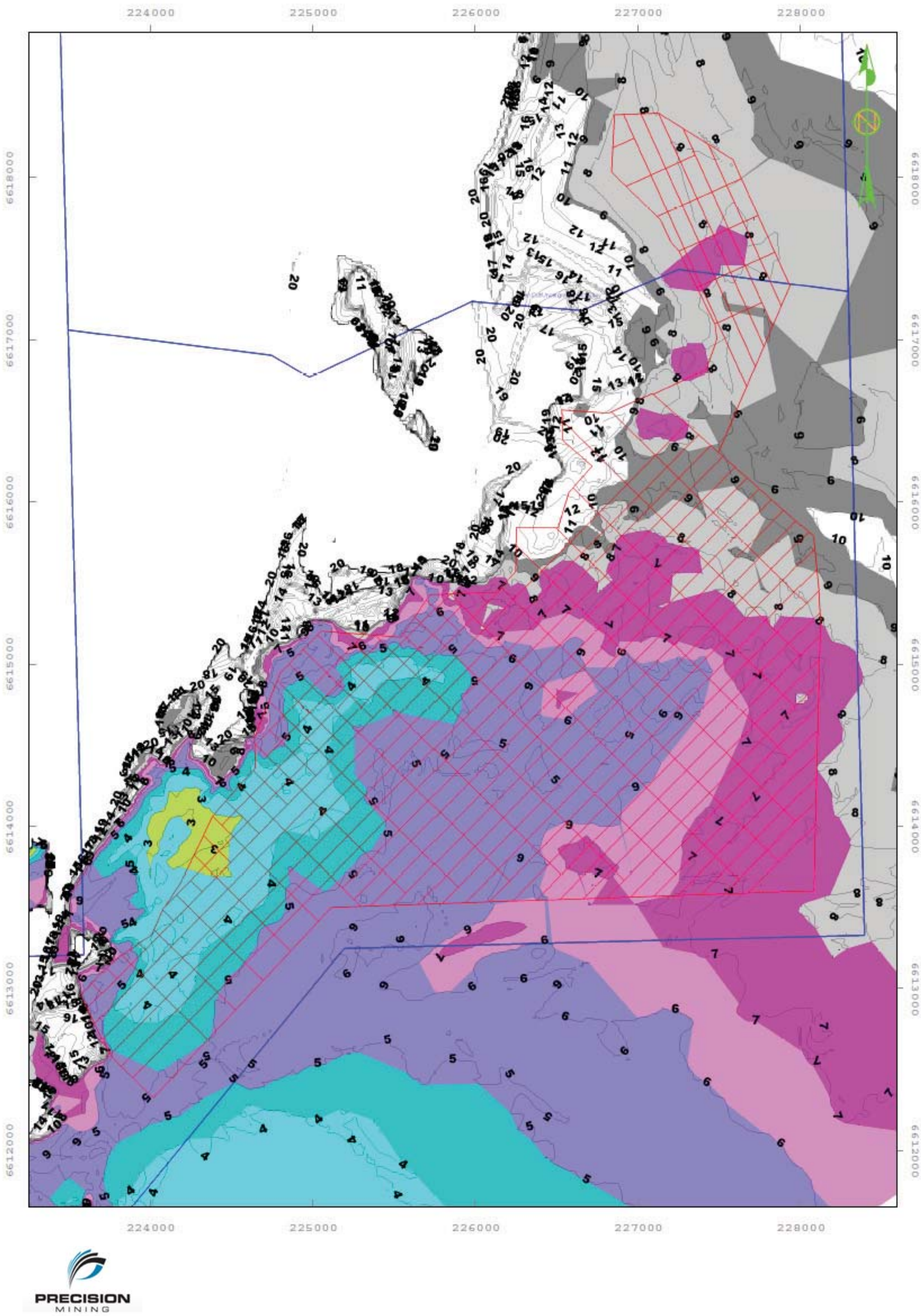
Most standard coal mining methods have been considered and, based on current knowledge of the deposit and Aston Resources' production requirements, a mining method is recommended that not only meets these requirements, but also ensures the practicality of developing an efficient operation in the relatively remote region of Boggabri.

It is important to realise that no mining system is ideal for all situations and compromises are always necessary. The system selected should be proven, cost effective, reliable and workable in the planned environment.

2.2.2 *Key Considerations*

After preliminary review of the geological models several key considerations were used to help decide on the method of mining. Some of these considerations are outlined below:

- **Seam Dips** – Seam dips are typically around 4 to 5 degrees at the base of the Templemore seam group;
- **Vertical Strip Ratio** – **Figure 11** illustrates the strip ratio at air dried coal density. The strip ratio plot is underlain by the 13 Mtpa – 20 year mining void. The area shown in green illustrates strip ratio between 2 bcm to 6 bcm of waste per tonne of coal;
- **ROM Strip Ratio** - **Figure 12** illustrates ROM strip ratio by block down to the Templemore seam group seam floor respectively. The strip ratio plot is underlain by the 13 Mtpa – 20 year mining void; and
- **Depth of Mining** – The overall depth down to the Templemore seam group floor is significantly greater than the depth down to the Braymont seam group. **Figure 13** shows the total depth by block to the Templemore seam group floor. In general, mining coal down to the Templemore seam group adds about 90 m of total depth to the operation below the Braymont floor level.



Source: Mine Scheduling and Planning Report, by Precision Mining

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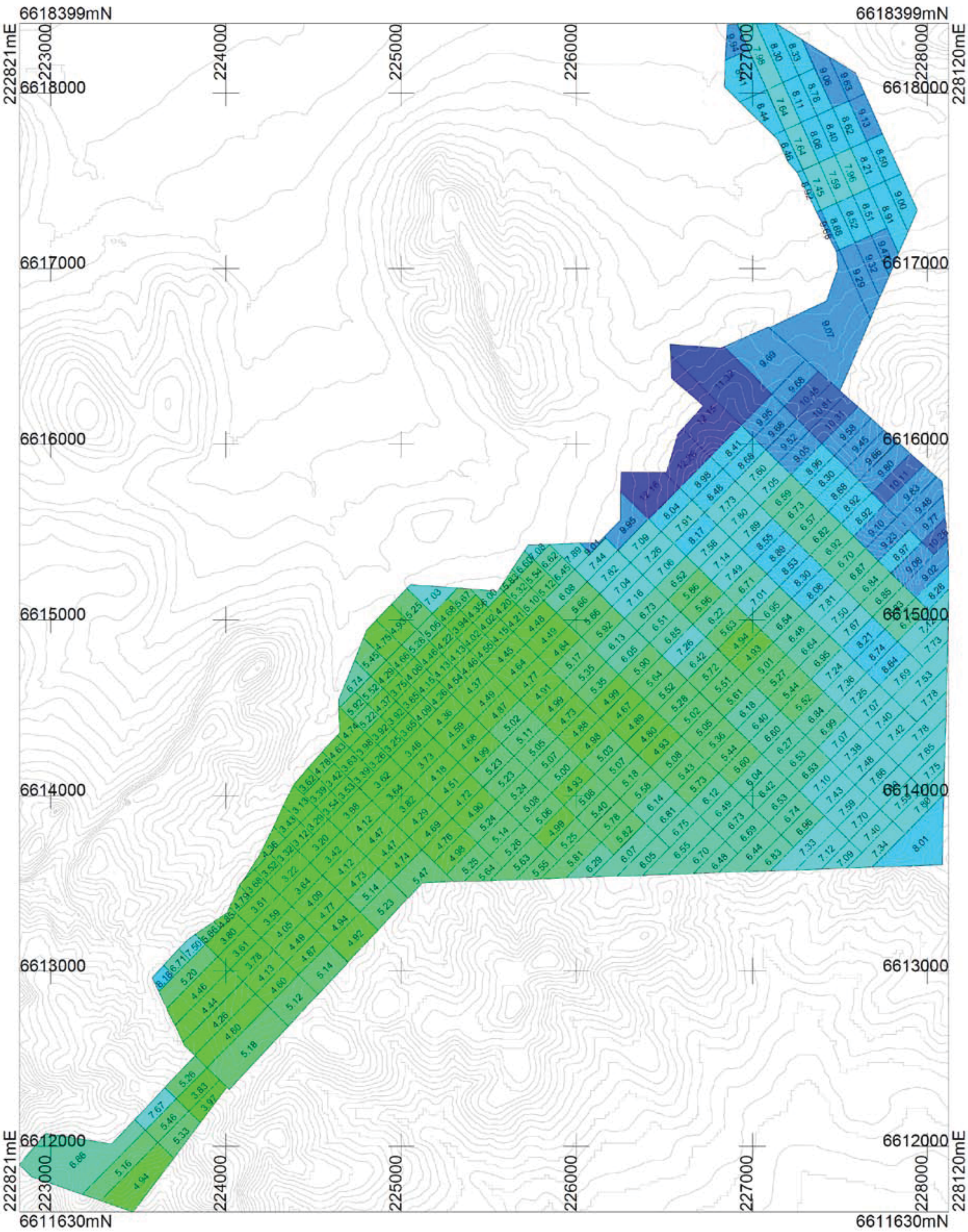
Figure 11 - Vertical Strip Ratio Plot



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Source: Mine Scheduling and Planning Report, by Precision Mining

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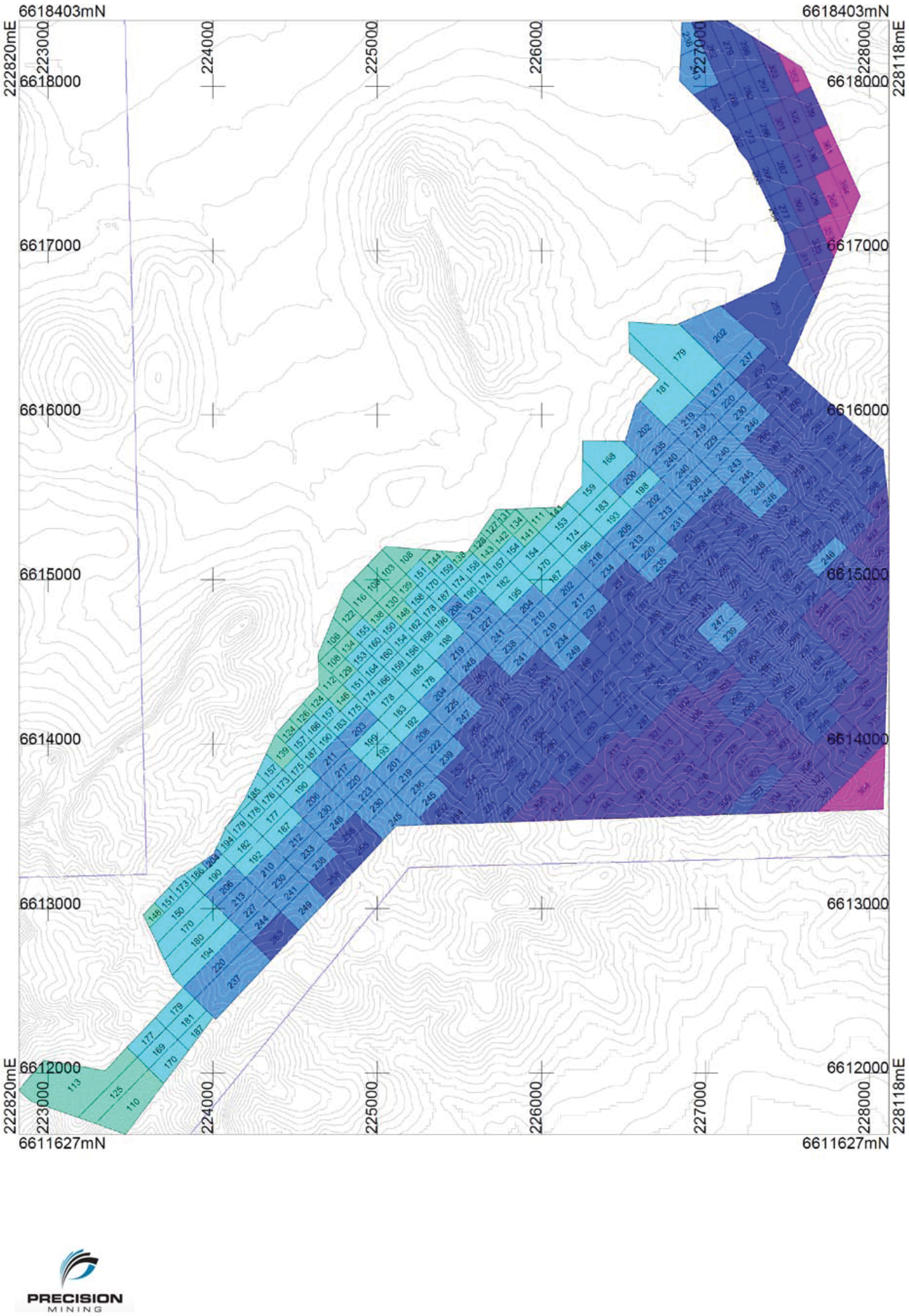
Figure 12 - ROM Strip Ratio Plot



Source: Mine Scheduling and Planning Report, by Precision Mining

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Figure 13 - Overall Depth Plot

2.2.3 *Mining Systems*

The following generic systems form the basis of most operating coal mines:

- Underground mining; and
- Open cut mining.

Underground mining, generally either room-and-pillar or longwall, is widely applied throughout the world. It is not considered appropriate for the Maules Creek Project for the following reasons:

- The deposit is characterised by rolling floor levels and associated seam splitting, both unfavourable to underground mining;
- Irregular interburden thickness would lead to a large number of seams being sterilised;
- Variable seam thickness would led to high level of rock dilution; and
- A number of coal seams sub-crop close to the surface.

An independent underground study was conducted by Runge in 2010. This study showed that the overall recovery was less than 10% of the open cut recovery, significantly modifying the project economics. A summary table (**Table 4**) is shown below to highlight the recovery analysis.

Table 4 – Underground Analysis Summary Table

Coal Option	Quantity Mt	% of In Situ Coal
In situ Coal		
Braymont Seams	102 Mt	
Merriown Seams	38 Mt	
Other	206 Mt	
In Situ Coal	**346 Mt**	**100 %**

Coal Option	Quantity Mt	% of In Situ Coal
Open Cut Mineable Coal	ROM Coal **313 Mt**	**90.5%**
Underground Target Coal		
Braymont Sections	**100 Mt**	**28.9%**
Underground Mineable Coal		
Braymont Sections	**28 Mt**	**8.1%**

As such, open cut mining is seen as the most appropriate mining method for the Maules Creek Project coal resource. The method of open cut mining being developed is based on the use of highly efficient diesel hydraulic gear. Other methods have been considered but deemed in-appropriate at the Maules Creek project:

- Dragline - Physical size and nature of operating a dragline limits its ability to perform successfully at the Maules Creek Project. Given limited low wall dump room, electrical power requirements are also a limiting factor;
- Rope shovel - Non-flexible method requiring vast operating room; and
- Continuous mining systems – Non-flexible system.

3 Waste Dump Options

Key Points

- Progressive establishment of in-pit emplacement capacity;
- Minimise the amount of out of pit emplacement; and
- Reduce the impact of the Northern Overburden Emplacement Area (NOEA) on the existing environment.

3.1 Develop In-Pit Dumps As Soon As Possible

During the first two years of mining, the open cut void is being developed for the mining of the 15 coal seams in the sequence. Due to the amount of material to be removed from the open cut void in these initial years for operational and safety reasons, the in-pit dumping only begins mid way through the second year when sufficient capacity is available.

Table 5 shows the relative percentages of the dump development is available. The development of the in-pit dump starts with 18% of overburden in the second year increasing to 100% by Year 10.

Table 5 – Dump Summary

Dump Summary										
Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
NOEA %	100%	82%	72%	58%	63%	59%	49%	49%	46%	0%
In-Pit %	0%	18%	28%	42%	37%	41%	51%	51%	54%	100%

3.2 NOEA Volume

Different mine planning models have been evaluated to optimise the minimum amount of material to be mined and emplaced out of pit in order for the operation to develop the on-going void. This volume of material has been assessed at approximately 410 Mbcm for the current pit configuration.

The minimum out of pit volume requirement does not change with utilising varying fleet configurations or targeted coal mining or production rates.

The controlling design factor to the size and capacity of the NOEA is directly related to the associated working room and depth of the box-cut. To successfully develop the 15 coal seams in a steady state mining operation, both the working room and depth of the box-cut is critical. The remaining overburden that is produced in these earlier years will be a conjunction of advancing low wall and high wall faces of the pit. Once these areas have been developed, a post mining void will be produced and from Year 10 onwards will accommodate all of the overburden produced from the mining activities.

The main constraints in accessing the 15 seams and developing the boxcut are as follows but are not limited to:

- Safety factors that relate to safe working distances for operating machines;
- Multitude of cyclic activities to be undertaken in the 15 coal seam extraction process:
    - Clear & grub;
    - Topsoil removal;
    - Drill & blast waste;
    - Ramp development;
    - Coal preparation; and
    - Coal mining.
- Angle of ramps for the safe / efficient operation of mining vehicles;
- Depth to the bottom coal seam unit, 70 - 150 m in the initial Year 1 box-cut area;

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3.3 Site Layout

The site layout for Maules Creek Project utilises several of the natural features of the site. The location of the Coal Handling and Processing Plant (CHPP) and Run of Mine stockpiles (ROM) has been designed to benefit from the natural topography with the ROM being both close to the pit mouth and elevated in relative terms to the CHPP. The NOEA has been incorporated into this layout and the area chosen is not suitable for placement of either of those infrastructure items.

The MIA has been designed to the west of the NOEA and in close proximity to the haul road network for the pit, NOEA and CHPP. The location of the MIA is to minimise the amount of distance vehicles travel between the different work areas. This has a positive effect by reducing the amount of potential dust emissions and vehicle efficiencies. The proposed location is also able to incorporate existing surface water structures.

3.4 Height of NOEA

The height of the NOEA has been designed to be generally consistent with the surrounding landforms. The surrounding landforms are 438RL with the highest point on the NOEA being constrained to 438RL. The top of the NOEA is shaped to provide a free draining and undulating surface.

Figure 14 demonstrates the existing height of the surrounding terrain. It should be noted that given the proposed location of the NOEA that it is largely shielded from view. The NOEA would normally be viewed from a number of points around the Maules Creek community, however given the undulating nature of the surrounding terrain, views are shielded by the row of hills immediately to the south of the area concerned.

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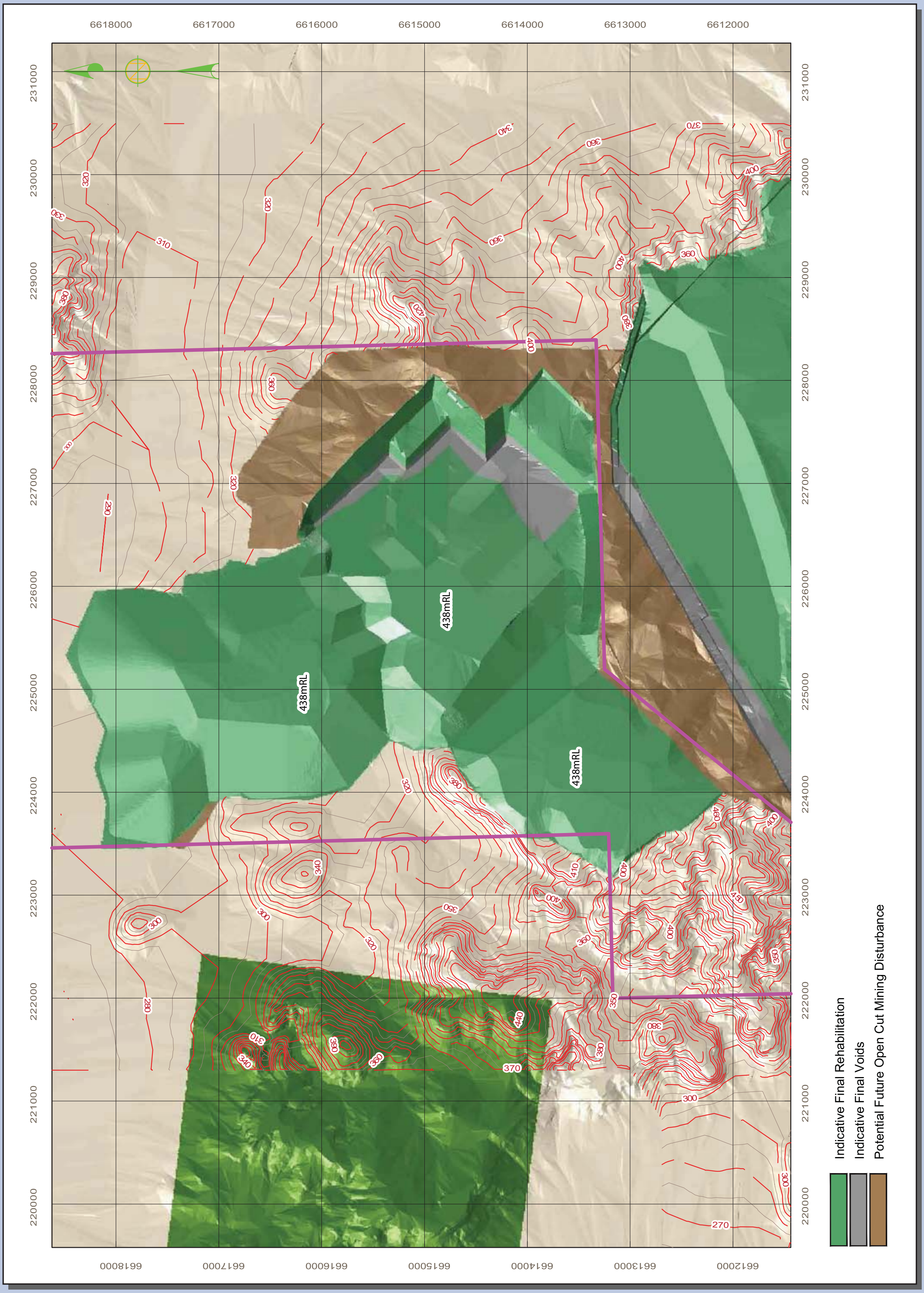

Source: Maules Creek Dump Analysis 2010, by Precision Mining

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Figure 14 - Height Comparisons

3.5 Water Management

The NOEA has been designed to incorporate pre existing surface water management structures along with natural drainage lines.

The existing surface water structure was developed by RTCA under the existing development consent. This critical piece of infrastructure, the existing dam, was retained and will be incorporated in the surface water management plan for the Maules Creek Project. Due to the location of the existing water management structure, the design of the NOEA to the west was limited. This placed a physical constraint on the design team to maintain the existing structure when developing the NOEA.

The surface water management plan also incorporates natural drainage around the eastern and northern faces of the NOEA.

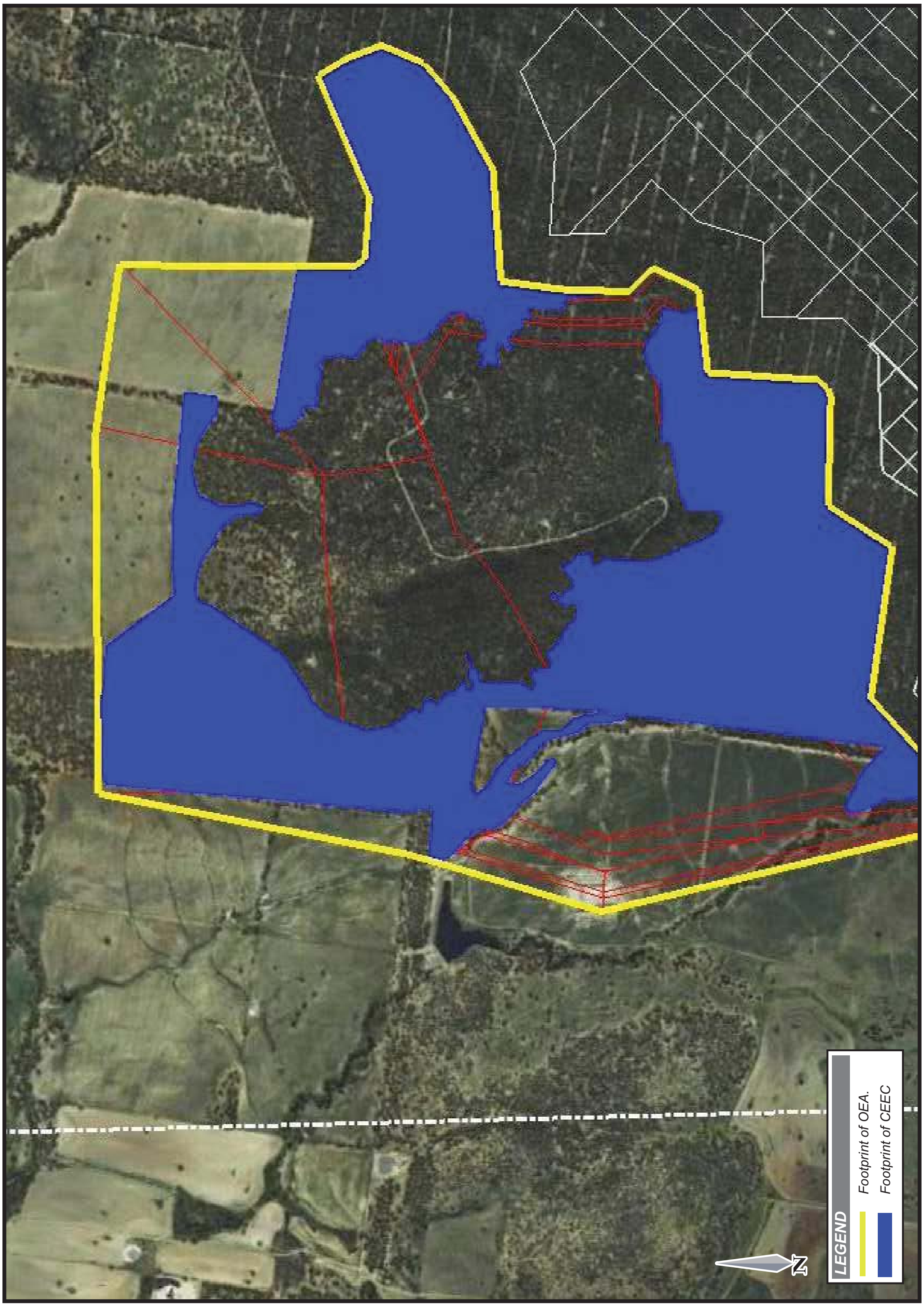
3.6 Minimise Impact on CEEC

Cumberland Ecology has extensively mapped vegetation across the Maules Creek Project boundary, with special attention given to mapping Critically Endangered Ecological Community (CEEC) boundaries. Calculations of the CEEC boundaries were then used to assess the potential impacts from the Maules Creek Project.

With the first option for the NOEA potentially impacting 192ha of CEEC, Precision was commissioned to undertake an options analysis of NOEA footprints against CEEC. The analysis provided a number of NOEA's that were compared to the mapped CEEC. Six options were designed for consideration, with the option having minimal impact on the CEEC being selected. Through this process, a reduction of 55ha of CEEC was achieved. The six designs have been included, and start at **Figure 15** through to **Figure 20**. The impact of each option is detailed below.

Option six has been the proposed NOEA for the project as it has reduced the impact to CEEC by 55ha and still retains the correct volume to handle the material generated by the mining operation.

- NOEA option 1 impacts 192 hectares of CEEC with capacity to take 411 million loose cubic metres;
- NOEA option 2 impacts 160 hectares of CEEC with capacity to take 430 million loose cubic metres;
- NOEA option 3 impacts 146 hectares of CEEC with capacity to take 406 million loose cubic metres;
- NOEA option 4 impacts 137 hectares of CEEC with capacity to take 407 million loose cubic metres;
- NOEA option 5 impacts 136 hectares of CEEC with capacity to take 410 million loose cubic metres; and
- NOEA option 6 impacts 137 hectares of CEEC with capacity to take 411 million loose cubic metres.



Source: Maules Creek Dump Analysis 2010, by Precision Mining

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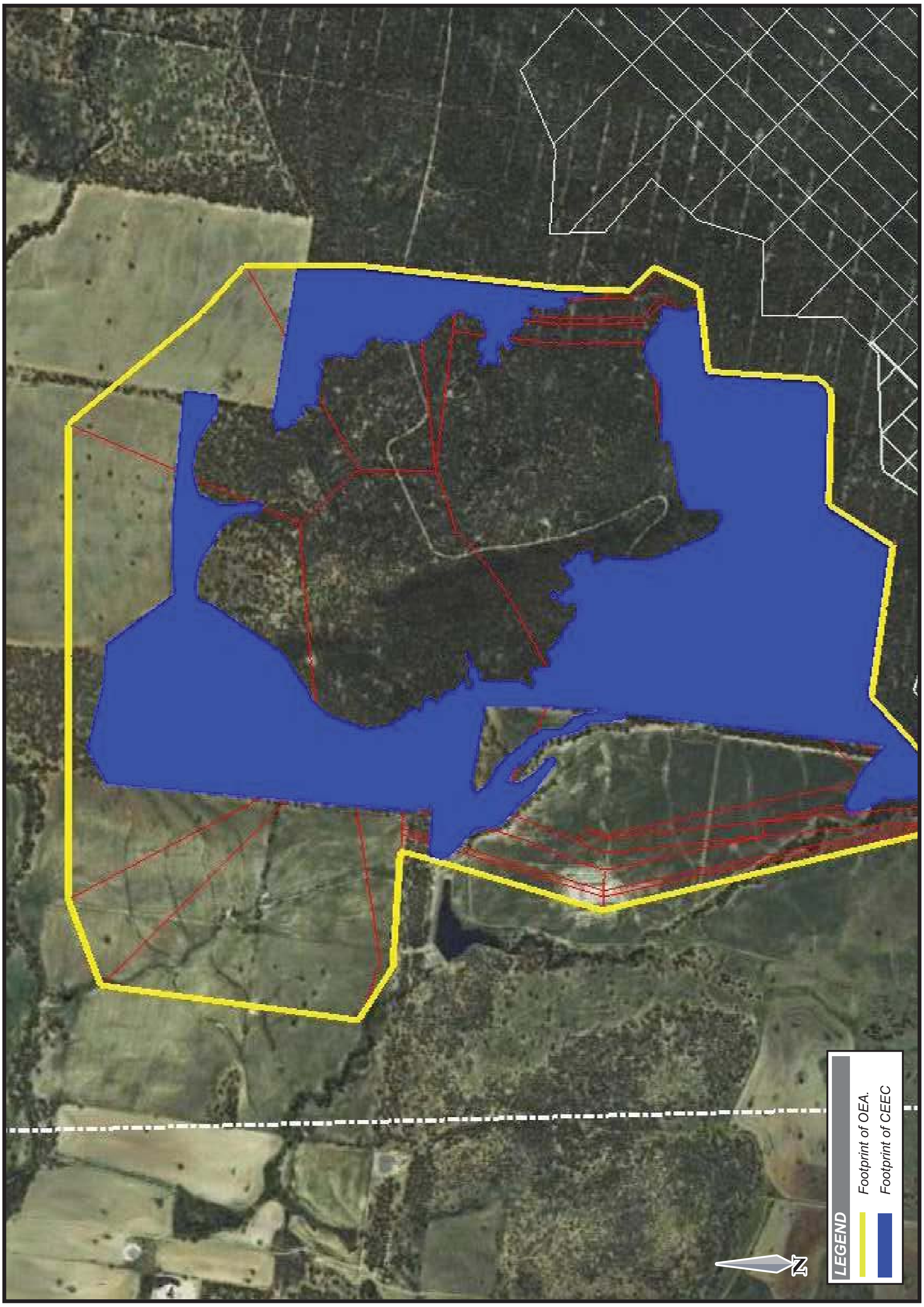
Figure 15 - Option 1



Source: Maules Creek Dump Analysis 2010, by Precision Mining

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Figure 16 - Option 2

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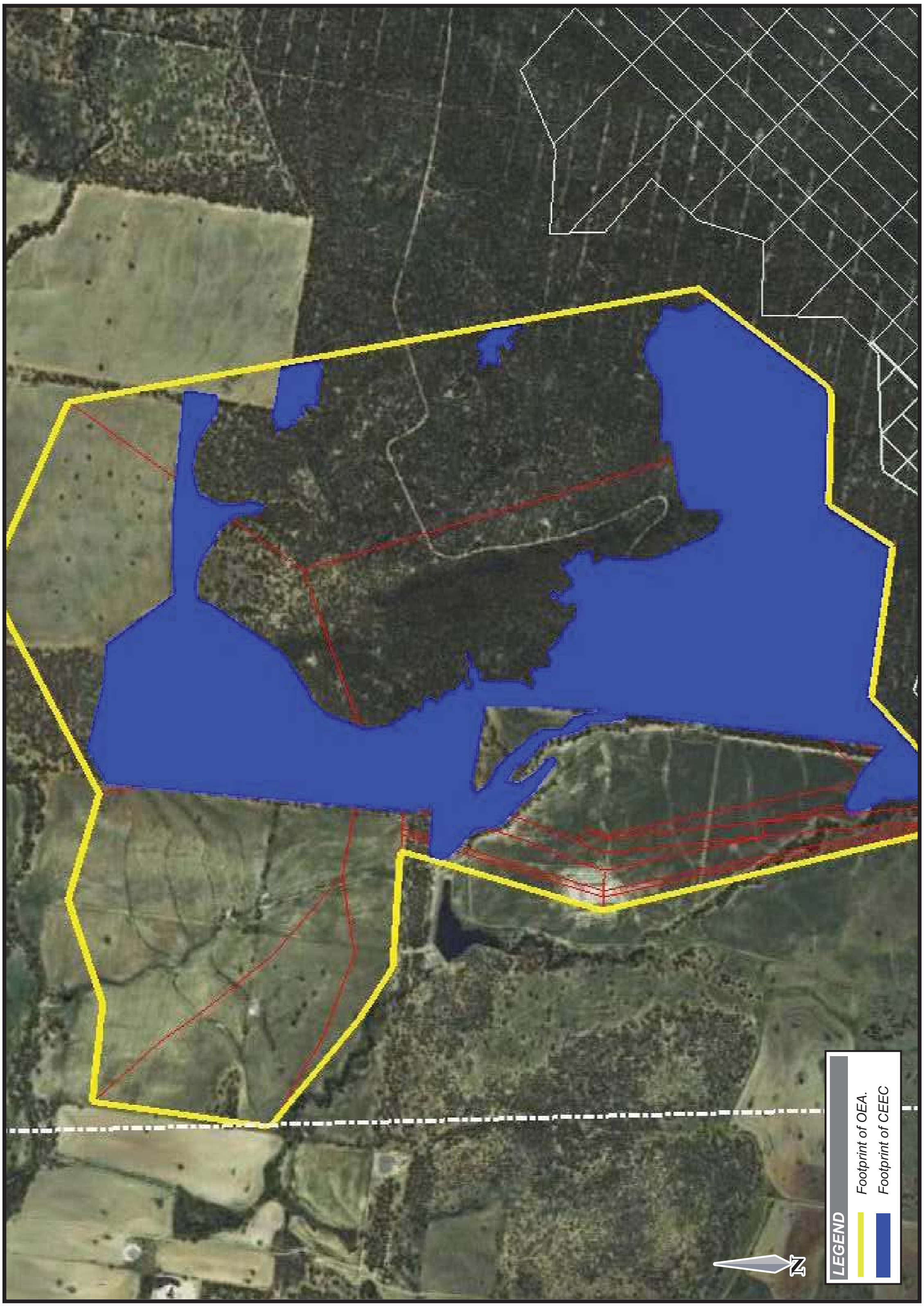

Source: Maules Creek Dump Analysis 2010, by Precision Mining

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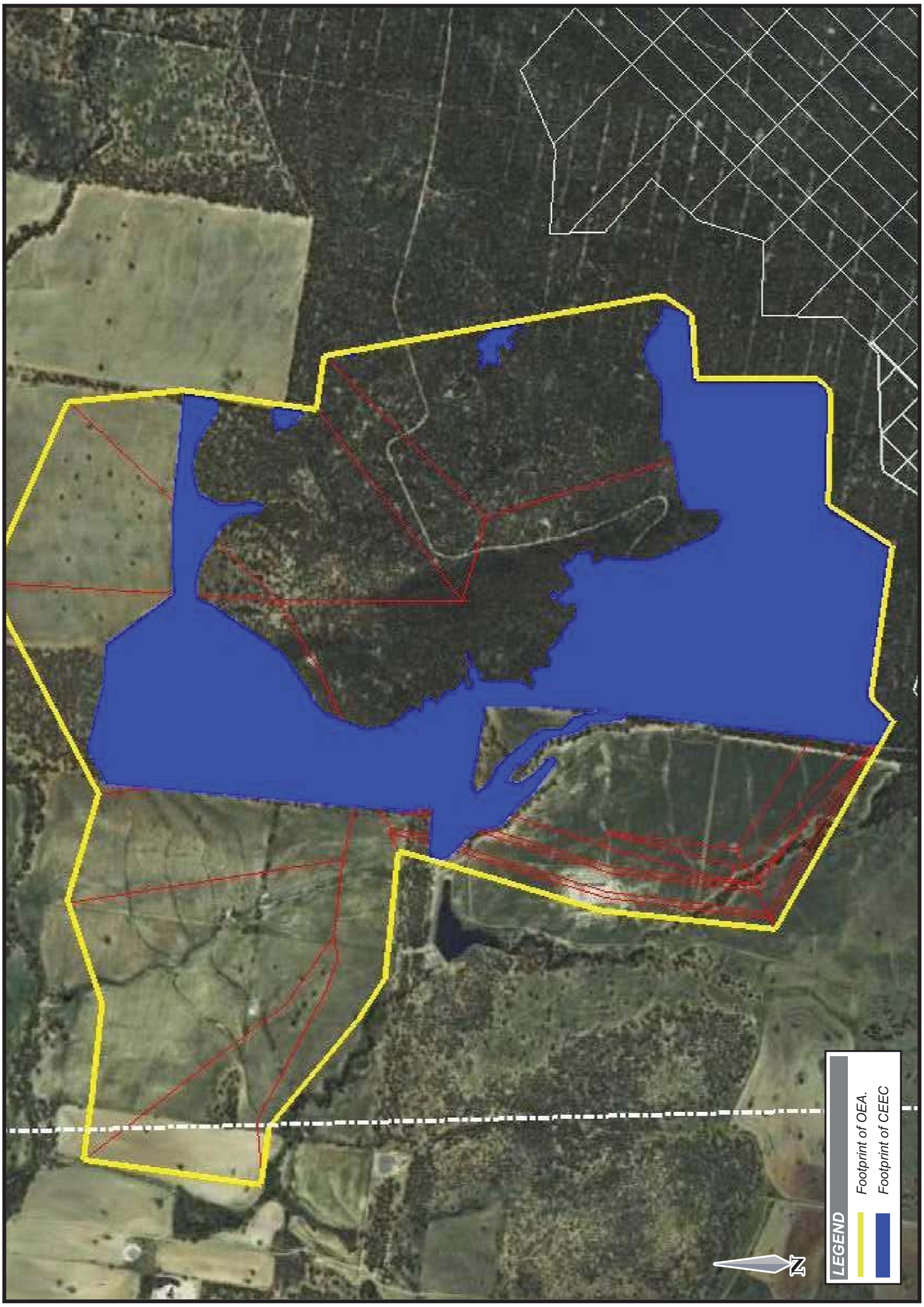
Figure 17 - Option 3



Source: Maules Creek Dump Analysis 2010, by Precision Mining

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Figure 18 - Option 4

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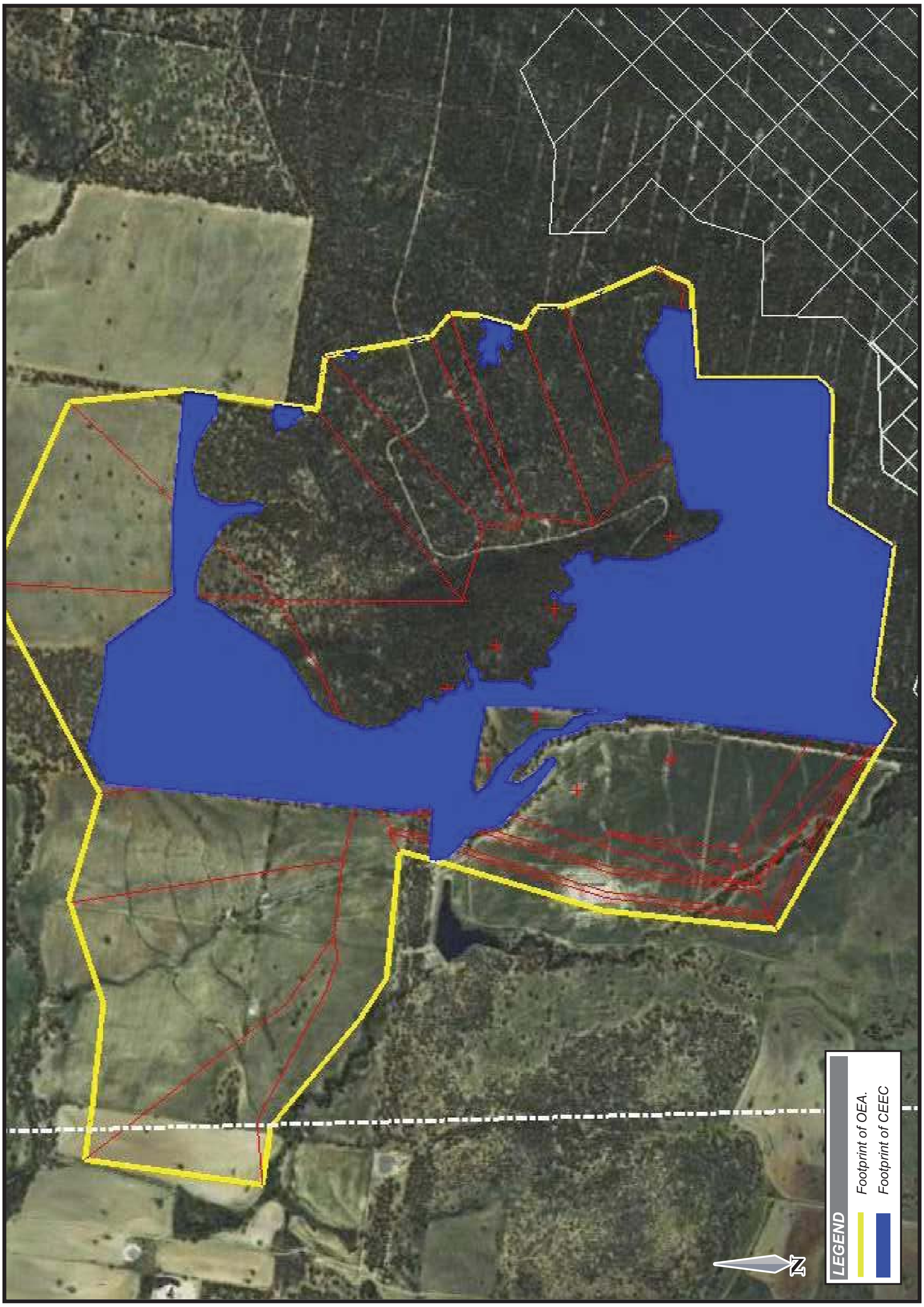

Source: Maules Creek Dump Analysis 2010, by Precision Mining

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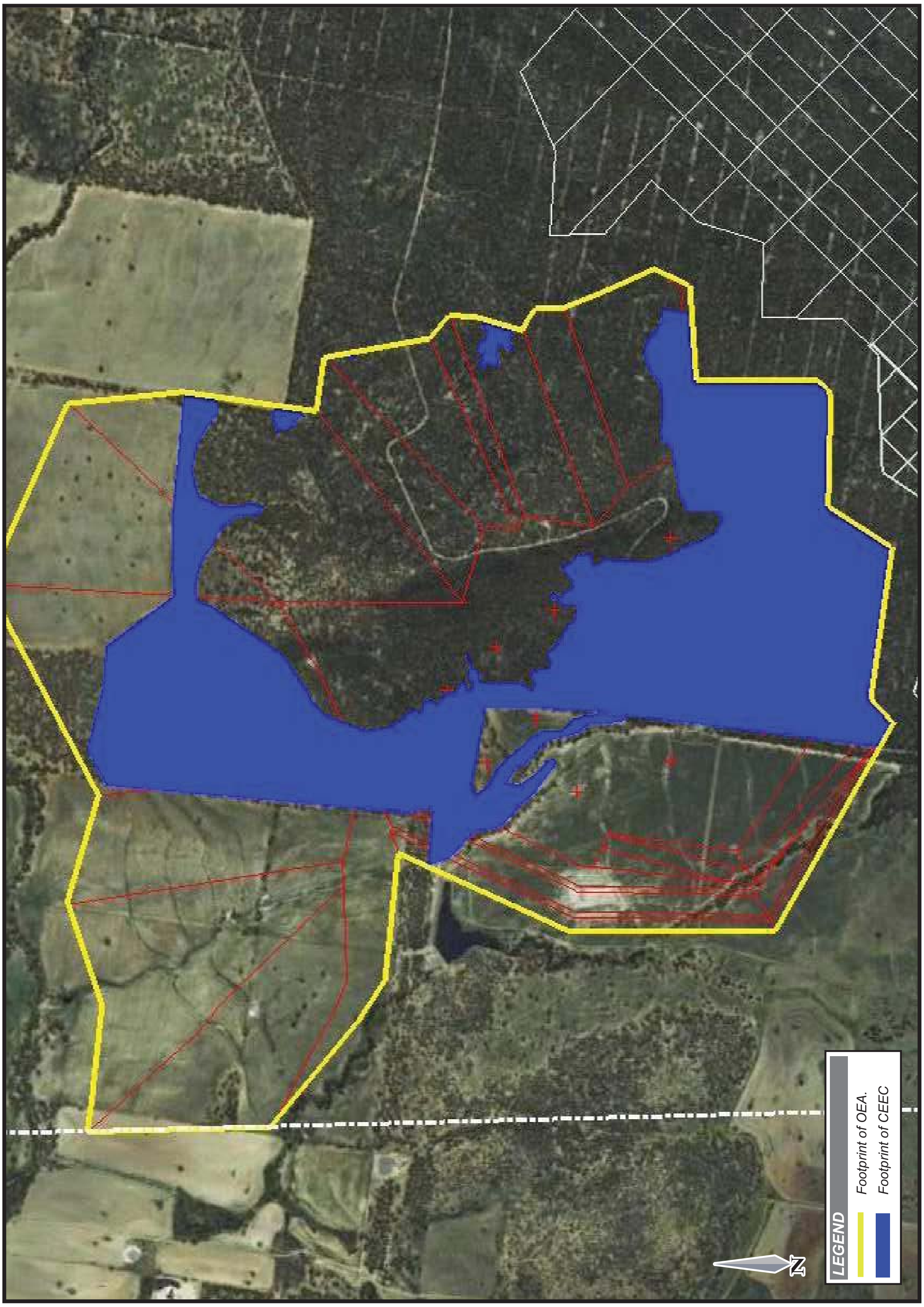
Figure 19 - Option 5



Source: Maules Creek Dump Analysis 2010, by Precision Mining

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Figure 20 - Preferred Option

3.7 Impact to Prime Agricultural Land

GSSE were commissioned to conduct an assessment of the potential soils and land capability issues that may arise during the development of the Maules Creek Project. As part of this work, the agricultural land capability of the Project Boundary was extensively mapped. Through their findings, no prime agricultural land will be impacted by the location of either the mine pit of NOEA.

3.8 Coal Sterilisation

A dump sterilisation report has been completed to estimate the amount of coal sterilised by the NOEA. The dump sterilisation report aimed at identifying the following:

- Amount of coal sterilised under the footprint;
- Economic viability of the coal sterilised by the dump footprint; and
- Potential for altering the dump footprint to minimise coal sterilisation.

Total coal estimated to be sterilised under the proposed out of pit dump footprint is 3.6mt ROM Tonnes at a strip ratio of 22:1.

The economic cut off for a 100% Thermal Coal Product has been estimated at 15:1. None of the areas under the current dump footprint had a calculated strip ratio below this cut off strip ratio.

The dump footprint has been shifted slightly to allow for environmental issues and a more practical dump footprint to be achieved. Both of these adjustments were made to the eastern edge of the dump.

4 Final Landform

Key Points

- Rehabilitate areas as soon as they become practically available;
- Mining to progress past Year 21; and
- Mine full extent of the coal resources – barrier pillar.

A detailed Rehabilitation Management Plan will be developed for the Maules Creek Project that provides for the progressive rehabilitation of all mine disturbed areas. The key objectives of this plan will be to restore, where possible, the pre-mining biodiversity within a safe and stable landform.

4.1 Landform Criteria

As demonstrated in the attached **Figure 21** and **Figure 22**, Aston Resources has investigated the option to progressively backfill the mining void as mining clearance is provided. In Year 21 the mining void is proposed to progress to the north and east for at least a further ten years. Therefore the proposed final landform at Year 21 still shows an active mining area. The active mining area will be required to conform to the reasons mentioned in **Section 3.2** NOEA Volume.

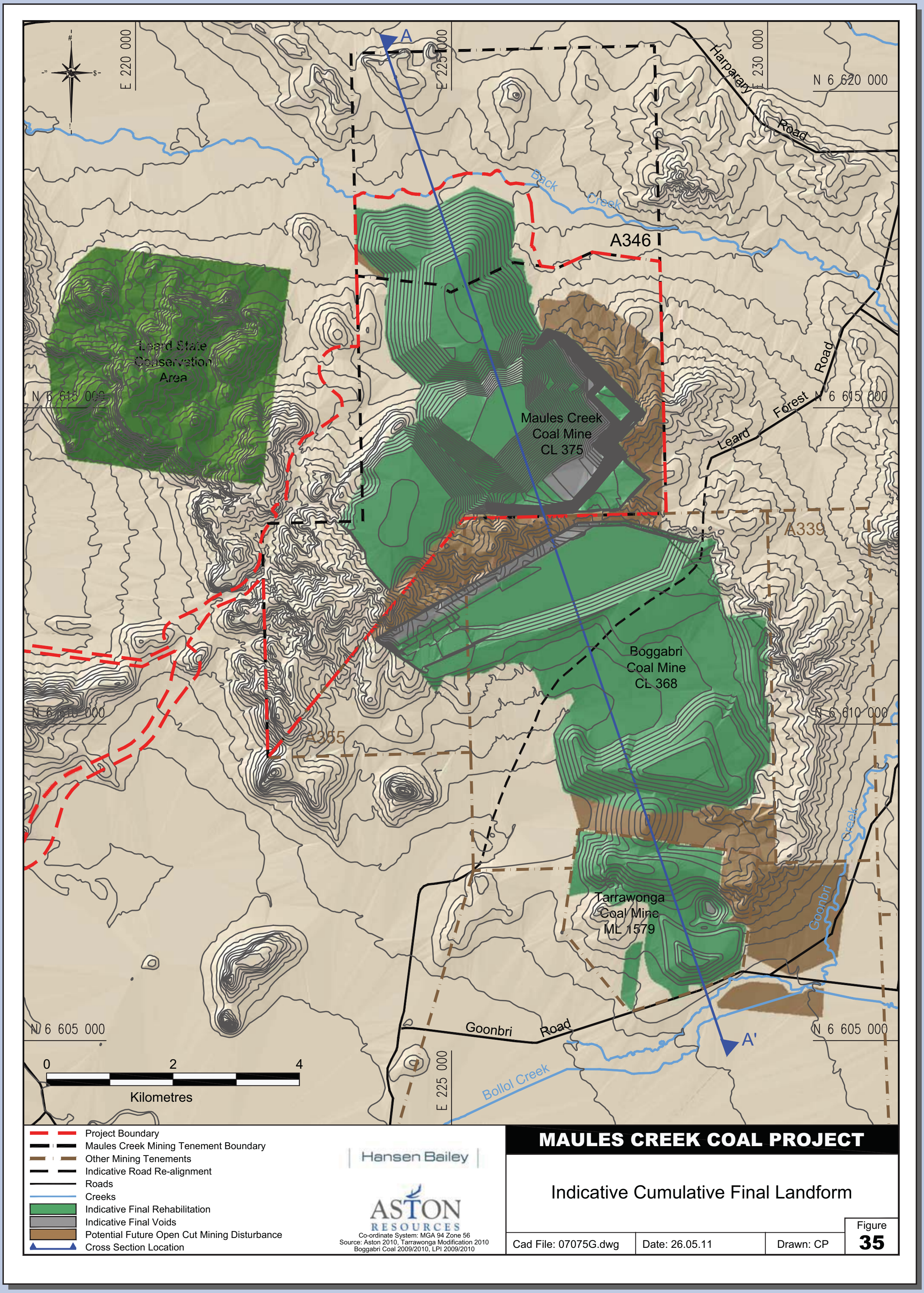
If mining is to be finalised in Year 21 and the operation to be closed the following final landform criteria should be further investigated and undertaken as indicated below:

- Minimise the number of voids between the adjoining mining operations;;
- Staged void backfilling program;
- Timely re-shaping and backfilling of mined pits as they come available;
- Progressive shaping and rehabilitation of the NOEA will be done progressively as areas become available;

- Flat top areas are to be avoided, undulations will be developed in large flat zones;
- Other pit edges are to be sloped at an overall 10 degrees;
- Permanent water management structures are to be placed along the toes of any embankments, ensuring clean / dirty water separation; and
- Height of the backfill is determined from the groundwater management study provided by AGE.

4.2 Barrier Pillar

It is Aston Resources intention to develop a barrier pillar agreement with Idemitsu Boggabri Mine (IBM) within the initial five years of operation. The current mining sequence has the pit reaching the southern boundary of the lease between Years 10 to 12. From discussions with Idemitsu Boggabri Mine, they do not reach this boundary until Year 30. This being the case within the first five years both operations mine plans will be significantly advanced to enable a suitable solution to be found. Aston Resources will develop its plans with the intent that IBM will develop the barrier pillar extraction methodology. However, the stated intent is to both maximise the coal extracted from the pillar whilst minimising any adjoining void between the two mines along the southern boundary.



Source: Maules Creek Coal Project EA by Hansen Bailey

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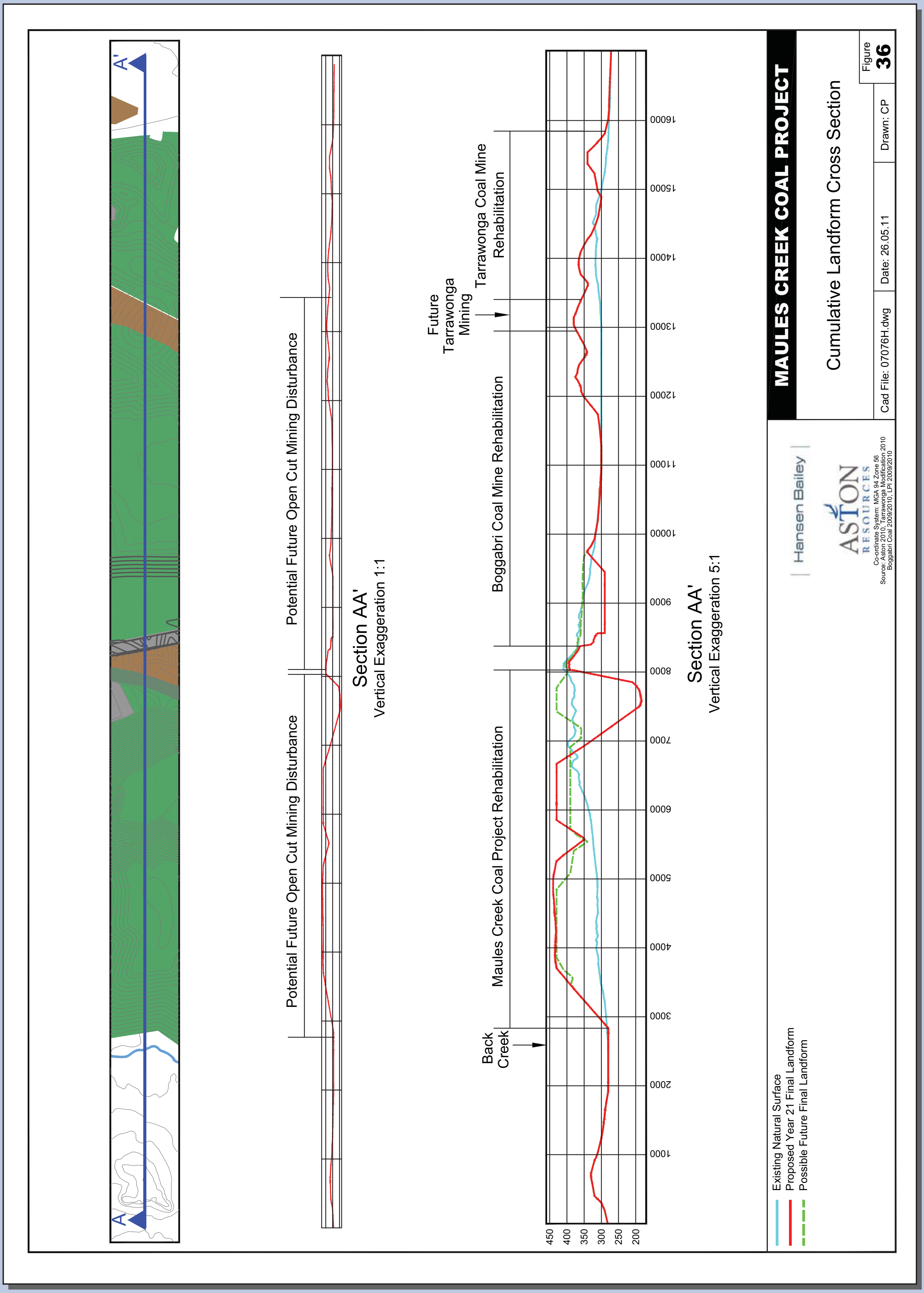
Figure 21 - Indicative Cumulative Final Landform



Source: Maules Creek Coal Project EA by Hansen Bailey

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Figure 22 - Cumulative Landform Cross Section

5 Conclusion

Maules Creek Project has utilised current mine planning techniques to develop the mine plan. Aston Resources has used robust scheduling and planning tools that have been confirmed by third party mining consultants.

The proposed mine plan, focused on minimal strip ratio across the reserve. The project commences in the lowest strip ratio area of the pit blocks (in the central west) and progresses to the south-west along the limit of oxidisation of the coal reserve, before turning toward the south-east in around Year 5. The mining activities, whilst progressing towards the eastern part of the Project Disturbance Boundary also advance to the north out to Year 21.

The southern boundary is a common boundary with the neighbouring Boggabri Coal Mine's mining authority. A coal resource known to occur at the boundary (barrier coal) is not currently proposed to be extracted as part of the Project. As a result of the staging of the mine plans for the Project and the Boggabri Coal Mine, it is unlikely that the two operations will exist in this area concurrently. As such, the barrier coal may be extracted, subject to a commercial agreement with Boggabri Coal and the approval of the relevant regulator.

During the early years of operation, the Northern Overburden Emplacement Area (OEA) is to be developed. The footprint of the Northern OEA has been specifically designed to minimise disturbance of sensitive ecological communities, whilst providing the waste capacity required for the mining operations. The Northern OEA will store overburden material from the initial years of mining operations to facilitate the box cut being constructed down to the lowest coal seam in the sequence, maximising coal extraction.

The Northern OEA is anticipated to be fully developed up to a Reduced Level (RL) 430 m by the end of Year 10. It should be noted that in-pit dumping will commence as soon as possible and that the OEA program will see the in-pit OEA percentages increase over time with the NOEA being phased out in Year 10. Rehabilitation activities of the Northern OEA will be undertaken progressively ensuring this area is largely rehabilitated by Year 15. Final rehabilitation of the Northern OEA faces would cover the required mine water infrastructure areas and internal haulage roads that are expected to be required beyond the 21 Year mining period.

There are considerable known open cut mineable coal resources beyond the 21 Year Mining Limit and depending upon market factors and resource confirmation, Aston Resources may seek further relevant approvals for further mining. A conceptual final landform design has been developed in the event that an approval for the continuation of mining beyond the 21 Year Mining Limit is not sought or granted.

Aston Resources will maximise opportunities for a post mining landscape that is generally consistent with pre mining land use biodiversity. All mine areas will be rehabilitated except for the final void that will be shaped appropriately. Four key rehabilitation domains have been identified in the rehabilitation strategy based on the Project impacts.

An indicative cumulative final landform after 21 years of mining at Maules Creek and Boggabri Coal Mine is shown in **Figure 21** and accompanying cross sectional view shown in **Figure 22**. The final landform and rehabilitation for the Project will seek to merge into the surrounding landscape, reducing potential adverse cumulative impacts with adjoining operations.