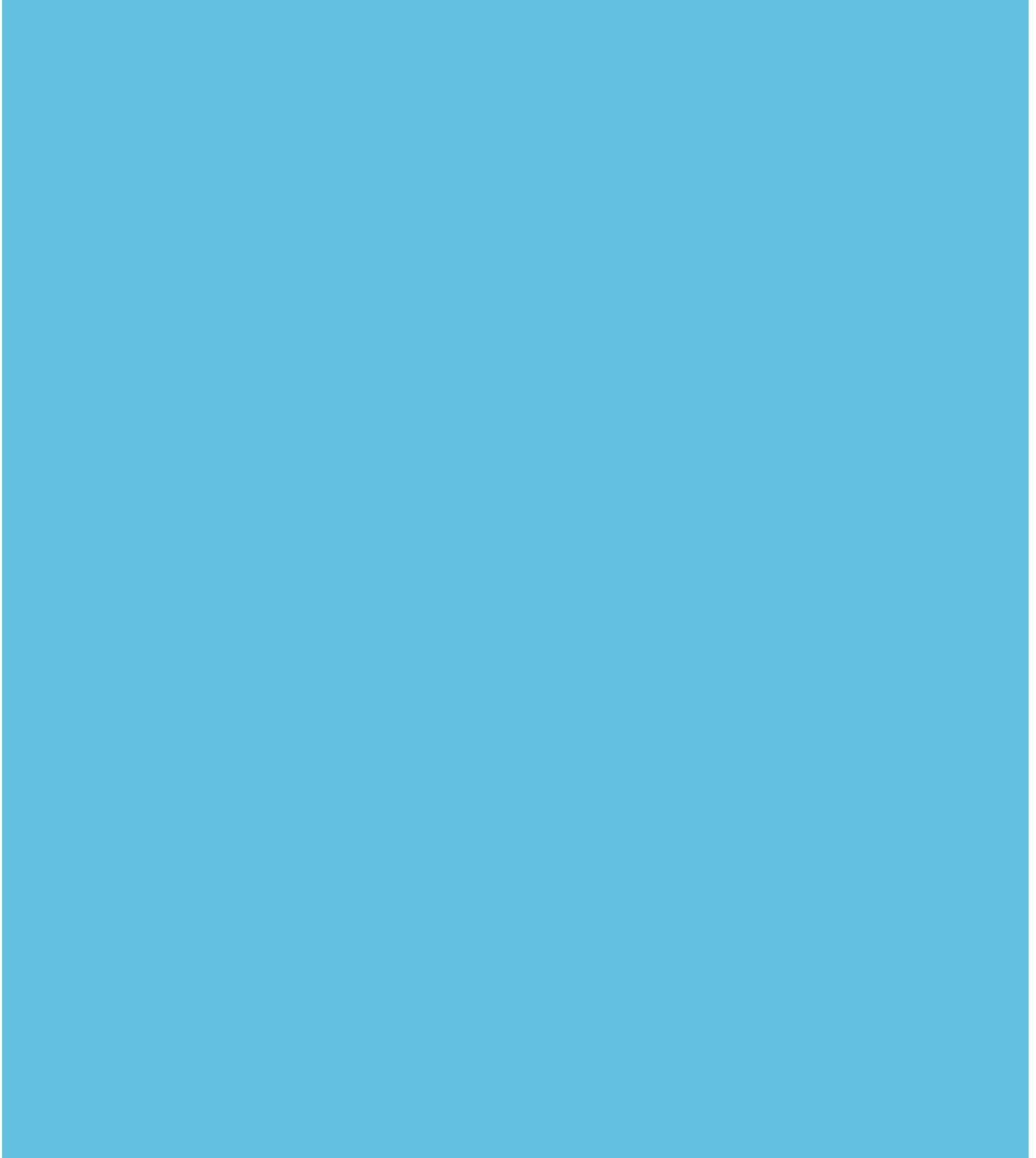


Appendix C



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Mount Thorley Warkworth Operations Pty Ltd

Accelerated Rehabilitation Plan Warkworth South Pit

Revision	Date	Description	Author	Reviewer	Approved
0	17/06/2014	Original document	B Baxter RTCA	D Bennett RTCA	30/06/2014

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1 INTRODUCTION

1.1 BACKGROUND

Mine planning during the early development at Warkworth Mine resulted in the South Pit area being left unmined due to the lower quality of coal and high stripping ratios associated with thick bands of conglomerate between coal seams. Although mining operations commenced at Warkworth in 1981, mining in South Pit was delayed until 1997. The 2001 aerial photograph in Figure 1.1 shows South Pit progressing west towards the previously mined areas of West Pit and Woodlands Pit. The later mining of South Pit has meant that the visual amenity of the eastern face of South Pit has not been improved by rehabilitation to the same extent that the eastern face on the north end of Warkworth has been.



Figure 1.1 Aerial photography from 2001 showing South Pit progression.

To maximise coal recovery from South Pit, additional strips have been mined to the West. The extended mining in South Pit and associated infrastructure requirements have resulted in rehabilitation progress in this area lagging behind the rehabilitation forecast outlined in the Environmental Impact Statement titled Extension of Warkworth Coal Mine (ERM 2002). In granting approval for Warkworth Modification 6 Planning and Environment (P&E) included a condition in the planning approval which requires Coal & Allied to prepare an Accelerated Rehabilitation Plan for

South Pit detailing how mining and dumping operations can be modified to speed up rehabilitation progress in the South Pit area.

1.2 PURPOSE

This Accelerated Rehabilitation Plan (ARP) has been prepared to outline the operational and rehabilitation activities that will be conducted in the South Pit of Warkworth Mine during the period from 2014 to 2018.

To achieve this purpose the ARP will:

- Outline the timing of mining, dumping and rehabilitation activities;
- Provide information on the quantity of dumped material required for the various stages of dump construction;
- Describe the monitoring, auditing and reporting activities ; and
- Define accountabilities for the operational, monitoring, auditing and reporting activities.

1.3 STATUTORY REQUIREMENTS

This ARP has been developed to meet the requirements of Condition 69 from Schedule 4 of Development Consent DA 300_09_0202. Table 1.1 below outlines the requirements of Condition 69 and the section where they are addressed in this ARP. The rehabilitation progression outlined in the MTW Mining Operations Plan (MOP), submitted to the Division of Resources and Energy (DRE) on 10th June 2014, is consistent with that outlined in the ARP.

Table 1.1 Consent condition requirements and section of the ARP where they are addressed

Consent Condition 69	ARP Section
The applicant shall prepare and implement an accelerated progressive rehabilitation program for the South Pit area of the site. The program must:	
(a) be prepared in consultation with the Executive Director Mineral Resources;	Section 2
(b) be submitted to the Director-General for approval by 30 June 2014, unless the Director-General agrees otherwise;	N/A
(c) describe the measures to be undertaken to implement the program;	Section 3
(d) include performance and completion criteria for evaluating the performance of the accelerated progressive rehabilitation measures;	Section 4
(e) include a timetable for the implementation of the program, including any amendments required to the MOP; and	Section 3.2
(f) include a program to monitor, independently audit and report on the effectiveness of the accelerated progressive rehabilitation measures and progress against the performance and completion criteria.	Section 5 and Section 6

2 CONSULTATION

Representatives from Coal & Allied’s Environmental Services and Mine Planning departments have met with the Team Leader Compliance (Mining) from Planning and Environment (P&E) and the Senior Inspector Environment from DRE on a number of occasions to discuss and review the accelerated rehabilitation program for South Pit. This final version of the ARP has been prepared to address the feedback received from the representatives of the two government departments.

3 IMPLEMENTATION

3.1 MINE DESIGN AND PLANNING

3.1.1 South Pit South

The final landform in South Pit South has been amended to avoid disturbing existing rehabilitation on the outer slopes. Figure 3.1 shows how the dragline spoils can be reshaped without impinging on existing rehabilitation or future mining in South Pit Extension. The eastern slopes of South Pit South will be shaped to final landform and rehabilitated in late 2014. Further rehabilitation of upper slopes will occur in 2015.

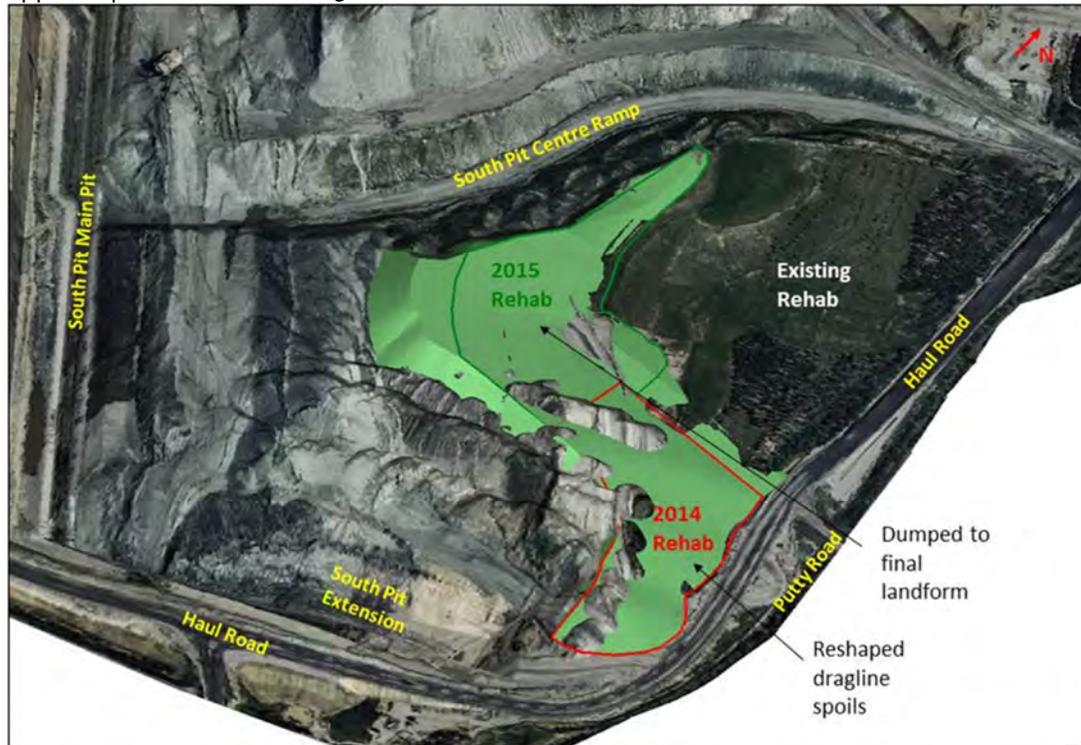


Figure 3.1 South Pit South rehabilitation in 2014 and 2015.

3.1.2 South Pit Centre

Commencement of dumping operations in the South Pit Centre (SPC) Ramp is constrained by coal mining operations in South Pit. The current pit/ramp design means the basal coal seams from South Pit Extension and the main South Pit strips are delivered to the Coal Handling and Preparation Plant via the SPC Ramp. With this pit/ramp arrangement, all of the South Pit coal, from both Strip 21 and 22, would need to be removed before dumping could commence in the SPC Ramp area.

The MTW Mine Planning department have designed a new ramp system (shown in Figure 3.2) that will allow coal and partings from Strip 22 to be transported out of the pit without the need for the SPC Ramp. Construction of the new ramp system brings SPC Ramp dumping forward by 12 months to the time of completion of Strip 21 coal removal and hence provides for earlier rehabilitation of the eastern slopes of SPC Ramp.

The alternative access system is not able to be used to remove coal from Strip 21 because there is insufficient room to establish a haul route at a suitable grade for the trucks to climb out of the pit. SPC Ramp is therefore required for coal mining access until coal mining is completed in Strip 21 in late 2015.

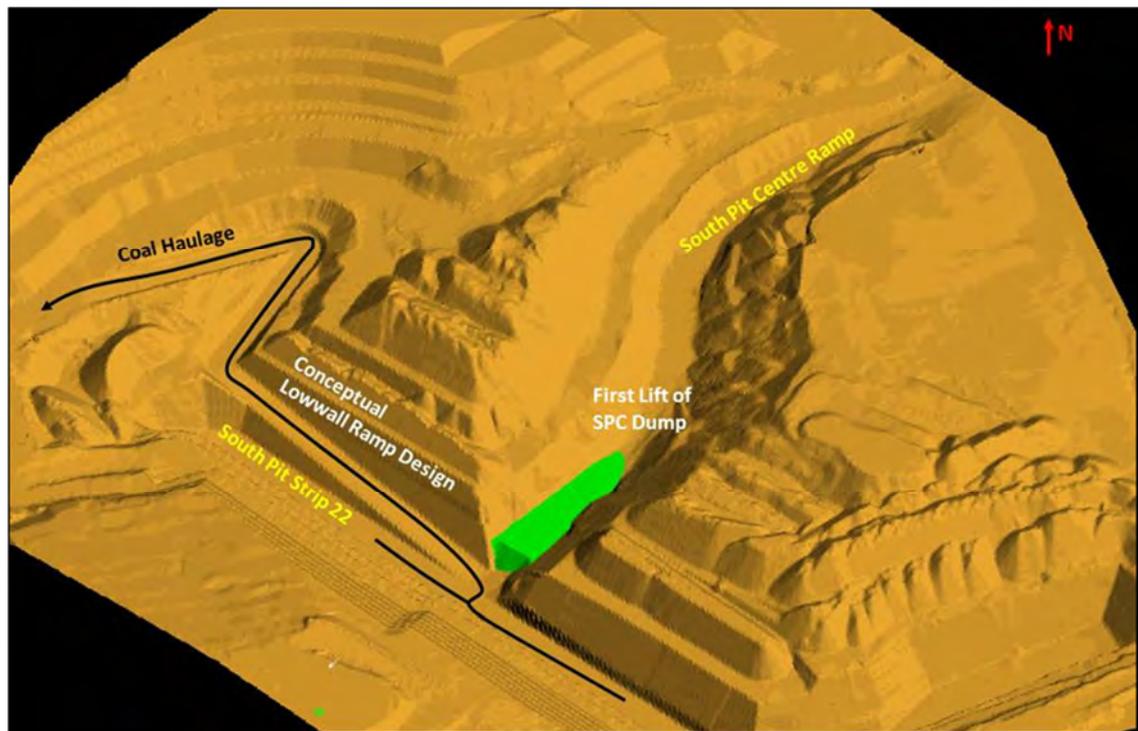


Figure 3.2 Strip 22 conceptual lowwall ramp design.

The SPC dump sequence has been designed to prioritise dumping of the eastern slope for release of areas for rehabilitation. However, the dump designs also need to consider future access to the lower lifts as this required to build the base of the overall final landform. Figure 3.3 shows the sequence of dumping required in order to release the first slope for rehabilitation, at RL 80. The lowest dump lifts have the longest haul (from West Pit) and the narrowest tip heads, so therefore

will be slower to dump in. The total volume of material required for the RL 80 SPC ramp dump is 6.7 Mbcm (million bank cubic metres).

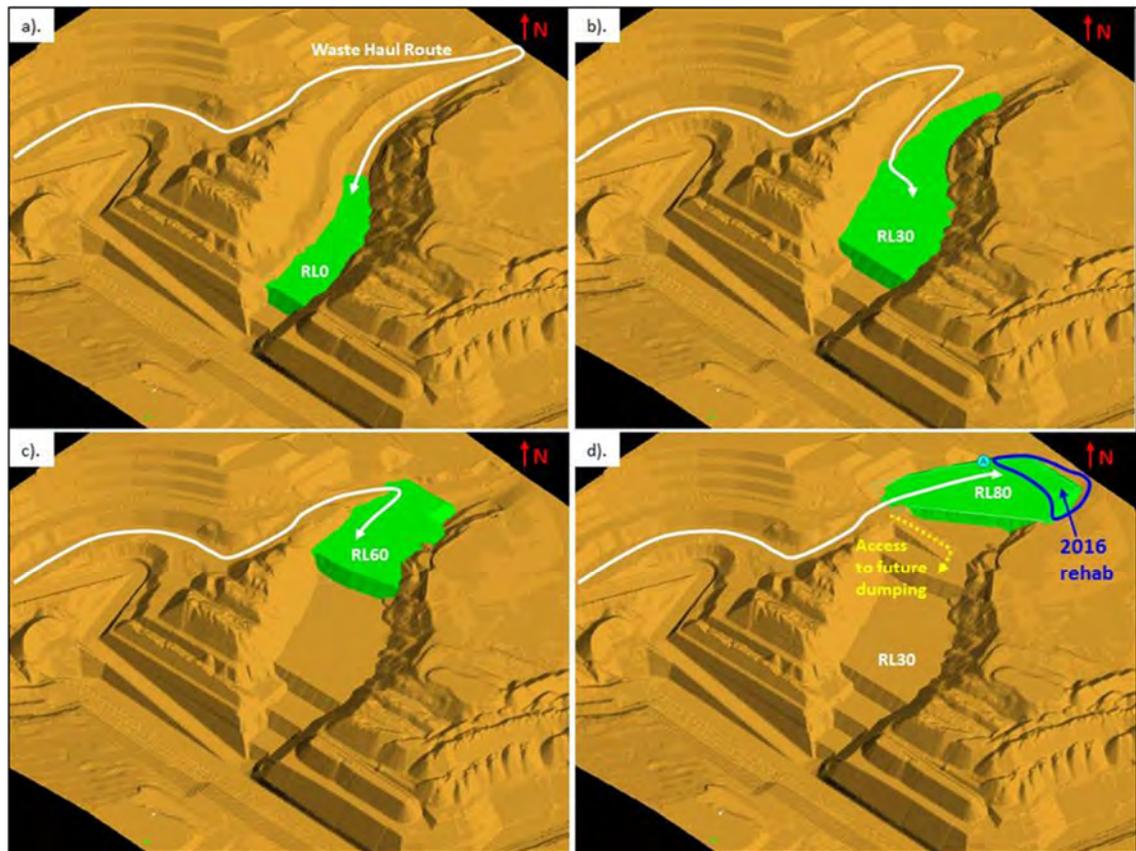


Figure 3.3 Sequence of dump lifts for RL 80 South Pit Centre Ramp dump.

Subsequent lifts, shown in Figure 3.4, follow a similar pattern prioritising dumping the eastern face while maintaining access for the future dumping sequence. Figure 3.4 a and b show that in order to achieve the eastern slope of the dump to final landform at RL140, the lower lifts for the whole centre ramp area need to be completed. The volume of material needed to fill the SPC dump from RL 80 to RL 140 is 15.4 Mbcm.

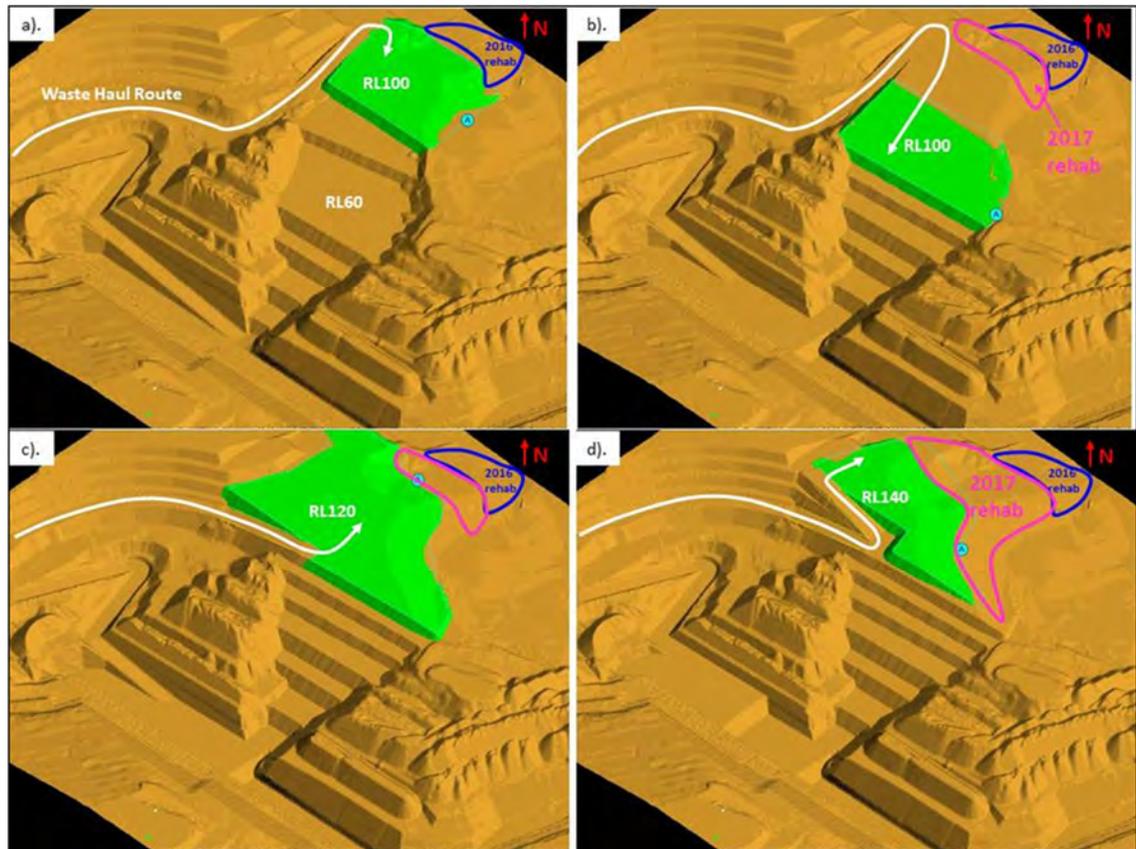


Figure 3.4 Sequence of dump lifts to RL 140 South Pit Centre Ramp dump.

Figure 3.5 shows the final dumping required to raise the final landform to RL 160 and rehabilitate some of the western slopes. This requires 12.9 Mbcm of material to build. The southern end of the pit will have un-rehabilitated dragline spoil, which has been left as provision to construct access ramps to a potential future underground mine portal in the highwall of the South Pit Extension.

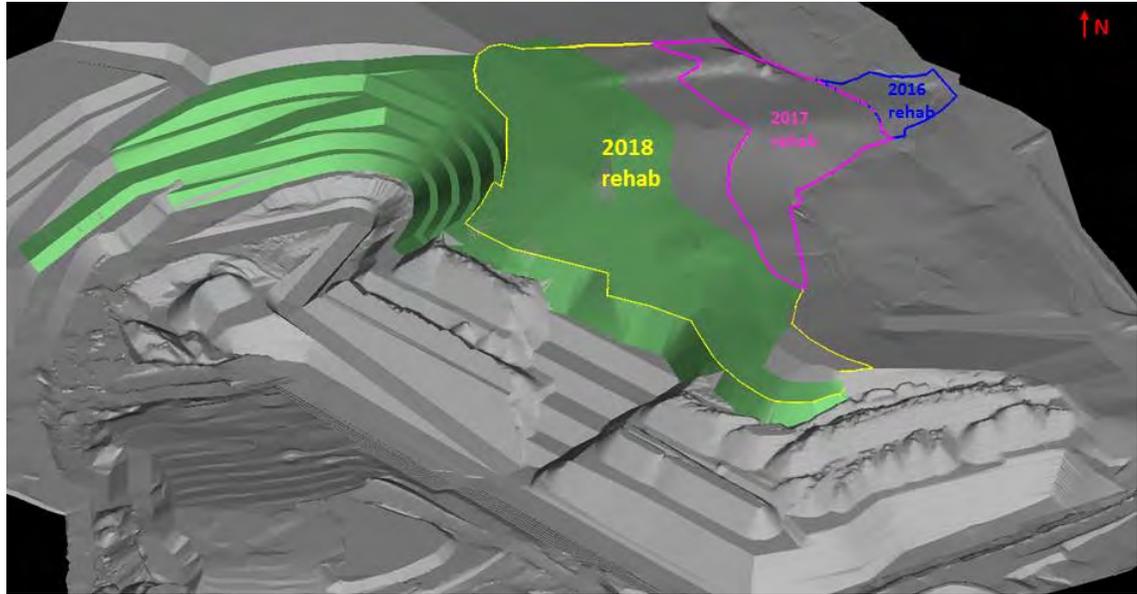


Figure 3.5 South Pit Centre dump area with rehabilitation areas for 2014 to 2018.

3.1.3 South Pit North

Dumping conducted in South Pit North during 2013 and 2014 has been prioritised to complete the eastern slopes. Rehabilitation of the eastern slopes will be progressively undertaken during 2013 and 2014 which will improve the visual amenity of Warkworth Mine when viewed from the Golden Highway and residences on the eastern side. Figure 3.6 shows the planned rehabilitation areas in South Pit North during the period 2014 to 2018.

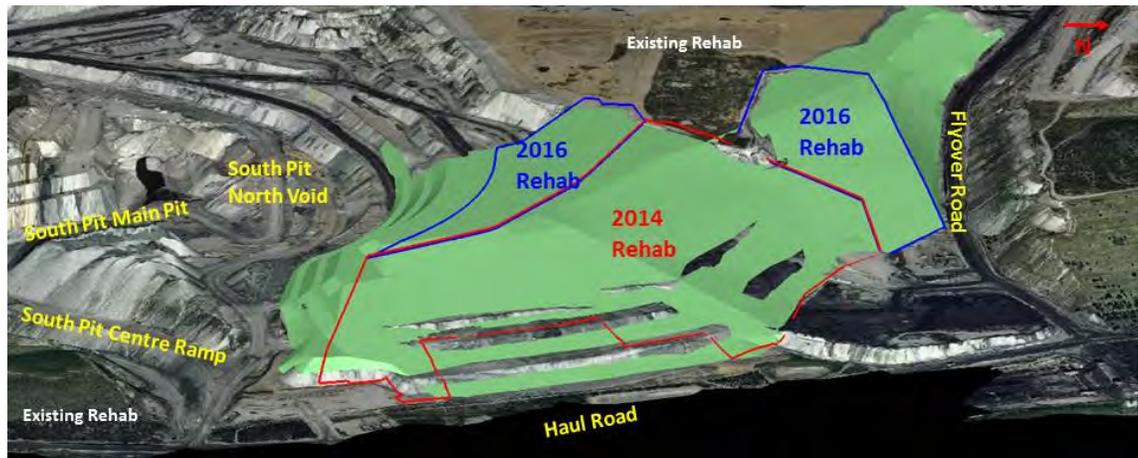


Figure 3.6 South Pit North dump area with rehabilitation areas for 2014 to 2018.

While the SPC Ramp dump sequence is occurring, the South Pit North (SPN) void becomes available for dumping. The void area does not release any slopes for rehabilitation in the period 2014 to 2018, however, it is crucial to start dumping in this area as soon as it is available to attain final landform by the end of the mine consent period (2021). Figure 3.8Point © shows that the start date of dumping is constrained by the completion of coal mining and floor blasting in Strip 22.

The first lift for SPN involves filling the whole floor of the pit to RL20, as shown in Figure 3.7a. This is the proposed operating level of infrastructure for a potential underground mine. Due to the longer haul length and concurrent dumping activities in SPC, the RL20 dump volume of 4 Mbcm will progress relatively slowly.

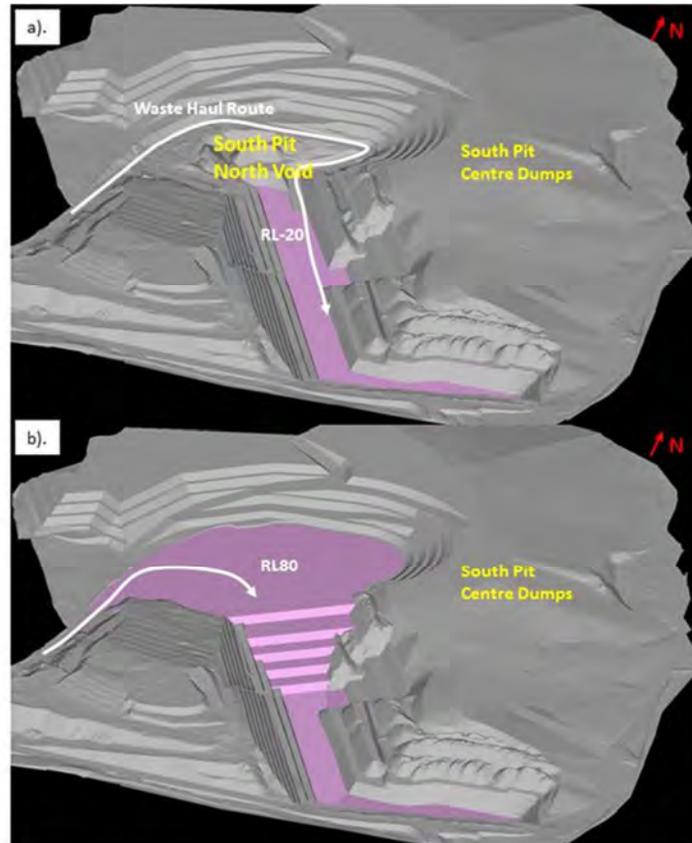


Figure 3.7 Proposed dump sequence for South Pit North void.

The main SPN void dump has a volume of 19.6 Mbcm, and will not be completed to RL 80 by the end of 2018 due to the constraints discussed for SPC dumps.

3.2 SCHEDULE, VOLUMES AND REHABILITATION AREAS

When calculating how long it will take to complete the South Pit Centre dumps, and generate a timetable of rehabilitation, a number of considerations and constraints must be factored in. The start date for SPC is constrained by the completion of Strip 21 coal mining, shown in Figure 3.8 Point ①. The mining schedule presented in Figure 3.8 includes assumptions related to breakdown maintenance of equipment, weather and environmental delays, and is the best available estimate based on current mining fleets and production levels.

- ①, ② Key constraints on start times for dumps
- ★ Dumped out area released to begin rehabilitation

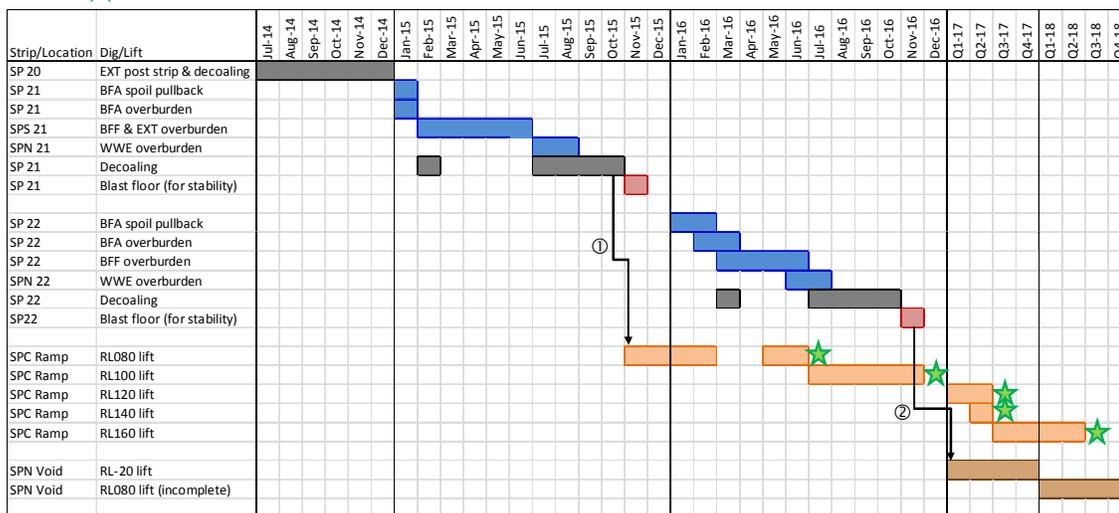


Figure 3.8 Projected schedule of mining and dumping in South Pit Centre Ramp and South Pit North Void, 2014-2018.

Table 3.1 shows a comparison of predicted haul cycle times from the different pits to SPC dump RL120 (shown in Figure 3.4c). Increased haul distances result in the following impacts:

- increased number of trucks required to keep the loading unit fully utilised;
- increased haulage cost on a \$/bank cubic metre basis;
- increased risk of hot/blown tyres due to increased TKPH (tonne kilometre per hour) value; and
- increased dust generation and noise exposure.

These constraints are prohibitive to hauling material from North Pit and Mount Thorley to the SPC dumps. However, in limiting haulage of overburden material into SPC and SP North Void to material from West Pit, MTW is still committing over 20% of the total pre-strip truck fleet to the South Pit accelerated rehabilitation program.

Table 3.1 Estimated haul cycle times from different pits to South Pit Centre dump RL120.

Pit Location	Haul Distance (km return)	Haul Cycle (mins)	Trucks required for P&H 4100
West Pit	9.8	27.5	16
North Pit	18.6	42.3	24
Mt Thorley	13.8	32.2	18

The schedule in Figure 3.8 shows how long it is estimated to take to fill each dump level. It is based on all trucks from a P&H4100 shovel hauling to SPC whenever a unit is operating in West Pit. Gaps in the schedule are due to there being no excavating equipment operating in West Pit at that time. Figure 3.3 shows that the lower lifts are narrow with longer hauls from West Pit, so take longer to dump out. As the lifts get higher in Figure 3.4, dumping will speed up due to more productive tip heads and shorter hauls. However, it is unlikely that these dumps would be able to accommodate more than one fleet of trucks at a time due to safety limitations.

Dump designs will be refined over time and interim dump lift heights may be changed. In the event this happens it will be difficult to reconcile dump progression against the schedule presented in Figure 3.8. Table 3.2 details the annual dump volumes that have been committed to the accelerated rehabilitation program in South Pit. Tracking progress in accordance with these volumes will enable the rehabilitation areas to be achieved on time but still allow some flexibility in dump design.

Table 3.2 Commitment of dump volumes (cubic metres) for the South Pit accelerated rehabilitation program.

Year	SPC Ramp	SPN Void	Total Volume
2015	1,000,000		1,000,000
2016	12,000,000		12,000,000
2017	14,000,000	4,000,000	18,000,000
2018	8,500,000	9,500,000	18,000,000
			49,000,000

As discussed previously, the lower lifts of South Pit Centre will be slower due to smaller tip heads and longer haul distances which impacts the 2015 and 2016 volumes. The 12 Mbcm planned for 2016 equates to 36% of all pre-strip material from West Pit in that year and 75% of all waste from a P&H4100 shovel. The increase to 18 Mbcm for 2017 and 2018 is facilitated by the opening of the SPN dumps. This increased volume equates to over 60% of the annual amount of pre-strip material from West Pit, or over 25% of MTW's annual pre-strip volume.

Table 3.3 summarises the annual rehabilitation areas in the South Pit area that will be completed in the period 2014 to 2018 as a result of the accelerated rehabilitation program.

Table 3.3 Annual rehabilitation areas in the South Pit area for the period 2014-2018.

Year	Rehabilitation Area (hectares)
2014	70.0
2015	8.4
2016	32.5
2017	13.8
2018	39.9
Total	164.6

3.3 EVIDENCE OF ACCELERATED SOUTH PIT REHABILITATION PROGRESS

The following mine design and planning modifications have been made to accelerate rehabilitation progress and improve the visual amenity of South Pit:

- Prioritisation of 2013 and 2014 dumping in South Pit North to allow the eastern slopes to be rehabilitated by the end of 2014;
- Modification of the final landform design to eliminate the need to dump over existing rehabilitation on the eastern face of South Pit South;
- Alteration of the final landform design in South Pit South to achieve an additional 8.6 ha of rehabilitation in 2015;

- Design of an alternative coal and parting haul route for Strip 22 in South Pit to allow dumping in South Pit Centre Ramp to be brought forward by 12 months, will result in dump area being released for rehabilitation in 2016;
- Design of dump sequences for South Pit Centre Ramp to prioritise the release of eastern facing slopes for rehabilitation; and
- Commitment of dump volumes for the South Pit accelerated rehabilitation program.

4 PERFORMANCE CRITERIA

The MTW MOP has been prepared in accordance with ESG3: Mining Operations Plan (MOP) Guidelines (September 2013) which requires performance criteria to be nominated for the various types of rehabilitation being undertaken and for each phase of rehabilitation. The performance criteria are objective target levels or values that can be measured to quantitatively demonstrate the progress and ultimate success of a biophysical process. These criteria have been developed for each phase of the rehabilitation so that the rehabilitation success can be quantitatively tracked throughout the life of the mine.

Section 5 of the MTW MOP sets out performance criteria for the secondary domains and rehabilitation phases detailed in Table 4.1.

Table 4.1 MTW MOP performance criteria - secondary domains and rehabilitation phases

Secondary Domains
Final Void
Water Management Area
Rehabilitation Area – Grassland
Rehabilitation Area – Woodland EEC
Rehabilitation Area - Woodland Other
Rehabilitation Phases
Decommissioning
Landform Establishment
Growing Media Development
Ecosystem and Landuse Establishment
Ecosystem and Landuse development

5 MONITORING AND AUDITING

Monitoring of rehabilitation progress is undertaken throughout the year to ensure that MOP rehabilitation targets will be met. The progress of the following phases of rehabilitation is tracked on a monthly basis: Land Released for Shaping, Bulk Shaping, Topsoiling and Seeding. Progress is reported to the MTW Management Team and remedial actions are taken as required to address delays in rehabilitation progress.

The quality of the rehabilitation being undertaken will be monitored in accordance with the rehabilitation monitoring program outlined in Section 7 of the MTW MOP. The monitoring methodology adopted is a standard procedure that can be replicated over any vegetation community or rehabilitation area and allows results to be used to compare similar communities.

The methodology uses a combination of:

- Landscape Function Analyses;
- accredited soil analyses; and
- measures of ecosystem diversity and habitat values.

Independent auditing of the program outlined in the ARP will be conducted as part of the Independent Environmental Audit required under Condition 10 of Schedule 6 in the Development Consent DA 300_09_0202. Independent audits will be required to be undertaken in 2015 and 2018 in accordance with DA 300_09_0202 (approved 29 January 2014).

6 REPORTING

Reporting of the progress, methods and resulting quality of rehabilitation will be reported in the Annual Environmental Review that is submitted to P&E and DRE by the end of March each year. This report is prepared in accordance with EDG03 Guidelines to the mining, rehabilitation and environmental management process (Version 3 January 2006).

7 RESPONSIBILITIES

Table 7.1 South Pit Accelerated Rehabilitation Plan Responsibilities

Role	Responsibility / Accountability
Manager Technical Services	<ul style="list-style-type: none"> ▪ Ensure Annual Operating Plans address the requirements of the ARP and MOP. ▪ Track progress of dumping in South Pit to ensure rehabilitation progress is achieved in line with ARP requirements. ▪ Design of alternative coal/parting haulage access for South Pit Strip 22.
Manager Mining	<ul style="list-style-type: none"> ▪ Implement mining and dumping plans to provide for release of dumps for rehabilitation in line with ARP requirements
Manager Projects	<ul style="list-style-type: none"> ▪ Provide adequate budget and resources for annual rehabilitation programs. ▪ Implementation of annual rehabilitation programs (including bulk shaping, water management, topsoiling and spreading of soil ameliorants).
Manager Environmental Services	<ul style="list-style-type: none"> ▪ Provide adequate budget and resources for annual rehabilitation program. ▪ Monthly reporting of rehabilitation progress. ▪ Annual reporting of rehabilitation progress and quality in Annual Environmental Review.
Environmental Specialist - Systems	<ul style="list-style-type: none"> ▪ Schedule and implement Independent Environmental Audit for Warkworth, include progress of ARP in audit scope.
Environmental Specialist - Rehabilitation	<ul style="list-style-type: none"> ▪ Implementation of annual rehabilitation programs (including soil preparation, weed control and sowing). ▪ Implementation of rehabilitation monitoring program in accordance with MOP requirements. ▪ Review ARP annually.

8 REFERENCES

- ERM (2002) *Environmental Impact Statement, Extension of Warkworth Coal Mine*, August 2002.
- NSW Government
Department of Planning
and Infrastructure (2014) *Development Consent DA 300_09_0202 Warkworth Modification 6*, January 2014.
- NSW Government
Department of Primary
Industries (2006) *Guidelines to the Mining, Rehabilitation and Environmental Management Process – Version 3*, January 2006.



Contact: Scott Brooks
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Our ref: 300-9-2002-i

The General Manager
Mt Thorley-Warkworth Mine
PO Box 267
SINGLETON NSW 2330

Attention: Andrew Speechly

Dear Andrew,

Warkworth Condition 69, Accelerated Rehabilitation Program South Pit.

On the 30th June 2014 Bill Baxter provided me a copy of the report titled Accelerated Rehabilitation Plan Warkworth South Pit. This report is a requirement of Condition 69 Schedule 3 of the revised Warkworth consent. Prior to the submission of this report, joint DRE, DP&E meetings were held with your company to determine reasonable and feasible measures to accelerate rehabilitation in the South Pit of the Warkworth mine. As a part of the reports review, DRE were consulted and our Department briefly reviewed the draft Warkworth Mining Operations Plan to ensure consistency between the 2 documents.

The report has been reviewed and we can advise it has been approved by the Secretary, Department of Planning & Environment.

In our negotiations and review of the document we agreed at this stage that whilst the nominated outcome in your current consent is for the void to be completely backfilled, it may be possible to have the area be an entry for future underground mining. The application for this change is within the Warkworth Continuation project currently with the Department. There is nothing in the current Accelerated Rehabilitation Plan that prevents eventual backfill of the Warkworth south pit. Should your current application for the Warkworth Continuation Project be refused, we will need to continue the current accelerated program past the current 2018 identified in the report.

Should you need to discuss the matter, please contact Scott Brooks on telephone number 6575 3401 or by email to Scott.brooks@planning.nsw.gov.au.

Yours sincerely

Scott Brooks

Team Leader, Compliance, Singleton

As Nominee of the Secretary, Department of Planning & Environment.

11-7-2014

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