8 Soils and agriculture

8.1 Project changes and assessment

The Project footprint has been changed, particularly in the mine infrastructure areas; the out-of-pit tailings emplacements area; and along the Spring Ridge Road diversion and mine access roads. The progressive and post-closure rehabilitation calculations have been updated for these changes using higher resolution soil mapping based on additional soil survey data.

8.1.1 Assessment method

An additional soils survey, including collecting field samples, laboratory analyses and mapping, was undertaken in November and December 2012. This increased the soil map resolution in the mining areas from 1:250,000 to 1:50,000 in response to comments from the Department of Primary Industries (DPI). The survey and rehabilitation calculations used methods described in the EA (Appendix F). The results and an updated rehabilitation strategy are provided in Appendix G of this report.

8.1.2 Environmental management

The environmental management and rehabilitation measures described in the main EA (Section 9.4) will be implemented.

8.1.3 Impacts

The EA determined that Rural Land Capability Class III to VII land will be disturbed but not Rural Land Capability Class I or II land. The realigned mine access road will now disturb 3 ha of Class II land.

The post-mining landform will be capable of accommodating cropping (Class III) and grazing (Class IV) enterprises and will contain some land that will be revegetated for erosion control (Class VI). It was previously proposed that the area of Class III in the post-mining landform would increase by about 300 ha compared to the pre-mining area. However, it is now proposed to rehabilitate a smaller area to Class III but to provide greater soil depths in these areas to meet the DPI's recommended soil depths (Table 3.4). In areas to be reinstated to Class III land, it is proposed to increase the soil depth from 200 mm of topsoil and 300 mm of subsoil to 300 mm of topsoil, 500 mm of subsoil and a 300 mm layer of ripped waste rock that will act as subsoil. The differences between the pre- and post-mining Rural Land Class areas are provided in Table 8.1.

Table 8.1 Post-mining rural land capability – disturbance footprint

Land capability	EA (Table 9.15)			Update (Table 4.2, Appendix G)		
Class	**Pre-mining area (ha)**	**Post-mining area (ha)**	**Difference**	**Pre-mining area (ha)**	**Post-mining area (ha)**	**Difference**
I	0	0	0	0	0	0
II	0	0	0	3	0	-3
III	782	1,105	323	439	439	0
IV	2,380	1,743	-637	2,109	2,345	236
V	435	156	-279	132	28	-104
VI	790	1,406	616	1,484	1,468	-16
VII	313	5	-308	369	20	-349
VIII	0	285	285	0	236	236
Total	**4,766**	**4,766**	**-**	**4,536**	**4,536**	**-**

The final land use map is provided in and Figure 3.11 and aerial views of the final land form and use are provided in Figures 8.1 to 8.3.

8.2 Response to submissions

8.2.1 Assessment of the loss of agricultural resources

Submissions

I-15, I-79, I-80, I-84, I-116, I-118, I-157, I-179, I-185, G-5, G-15

Issue

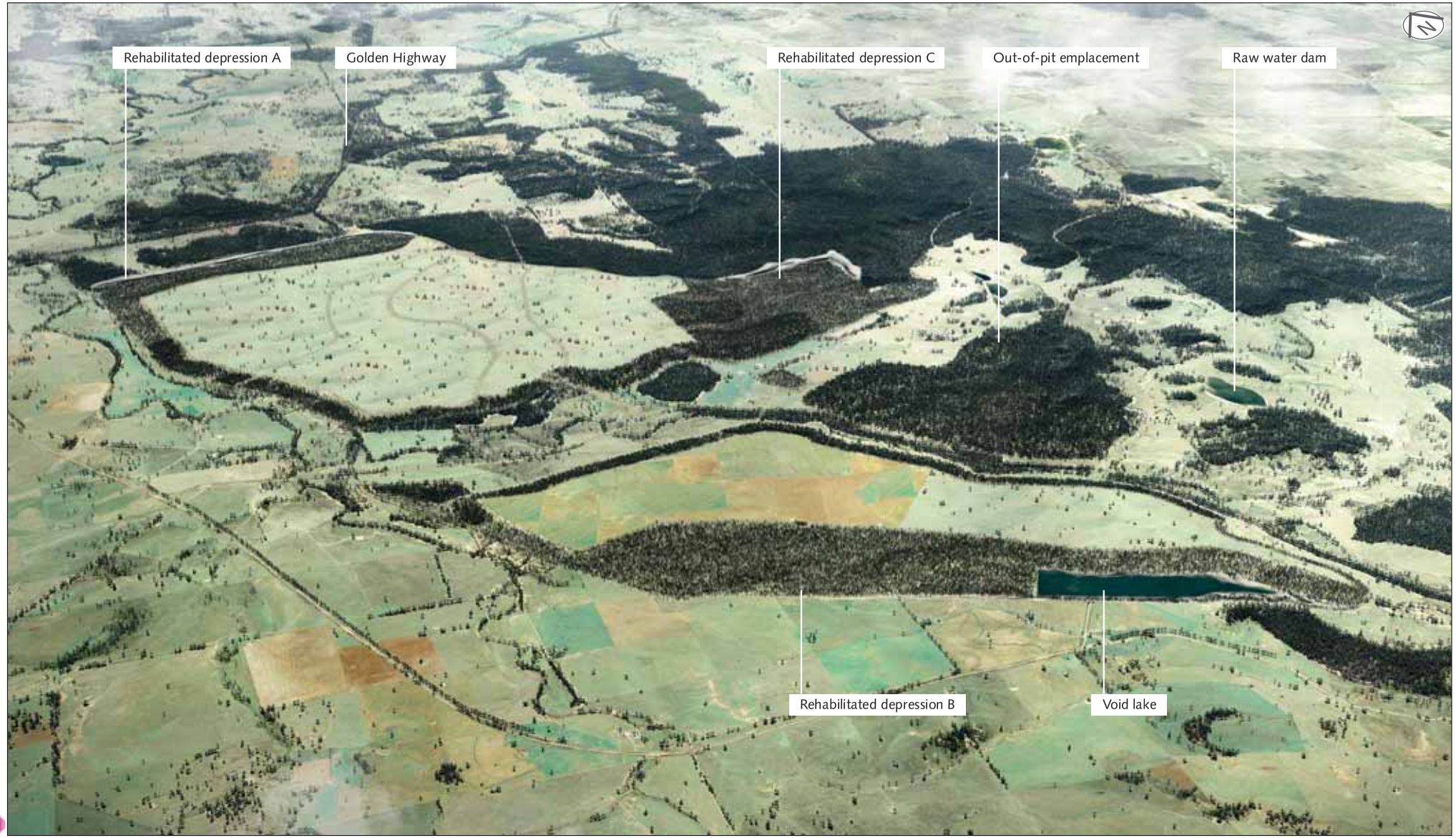
These submissions comment the EA did not adequately assess loss of farming activity and broad-scale food production.

Response

An agricultural impact statement (AIS) is required for all new state-significant development applications for mining projects that have the potential to affect agricultural resources or industries. While the Project is not classified as a state significant development, an AIS was prepared to satisfy the Director General's environmental assessment requirements for the Project.

The AIS describes the amount of farming land lost and the impacts of this loss in accordance with the Agricultural Impact Statement Guideline (DP&I 2012) and provides the following:

- a description of agriculture in the region, including the agricultural resources and agricultural production within and surrounding the disturbance footprint;
- the impacts of the Project on agricultural resources or industries, including the Project's water use; and
- options for minimising adverse impacts on agricultural resources, including agricultural lands, enterprises and infrastructure at the local and regional levels.

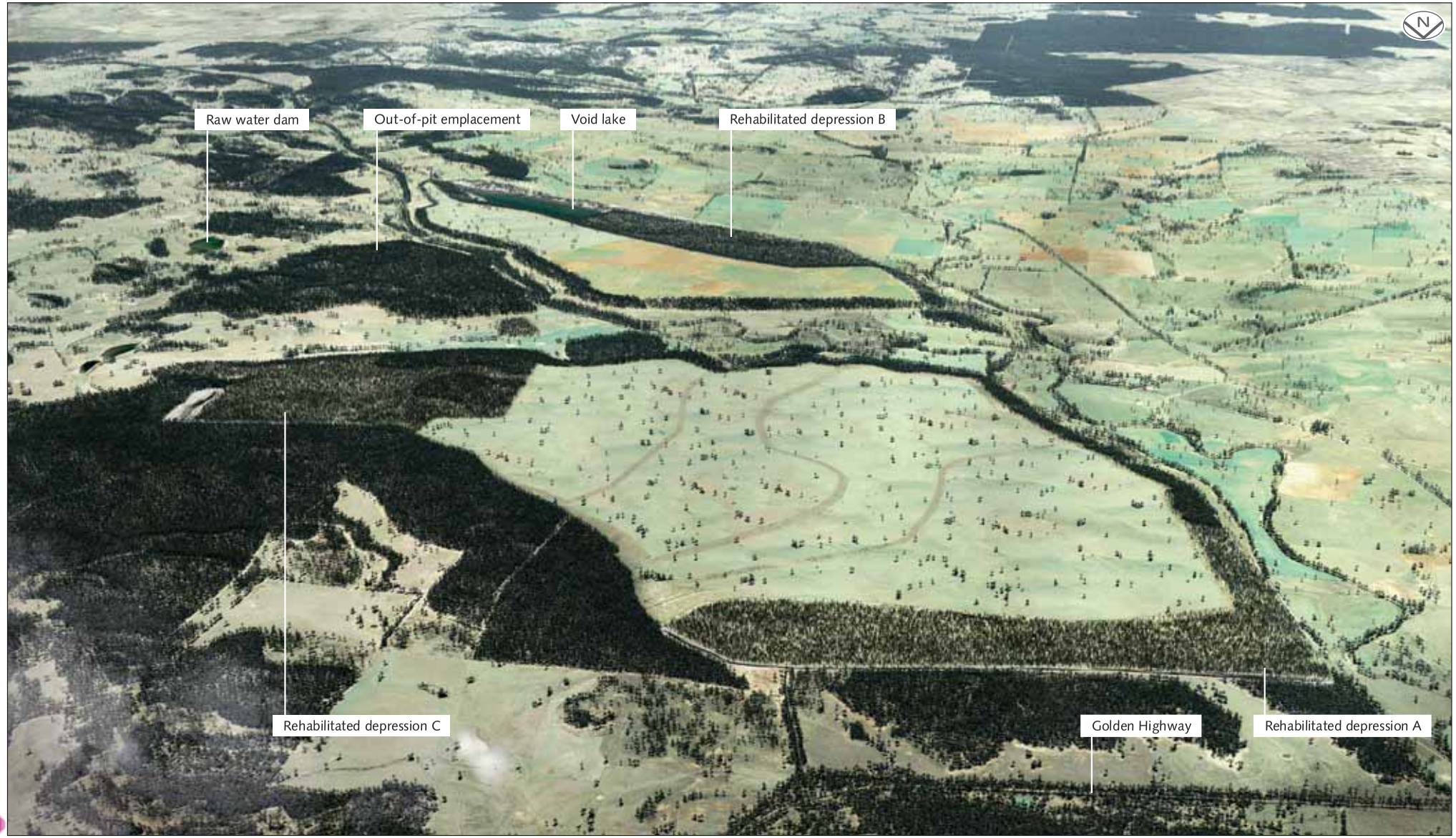


Integrated Design Solutions | 030518 Cobbora Coal Project - Rehabilitated Landform Rev B - 29 January 2013

Rehabilitated Landform - View to the North-east

Cobbora Coal Project - Preferred Project Report and Response to Submissions

Figure 8.1



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EMM

Cobbora Holding Company Pty Limited

Rehabilitated Landform - View to the South

Cobbora Coal Project - Preferred Project Report and Response to Submissions

Figure 8.2

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Rehabilitated Landform - View to the North-west

Cobbora Coal Project - Preferred Project Report and Response to Submissions

Figure 8.3

8.2.2 Soil surveys

Submissions

NA-11, NA-13

Issue

These submissions comment that higher resolution soil maps (1:50,000), further identification of soil depths and limitations, and ongoing soil monitoring and assessment are, or will be, required.

Response

An additional soil survey was made based on discussions with the DPI. It is described in Section 8.1.1 and the results are presented in Appendix 1 of Appendix G 'Mine rehabilitation strategy'. This provides more detailed information on the soil types, their limitations and their use for rehabilitation.

8.2.3 Impacts on the agriculture sector

Submissions

NA-11, G-5, G-10, G-13, G-15, I-4, I-8, I-12, I-13, I-15, I-21, I-23, I-27, I-29, I-37, I-40, I-43, I-47, I-61, I-62, I-35, I-55, I-58, I-64, I-65, I-68, I-72, I-73, I-74, I-75, I-76, I-80, I-84, I-98, I-100, I-106, I-110, I-111, I-112, I-113, I-114, I-117, I-118, I-119, I-128, I-133, I-135, I-136, I-137, I-139, I-140, I-142, I-145, I-148, I-149, I-151, I-152, I-153, I-157, I-158, I-159, I-160, I-168, I-170, I-172, I-179, I-181, I-185

Issue

These submissions comment that the Project will disturb about 4,700 ha of land that has important conservation and agricultural value. Many of the submissions reference the impacts of the open cut coal mines in the Hunter Valley. Submissions also comment the mine will distort the local workforce and compete with agriculture for workers.

Response

The main EA (Section 1.3.2) assesses impacts based on a potential disturbance area of about 4,700 ha. This has been reduced to 4,540 ha (see Section 3.2).

As described in Appendix F of the EA, the quality of rural land in NSW has been historically mapped according to two different land classification systems. The first of these is known as the Rural Land Capability system, which identifies eight possible land classes, with Rural Land Capability decreasing progressively from Class I to Class VIII. Class I is the most productive and Class VIII the least productive. The second system is known as the Agricultural Suitability system and ranks lands according to their relative productivity for a range of agricultural activities. Class 1 is the most productive and Class 5 the least productive.

The Rural Land Capability classification system aims to mark out, or delineate, the various classes of rural lands on whether they can remain stable under particular land uses. The system classifies the land for its inherent physical characteristics or physical constraints and indicates measures needed to protect the land from soil erosion and other forms of land degradation. It therefore considers the best use of land rather than the maximum use. The Rural Land Capability classification system does not imply any aspect of agricultural suitability, which can involve connection to markets, availability of water and other facilities.

The Agricultural Suitability classification system aims to satisfy these agricultural suitability aspects. Class 1 ranks the land as most suitable for agricultural activities and Class 5 as the least suitable. Classes 1 to 3 are generally considered suitable for a wide variety of agricultural production whereas Classes 4 and 5 are unsuitable for cropping; however, they are suitable for some grazing activities. The revised disturbance areas within each Rural Land Capability Class and Agricultural Suitability Class are provided in Table 8.2 and Table 8.3 respectively.

Table 8.2 Existing Rural Land Capability Class

Rural Land Capability Class	Land use	Management options	Area (ha)	Percentage of disturbance area (%)
I	Regular cultivation	No erosion control requirements	0	0
II	Regular cultivation	Simple requirements, such as crop rotation and minor strategic works	3	<1.0
III	Regular cultivation	Intensive soil conservation measures required, such as contour banks and waterways	439	9.7
IV	Grazing, occasional cultivation	Simple practices, such as stock control and fertiliser application	2,109	46.5
V	Grazing, occasional cultivation	Intensive soil conservation measures required, such as contour ripping and banks	132	2.9
VI	Grazing only	Managed to maintain groundcover	1,484	32.7
VII	Unsuitable for rural production	Green timber maintained to control erosion	369	8.1
VIII	Unsuitable for rural production	Should not be cleared, logged or grazed	0	0
Total			**4,536**	**100**

Sources: Cunningham et al. (1988) and updated Mine Rehabilitation Strategy (Appendix G).

Table 8.3 Existing Agricultural Suitability Class

Class	Land use	Management options	ha	Percentage of disturbance area (%)
1	Highly productive land suited to both row and field crops	Arable land suitable for intensive cultivation where constraints to sustained high levels of agricultural production are minor or absent	3	<1.0
2	Highly productive land suited to both row and field crops	Arable land suitable for regular cultivation for crops but not suited to continuous cultivation	439	9.7
3	Moderately productive lands suited to improved pasture and to cropping within a pasture rotation	Grazing land or land well suited to pasture improvement. It may be cultivated or cropped in rotation with pasture	2,241	49.4
4	Marginal lands not suitable for cultivation and with a low to very low productivity for grazing	Land suitable for grazing but not for cultivation. Agriculture is based on native or improved pastures established using minimum tillage	1,484	32.7
5	Marginal lands not suitable for cultivation and with a low to very low productivity for grazing	Land unsuitable for agriculture or at best suited only to light grazing	369	8.1
Total			**4,536**	**100**

Sources: NSW Agriculture & Fisheries (1990) and updated Mine Rehabilitation Strategy (Appendix G).

Almost half of the disturbance footprint is Rural Land Classification Class IV (grazing, occasional cultivation) and less than 10% is Class I or II. Using the Agricultural Suitability Class system, almost half of the disturbance footprint is Class 3 and less than 10% is Class 1 or 2. So while the Project will impact agricultural land, it is not land in the highest two classes that is suited to continuous cropping.

The impacts of removing agricultural land from production are described in Appendix G of the EA. The Project will result in the direct loss of farming lands, use water that could otherwise be used for agriculture and require biodiversity offsets. However, the economic benefits are predicted to outweigh these losses (Table 8.4).

Table 8.4 Regional economic impacts of the Project and displaced agriculture

	Total agricultural impact[1]	Project
Direct output ($M)	5.6[2]	535.4
Direct value added ($M)	2.6	99.5
Direct income ($M)	1.2	49.7
Direct employment (no.)	51	482
Direct and indirect output ($M)	8.3	713.9
Direct and indirect value added ($M)	3.7	183.6
Direct and indirect income ($M)	2	102.4
Direct and indirect employment (number)	63	1,170

Notes: Source: Appendix 1 of EA Appendix G (Table 4.11).

1. These calculations are based on a disturbance footprint of about 4,700 ha. This has been reduced to about 4,540 ha and are based on operational costs so are unaffected by the changes to final land use.

2. Does not include addition impact of $0.3 million for additional water use.

The updated groundwater modelling (Appendix E) indicates the peak mine inflow rate from groundwater sources will be 2,723 ML/a (previously 1,775 ML). This will be about 799 ML/a from the Talbragar River and about 1,924 ML/afrom the Gunnedah-Oxley Basin groundwater source. CHC has obtained licences from each water source, with 1,780 ML/a secured for the Talbragah River Water Source (ie more than required) and 1,024 ML/a secured for the Gunnedah-Oxley Basin groundwater source (ie further 900 ML/a required) as described in Section 7.6 of Appendix E 'Groundwater assessment'.

The total maximum surface and groundwater licences required for the Project are 6,034 ML (3,311 ML from the Cudgegong River, 799 ML from the Talbragar River and 1,924 ML from the Gunnedah-Oxley Basin groundwater source), an increase of 18%. As described in the EA (Section 9.5.5), the gross margin for the production of high yielding, spray irrigated lucerne using this water allocation has been calculated to estimate the maximum agricultural return from this water. It requires about 8 ML/ha annually to produce spray irrigated lucerne and the total gross margin for this enterprise would be $1,405/ha (five cuts each producing 2.5 t). Therefore, the gross margin is $176/ML of water. In total, 754 ha of lucerne could be produced with 6,033 ML of water, so it is estimated the water licences the Project will hold could generate $1.8 million annually (previously $1.5 million annually) if used to produce a high yielding crop (ie an additional $0.3 million). This does not materially change the economic comparison between continued agriculture and development of the Project.

Responses to comments about the area of native vegetation disturbed are provided in Chapter 9.

As a new employer in the region, it is evitable the Project will compete with other sectors for employees, particularly given its commitments to minimise fly-in/fly-out and drive-in/drive-out employment. However, as described in Section 20.2.2, training programs will maximise the pool of workers with the skills to work on the Project while minimising the draw on the workers from the agricultural sector.

8.2.4 Removal of farmland

Submissions

I-34, I-70, I-73, I101, I-105, I-121, I-122, I-134

Issue

These submissions comment the Project will cause the irreversible loss of farmland and farming communities.

Response

Submissions comment the Project will remove farmland, but the majority of the loss will be temporary, with farmland replaced as part of the progressive rehabilitation. Permanent losses will occur as a result of the final void and high walls (143 ha) (see Appendix G) and through the dedication of farmland as biodiversity offsets (see Section 9.2.19).

Disruption of the local community is addressed in Section 20.2.4.

8.2.5 Agricultural production on CHC-owned land

Submissions

C-3

Issue

Wellington Shire Council comments the agricultural industry is important to the local economy and CHC should be required to maintain the agricultural productivity of land it owns, except for the actual mine site and biodiversity offset lands.

Response

CHC recognises the importance of agriculture in the area and that acquiring properties has affected this. With the acquisition program close to complete, CHC is preparing a land management plan with a comprehensive and long-term approach to properties that it owns. This will include leasing land to farmers with conditions the land must be appropriately maintained and used for ongoing agricultural production. Of the 32,538 ha CHC owns, 30,468 ha continues to be farmed via lease or licence arrangements (ie 93%).

8.2.6 Food security

Submissions

G-22, I-22, I-91, I-101

Issue

These submissions comment the destruction of farmland and loss of food production along with increasing population will increasingly jeopardise Australian and global food security, which will become an even greater problem in the future.

Response

The majority of the agricultural properties within the disturbance footprint are used for cattle and/or sheep production. In 2011–12, Australia exported 66% of its total beef and veal production (Meat and Livestock Australia 2013a), 49% of all lamb and 97.5% of all mutton (Meat and Livestock Australia 2013b). If it is assumed domestic food security will be prioritised over the export of agricultural products, changes to grazing land will not jeopardise food security in the country. However, the temporary or permanent loss of agricultural land due to the Project will have economic impacts as discussed in Section 8.2.3.

8.2.7 Soil availability for rehabilitation

Submissions

G-10, I-28

Issue

One submission comments that much of the topsoil in the disturbance footprint area has limitations (eg sodicity and weak structure) so it is not ideal for rehabilitation, and that all subsoils are unsuitable for rehabilitation due to severe physical and chemical limitations. One submission believes the rehabilitation in the proposal will be inadequate in providing useful land after mine closure. One submission comments the topsoil stockpile is miniscule, indicating the topsoil is fragile and shallow and the proposed rehabilitation is inadequate.

Response

The EA (Section 9.5.4) considered the soil resources available for rehabilitation. This has been updated based on the higher resolution soil mapping and the DPI's comments about soil depth requirements (see Section 8.1.3) for re-instated Class III land (Appendix G). With the proposed soil stripping, handling, stockpiling and replacement measures, there is enough soil for the proposed final land uses. It is correct the existing agricultural soils have a range of chemical and physical limitations, as described in Appendix F of the EA and updated in Appendix G of this report. However, measures to improve, or ameliorate, these properties (such as adding gypsum or lime) have been identified for each soil type in Appendix G. These measures will be further detailed in the soil management plan.

8.2.8 Impact of climate change on rehabilitation

Submissions

G-10

Issue

This submission comments that no consideration has been given to the impact of extreme weather conditions in a drier climate on the success of the ecological outcomes of the proposed rehabilitation.

Response

The impacts of climate change on the rehabilitation program cannot be predicted. However, the rehabilitation monitoring program and the success criteria presented in the EA will be used to determine whether additional resources are required to achieve the success criteria. The DRE rehabilitation bond will only be returned to CHC in full once rehabilitation has been successfully completed.

8.2.9 Rehabilitation success for agricultural land

Submission

NA-13, G-10

Issue

The DP&I comments the final landform will increase the area of Class 3 land [the area of Agricultural Suitability Class 3 and Rural Land Capability Class III is the same in the Project footprint] but that this is not well justified in the EA. One submission comments the EA provides conflicting figures for the destruction and replacement of Class III agricultural land and doubts whether Class III land can be successful reinstated, particularly over former tailings storages.

Response

The area of land to be rehabilitated to Rural Land Class III (and Agricultural Suitability Class 3) has been reduced to allow soil to be replaced to a greater depth (see Section 8.1.3) in these areas. The updated soil availability assessment (Appendix G) confirms enough soil will be available to meet the proposed final land use objectives. The EA acknowledges tailings emplacements will continue to be rehabilitated after mining operations cease. An updated tailings emplacement rehabilitation schedule is provided in Table 3.4 and described in detail in Appendix B. As described in the main EA (Section 9.4.1), tailings emplacements will be covered with:

- a cap of at least 1 m low permeability material;
- a 'capillary break' (with wide interstitial spacing) at least 1.2 m thick preventing water moving upwards to the soil layer; and
- topsoil or suitable top dressing at least 0.3 m thick.

The final cover design will be developed in consultation with DTIRIS. This will provide a flat landform with soils suitable for agricultural activities.

8.2.10 Final slopes and contours

Submission

NA-13

Issue

The DP&I comments there is insufficient detail or commitments about final slopes on batters within the mining operations domain. The slopes appear to be generally >10° slopes on outside batters (EA Appendix F, Figure 4.1 indicates 10–18° or 32–56° slopes).

Response

Figure 4.1 shows the slope as a percentage rather than in degrees (a 10° slope is the same as a slope of about 18%). Most of the batters will have a slope of 10 to 20%. Appendix G provides an updated figure (Figure 4.1) showing the slopes in the final landform is provided.

8.2.11 Soils stripped during construction of linear infrastructure

Submission

NA-13

Issue

The DP&I comments that topsoils and subsoils from constructing the rail spur line are not identified as a resource for rehabilitation in the rehabilitation management strategy and asks what is proposed for managing and rehabilitating the rail spur line, and if soil is stockpiled, how and where will it be managed.

Response

Soil stripped during the construction of linear infrastructure will be stockpiled within the construction area and used to rehabilitate these construction areas, eg above trenches, construction compounds or lay-down areas. Any soil not used for rehabilitation in these areas will be used to progressively rehabilitate the mine rather than being stored and used to rehabilitate infrastructure areas after mine closure.

8.2.12 Rehabilitation plan

Submission

NA-3

Issue

The DRE comments that should the Project be approved, for the rehabilitation strategy to be implemented successfully will require detailed operational plans, monitoring and regulation. The DRE recommends the plans:

- be prepared in accordance with NSW Trade and Investment guidelines and in consultation with relevant agencies and stakeholders;
- be submitted and approved by the Director General NSW Trade and Investment prior to the commencement of construction; and
- address all aspects of rehabilitation and mine closure, including final land use assessment, rehabilitation objectives, domain objectives, completion criteria and rehabilitation monitoring.

The DRE states it would be pleased to meet with the proponent to help develop these documents.

Response

Rehabilitation plans will be prepared in consultation with the DRE to meet these requirements.

8.2.13 Long-term release of contaminants

Submission

NA-13

Issue

The DP&I comments the rehabilitation strategy does not include criteria related to chemical contaminants, long-term chemical stability, migration of contaminants from seepage from emplacements or long-term seepage from pit shell to groundwater or surface waters for the final void and emplacement domains.

Response

Contamination of groundwater by leachate from emplaced waste rock is not predicted based on geochemical test work results (see Chapter 5). Modelling the final void indicates it will be a groundwater sink and water from the void lake will not flow into surrounding aquifers. These are predictions based on analysing representative waste rock samples and an understanding of the groundwater system built up through baseline monitoring and tests (eg pump tests). There will be an extensive groundwater monitoring program during and after mining to test these predictions. As described in the Main EA (Section 3.20), a detailed mine closure plan will be prepared in Year 15 that uses the monitoring data collected to that point to refine the impact predictions. It will also include detailed mine closure management measures.

8.2.14 Removal rail bridges/embankments at road crossings

Submission

NA-13

Issue

The DP&I notes that decommissioning the rail spur line does not specifically mention removing bridges and associated infrastructure over creeks and roads. The EA states embankments and cuttings will remain post-closure; however, some embankments will need to be removed, particularly around road crossings. A key issue will be the long-term stability of cuttings and embankments if retained in the landscape.

Response

Cuttings and embankments will be constructed so they are stable during and after the Project life. After mine closure, the bridge carrying the Castlereagh Highway over the rail spur will be removed and the area beneath the bridge filled to provide a stable landform requiring no ongoing maintenance. Similarly, the other rail bridges will be removed and the remaining embankments and cuttings further stabilised if required.

8.3 Conclusion

The rehabilitation strategy has been updated based on the changes to the Project footprint and an additional soils survey. This includes reducing the area of Rural Land Capability Class III that will be re-instated from 1,105 ha to 439 ha. This will match the area of Class III land disturbed.

The statement of commitments has been amended as follows:

- no Rural Land Capability Class I land and less than 3 ha of Class II will be disturbed in the PAA; and
- an equal area of Class III land to that disturbed will be reinstated following mining.