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AUSTAR COAL MINE
PART OF THE YANCOAL AUSTRALIA GROUP

AUSTAR COAL MINE LWA7-A10 MODIFICATION – STAGE 3 AREA

ENVIRONMENTAL ASSESSMENT

October 2013

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ENVIRONMENTAL ASSESSMENT

October 2013

Prepared by
Umwelt (Australia) Pty Limited

on behalf of
Austar Coal Mine Pty Ltd

Project Director:	**Barbara Crossley**
Project Manager:	**Gabrielle Allan**
Report No.	**3264/R02/FINAL**
Date:	**October 2013**

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Executive Summary

Austar Coal Mine Pty Ltd (Austar) is seeking to modify Project Approval 08_0111 to allow for the extension of longwalls A7 to A10 in the Austar Coal Mine Stage 3 mining area, located approximately 10 kilometres south of Cessnock. This modification is referred to as the A7-A10 Modification and is sought under Section 75W of the *Environmental Planning and Assessment Act 1979*.

The scope of the Proposed LWA7–A10 Modification is limited to the extension of longwalls A7 to A10 by between approximately 100 and 300 metres to the west. Approval to retract the starting position of longwall A8 is also sought in accordance with Condition 3, Schedule 3 of Project Approval 08_0111. The proposed westerly extension to longwalls A7 to A10 provides access to an additional 1.05 million tonnes of ROM coal. No other changes to the approved Stage 3 mining operations are proposed as part of the modification.

With the commencement of longwall mining in the Stage 3 mining area in 2013, further geological information has become available which has identified a significant structural constraint at the eastern end of longwalls A7 and A8 that has necessitated amending the starting positions of these longwalls. In addition, opportunities to recover further high quality, thick seam coal to the west of longwalls A7 to A10 have been identified. The Proposed LWA7–A10 Modification will allow Austar to maximise resource recovery and avoid business interruption associated with the identified structural constraints.

The northern portion of the LWA7–A10 Modification Area is located within the Werakata State Conservation Area. The southern portion is largely cleared private land used for agricultural purposes.

Underground longwall mining in the Stage 3 area occurs at a minimum depth of 455 metres and due to the depth of mining, subsidence impacts to the land surface are predicted to be of a minor nature. The height of the fracture zone above longwall panels is predicted to be approximately 245 to 285 metres, consistent with that experienced in the Stage 2 mining area, therefore it is highly unlikely that cracking would extend up to the surface, or to the shallow alluvial aquifers associated with Quorrobolong and Cony Creek.

The Proposed LWA7–A10 Modification will result in a minor increase of 1.8 per cent in the total area of subsidence affectation associated with the Stage 3 Project. The maximum predicted subsidence parameters for the Proposed LWA7–A10 Modification are similar to those for the approved Stage 3 mine plan. Therefore, the predicted range of impacts on built and natural features, flora and fauna and archaeological sites are expected to be similar to those approved under Project Approval 08_0111. The Proposed LWA7-A10 Modification is not anticipated to have a significant adverse impact on the land surface or natural or built features located within the Modification Area, and will not have a significant adverse impact on existing land uses. There are two (2) additional private residences located inside the revised 20 millimetre subsidence contour. Subsidence predictions at these locations indicate there will not be a significant subsidence impact as a result of the Proposed LWA7-A10 Modification. No change to the existing suite of approved management measures are considered necessary as a result of the proposed modification.

Additional monitoring of subsidence along Quorrobolong Road is proposed due to a predicted increase in subsidence levels at this location. However, no change to the scope of existing management measures for Quorrobolong Road are anticipated, with a Built Features Management Plan currently being finalised with Cessnock City Council for the management of subsidence impacts on local roads.

The existing approved LW A7 to A10 Extraction Plan will be amended to reflect the LWA7-A10 Modification, as will the relevant supporting management and monitoring plans.

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FIGURES

APPENDICES

1.0 Introduction

Austar Coal Mine Pty Ltd (Austar), a subsidiary of Yancoal Australia Limited (Yancoal) operates Austar Coal Mine, an underground coal mine located approximately 10 kilometres south of Cessnock in the Lower Hunter Valley in NSW (refer to **Figure 1.1**). The Austar Mining Complex incorporates the former Ellalong, Southland and Bellbird South Collieries and includes coal extraction, handling, processing and rail and road transport facilities (refer to **Figure 1.2**).

Project approval 08_0111 was granted by the Minister for Planning in September 2009, enabling longwall mining in the Stage 3 area and the construction and operation of a new Surface Infrastructure Site and access road south of Kitchener (refer to **Figure 1.3**). The Stage 3 Project utilises the existing and approved infrastructure and facilities at the Austar Mining Complex to handle, process and transport coal. Two subsequent modifications to Project Approval 08_0111 were approved in 2010 and 2012 allowing changes to the approval conditions and longwall layout for panels A7 to A19. Underground longwall mining is currently being undertaken within the Stage 3 area in longwall A7 (refer to **Figure 1.3**) in accordance with Project Approval 08_0111 and an approved Extraction Plan for Longwalls A7 to A10 (Austar 2013a).

Following approval of the current Stage 3 mine plan in 2012, during first workings to develop longwall A7 and from in-seam geological information, structural constraints were identified at the eastern end of longwall A7. These structural constraints necessitated a variation of the approved commencing end of this first Stage 3 longwall panel. This was formalised with a first workings variation approval granted on 21 February 2013 to retract the longwall A7 commencing position. Since that time, further geological information has identified that the same structure that affected longwall A7 will affect the approved commencing end of longwall A8. The retraction of the longwall commencing end shortens development lead time, and therefore affects the ability to maintain longwall continuity. In addition, during the same period, an opportunity has been identified that additional high quality, thick seam coal to the west of approved longwalls A7 to A10 could be recovered by minor modifications to the approved mine plan, whilst at the same time reducing the impact of geological structures on longwall continuity.

In order to maximise resource recovery and avoid business interruption associated with the identified structural constraints, Austar is seeking approval to modify the approved layout for longwalls A7 to A10 as shown in **Figure 1.4** (the LWA7 - A10 Modification). The Proposed LWA7–A10 Modification would provide access to an additional 1.05 million tonnes of ROM coal.

The Austar Coal Project Stage 3 (08_0111) is a transitional Part 3A project and approval for the proposed modification to longwalls A7 to A10 is sought under the now repealed section 75W of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (the operation of which is continued under the transitional provisions provided in schedule 6A of the EP&A Act).

Umwelt (Australia) Pty Ltd (Umwelt) has prepared this Environmental Assessment (EA) on behalf of Austar to accompany an application to modify Project Approval 08_0111. A statement of authorship for the EA is provided in **Appendix 1**.

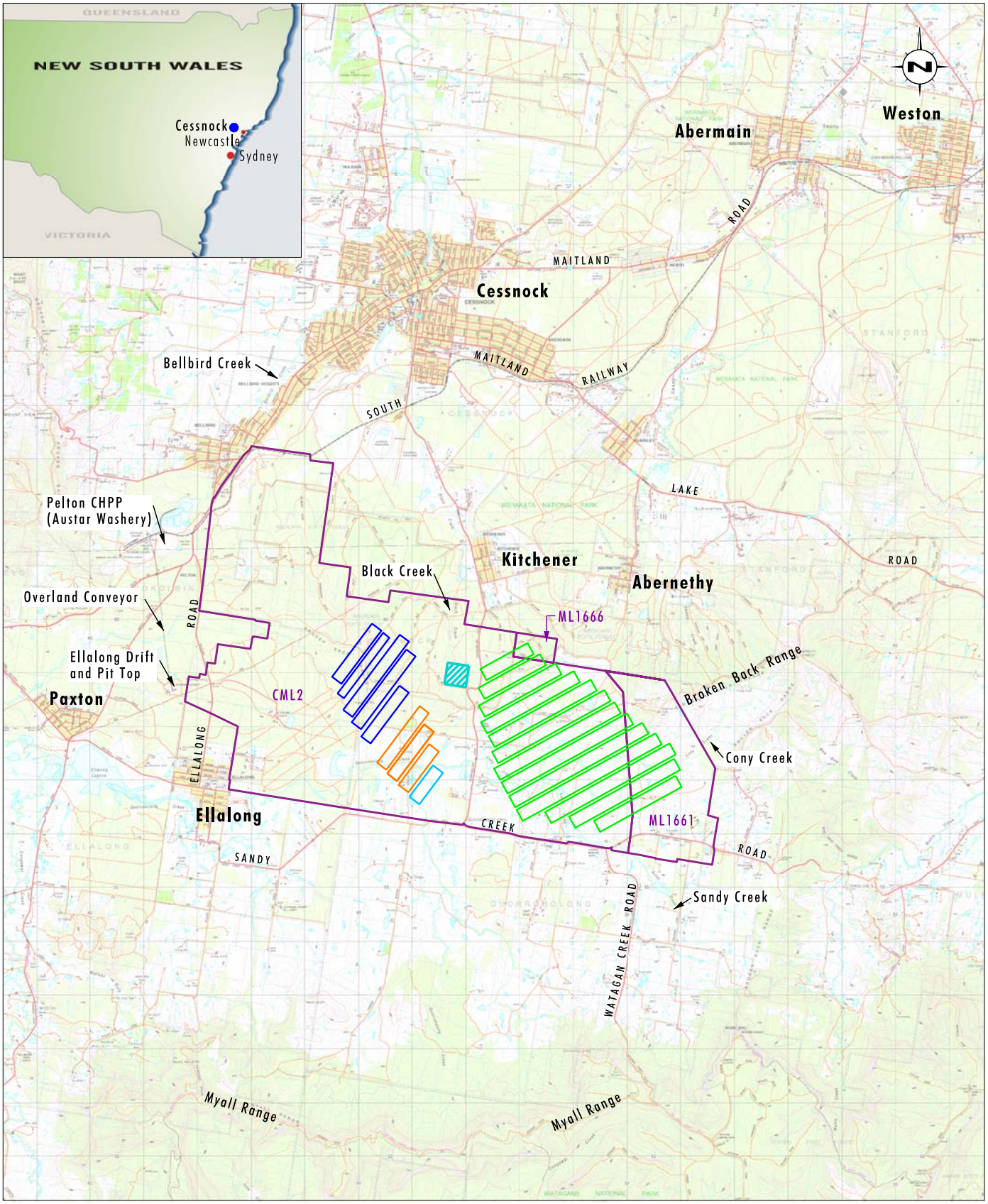


Image Source: Topo Maps: LPI NSW
Data Source: Longwall Layout: Austar Coal Mine

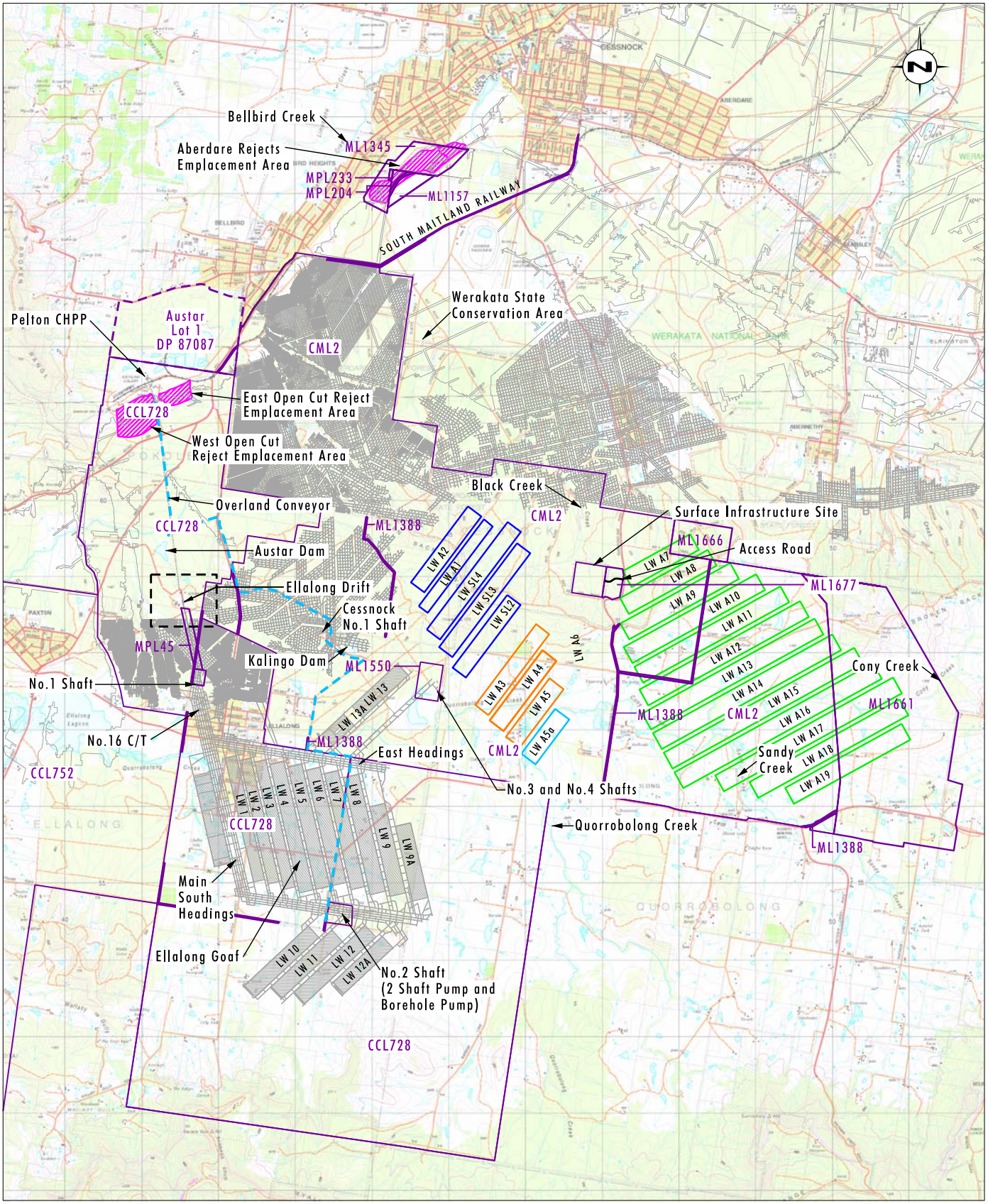
0 1.0 2.5 3.0km
1:100 000

Legend

- Layout for Stage 1 Longwall Panels
- Layout for Stage 2 Longwall Panels
- Layout for Stage 2 Extension Longwall Panel
- Layout for Approved Stage 3 Longwall Panels
- Approved Surface Infrastructure Site
- Mining Lease Boundary

FIGURE 1.1

Austar Mine Complex
Locality Plan



Data Source: Topo Maps: LPI NSW, Longwall Layouts: Austar Coal Mine

0 1 2 3 km

1:70 000

Legend

- Layout for Stage 1 Longwall Panels (complete)
- Layout for Stage 2 Longwall Panels (complete)
- Layout for Stage 2 Extension Longwall Panel (complete)
- Layout for Approved Stage 3 Longwall Panels
- Reject Emplacement Areas
- Old Workings
- Mining Lease Boundary
- Austar owned CHPP Land
- Water Pipeline

FIGURE 1.2

Austar Mine Complex

File Name (A4): R02_V1/3264_005.dgn
20131010 13.44

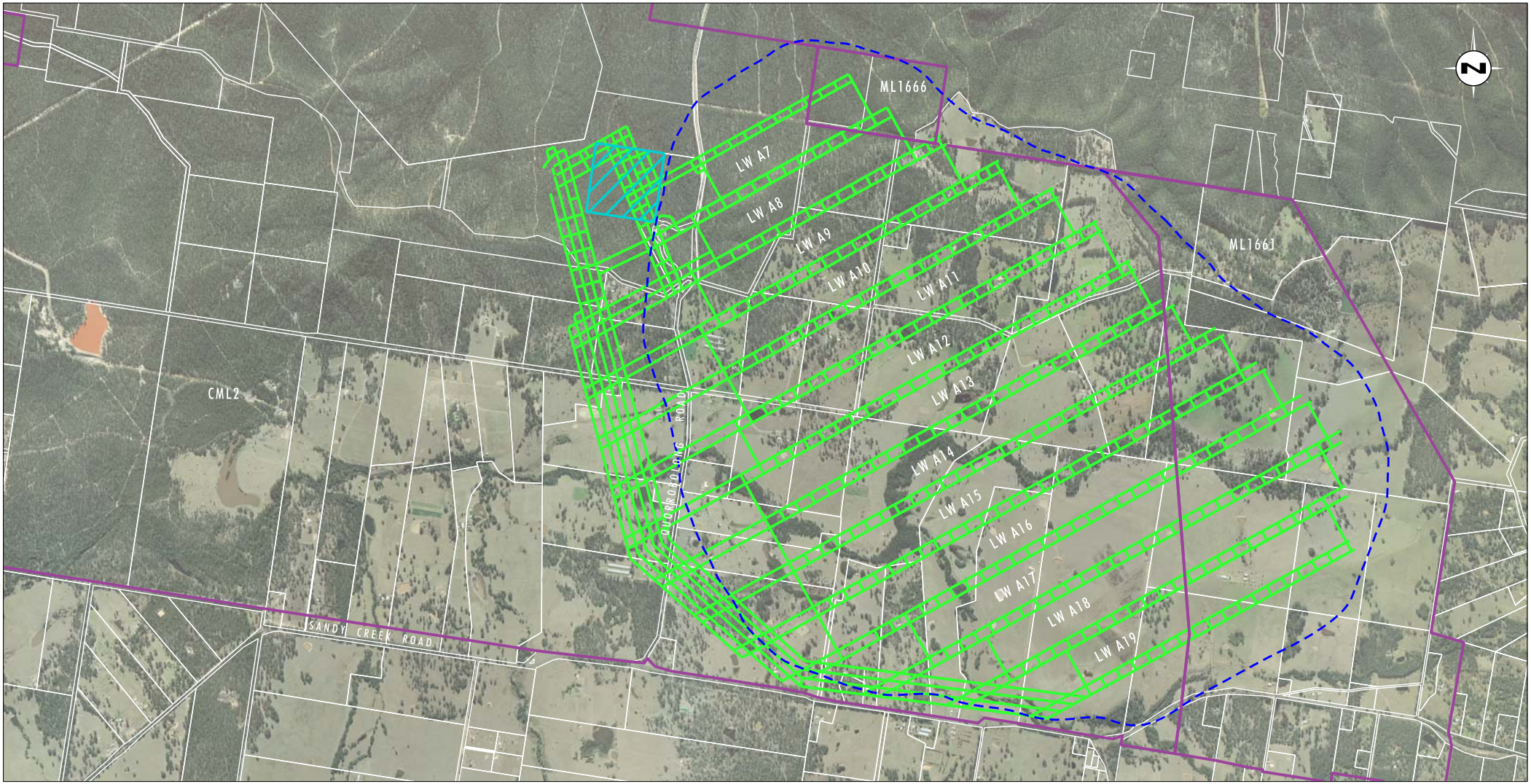


Image Source: AAM Hatch 2006
Data Source: Longwall Layout: Austar Coal Mine, Cadastre: LPI NSW

Legend

- Layout for Approved Stage 3 Longwall Panels
- 20mm Subsidence Contour for Approved Stage 3 Longwall Layout
- Approved Surface Infrastructure Site
- Mining Lease Boundary

FIGURE 1.3

Approved Stage 3 Longwall Layout

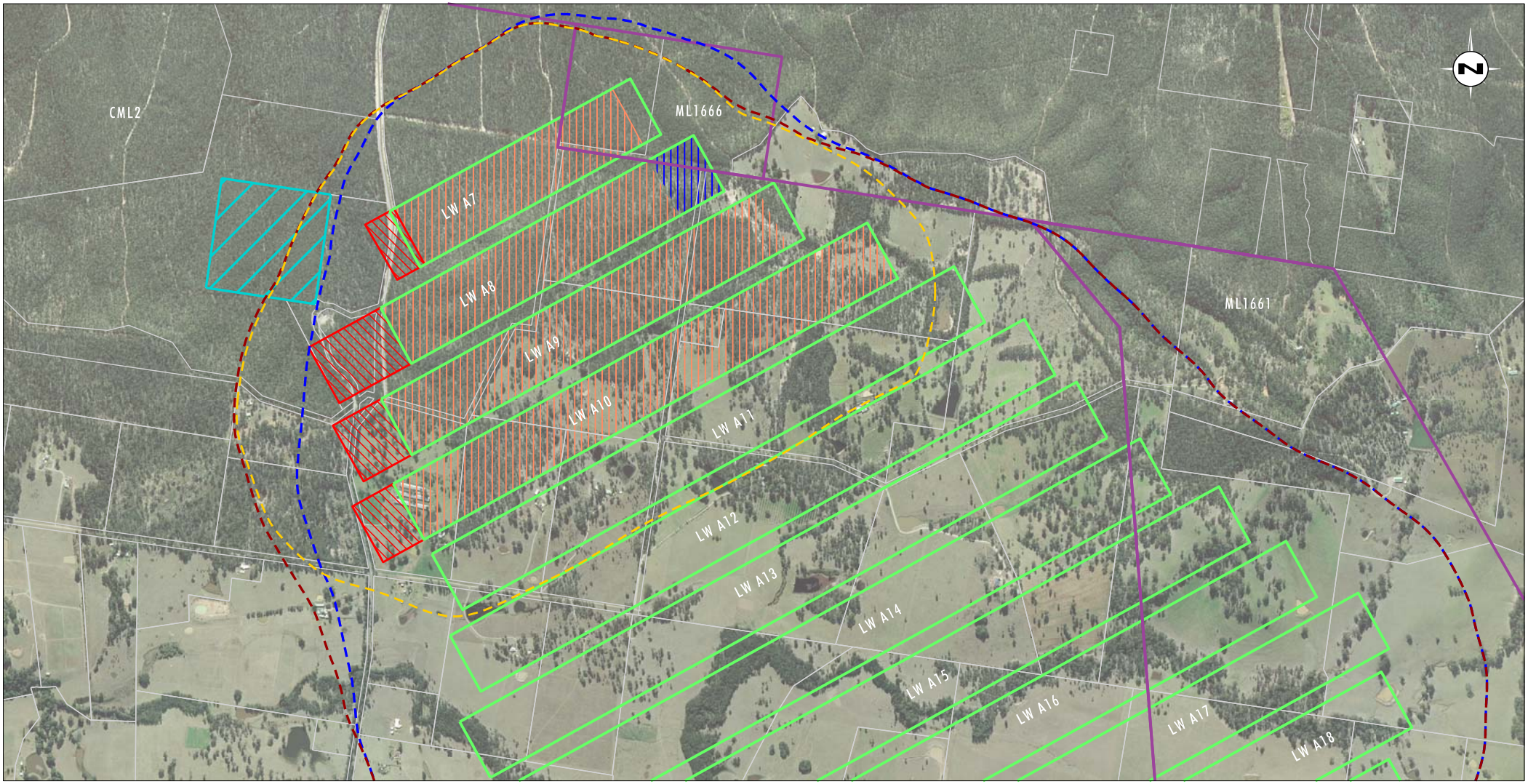


Image Source: AAM Hatch (2006),
Data Source: Austar Coal Mine (2013), LPI NSW (2010)

0 0.25 0.5 1.0km
1:20 000

Legend

- Layout for Approved Stage 3 Longwall Panels
- 20mm Subsidence Contour for Approved Stage 3 Longwall Layout
- LW A7-A10 20mm Incremental Subsidence Contour (Proposed LW A7-A10 Modification Area)
- Revised 20mm Subsidence Contour for Modified Stage 3 Longwall Layout
- Approved Surface Infrastructure Site
- Mining Lease Boundary
- SMP Approved Longwall Layout
- Proposed Retraction of Longwall A8 Start Position
- Proposed Extension of Longwalls A7 to A10 Finish Position

FIGURE 1.4

Proposed LW A7-A10 Modification

1.1 Overview of Proposed LWA7-A10 Modification

Austar proposes to modify the currently approved Stage 3 mine plan by extending longwalls A7 to A10 between approximately 100 and 300 metres to the west (refer to **Figure 1.4**).

The proposed westerly extension to these four longwalls provides access to an additional 1.05 million tonnes of ROM coal.

Approval is also sought to amend the starting position of longwall A8 in accordance with Condition 3 Schedule 3 of Project Approval 08_0111.

No other changes to the approved Stage 3 mining operations are proposed as part of the modification, including no change to the approved rate of extraction, life of the operation or no changes to any interactions of the Stage 3 Project with the operations of the Austar Mining Complex.

1.1.1 Proposed Modification Area

The environmental impacts of the Proposed LWA7–A10 Modification have been assessed within the 20 millimetre incremental subsidence contour for the proposed longwalls A7 to A10. This area is referred to as the 'LWA7-A10 Modification Area' throughout this EA and is shown on **Figure 1.4**.

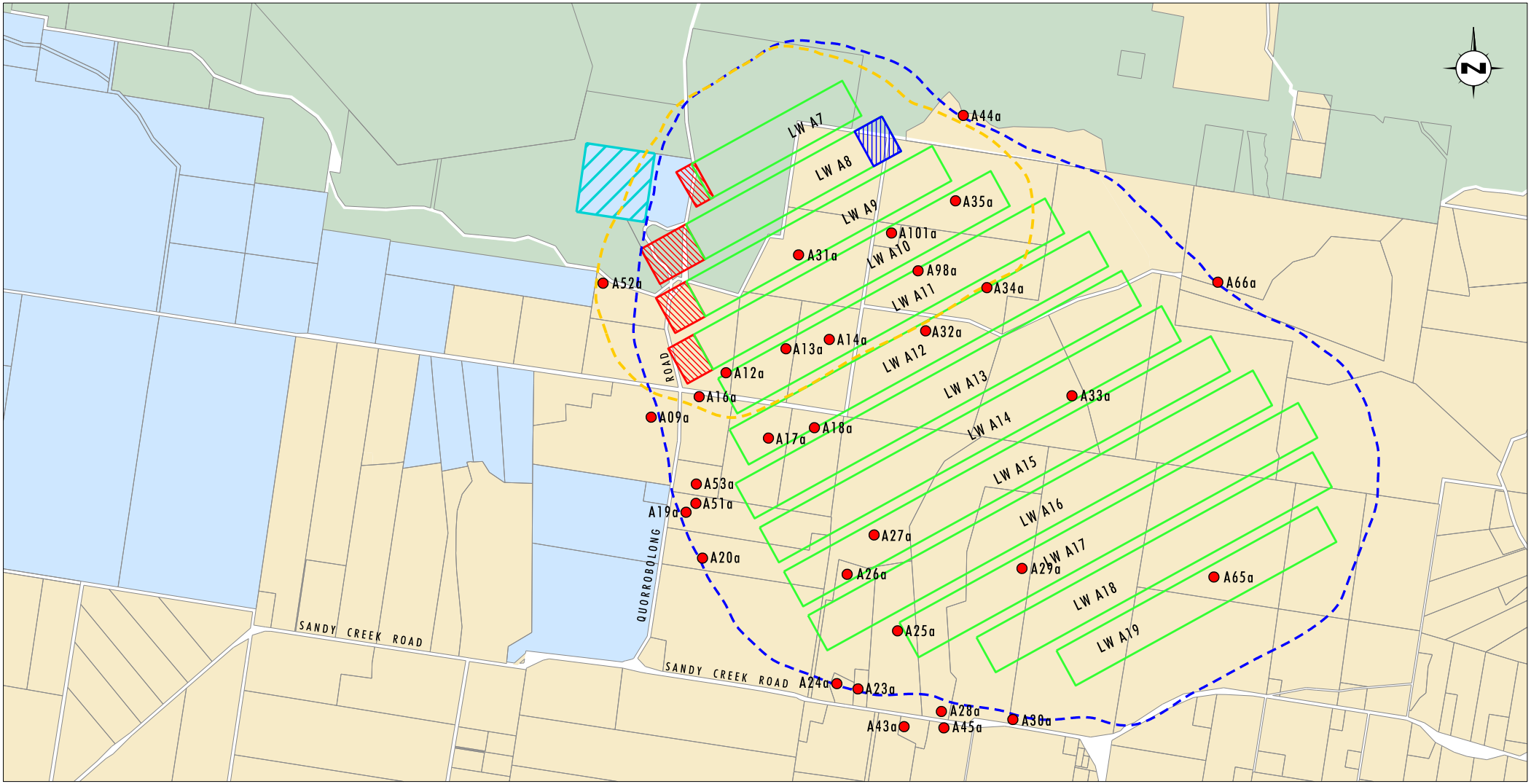
The 20 millimetre subsidence contour is considered the vertical limit of subsidence. While some far field horizontal movements may occur beyond the limit of the 20 millimetre subsidence contour, any natural or built surface features that could be sensitive to such movements have also been considered in this assessment.

1.2 Site Description and Land Use

The Proposed LWA7–A10 Modification Area is located in the Quorrobolong area, approximately one kilometre south of the village of Kitchener in the lower Hunter Valley of NSW (refer to **Figure 1.1**). The northern portion of the Modification Area is located within the Werakata State Conservation Area (previously Aberdare State Forest) and contains natural forests. The southern portion is largely cleared private land used for agricultural purposes. Land ownership within and surrounding the LWA7–A10 Modification Area is shown on **Figure 1.5**.

The north eastern portion of the LWA7–A10 Modification Area extends into the Broken Back Range, a major landform extending from west of Pokolbin to Mulbring. The topography of the Brocken Back Range is characterised by steep slopes, narrow ridges and deep gullies, with a maximum elevation adjacent to the LWA7–A10 Modification Area of RL 236 metres. The majority of the Broken Back Range landform in the vicinity of the Austar Mine complex is within the boundary of the Werakata State Conservation Area. South of the Broken Back Range, the topography descends to undulating hills, flats and floodplains associated with the alluvial landform of Cony Creek.

The majority of the LWA7–A10 Modification Area is located within the Cony Creek Catchment, with the far northern portions draining to Black Creek (refer to **Figure 1.6**). Cony Creek is located to the south of the Proposed LWA7–A10 Modification and flows from east to west where it joins Quorrobolong Creek approximately 2 kilometres west of LW A12. Numerous tributaries of the Cony Creek and Sandy Creek systems occur within the Proposed Modification Area, the majority of which have been dammed along their length for agricultural water supply.



Data Source: Cadastre: LPI NSW, Land Ownership: Mineral Resources 2003, Longwall Layout: Austar Coal Mine

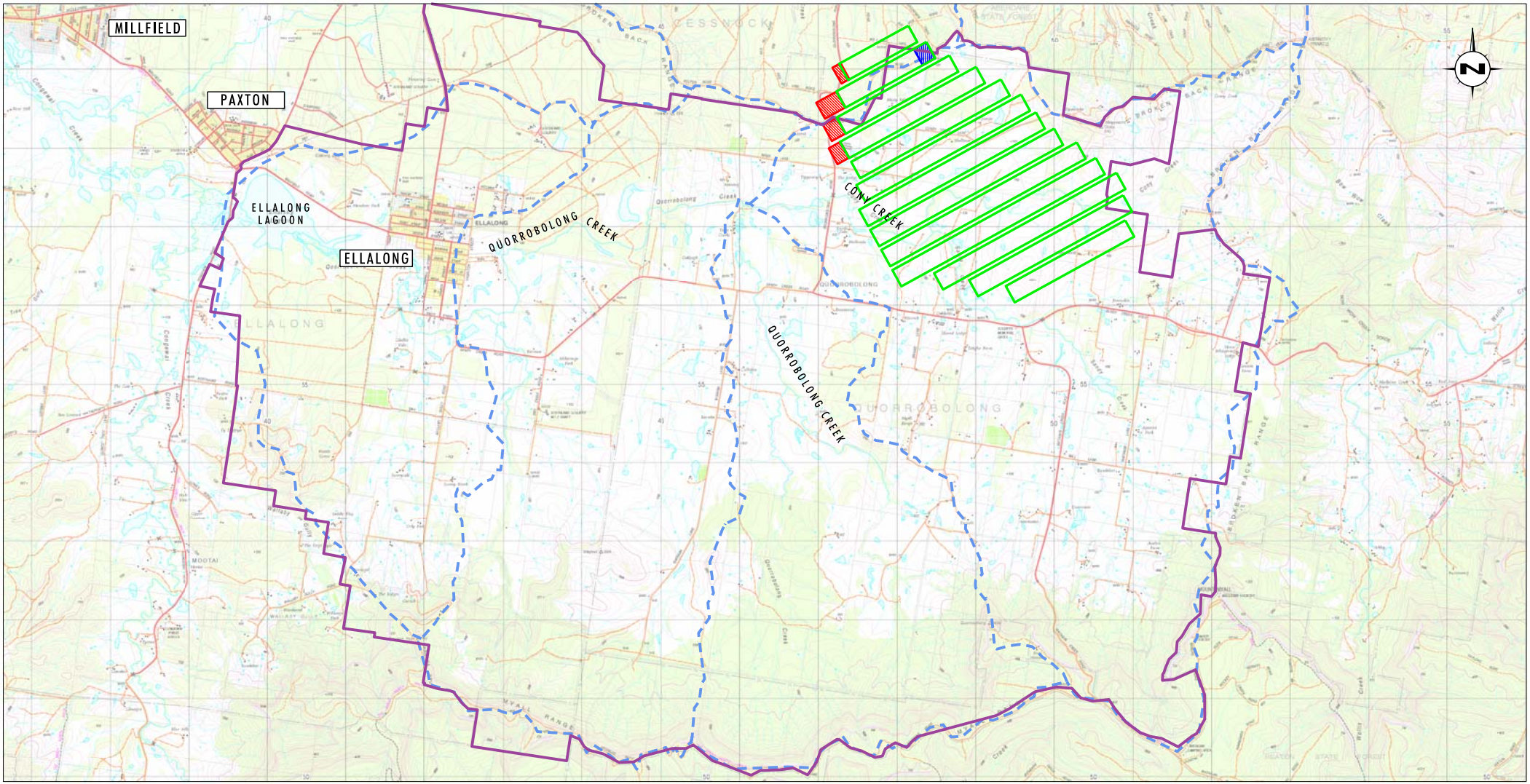
Legend

- Layout for Approved Stage 3 Longwall Panels
- 20mm Subsidence Contour for Approved Stage 3 Longwall Layout
- Proposed LW A7-A10 Modification Area
- Approved Surface Infrastructure Site
- Proposed Retraction of Longwall A8 Start Position
- Proposed Extension of Longwalls A7 to A10 Finish Position
- Austar Owned Land
- Werakata State Conservation Area / Crown Land
- Privately Owned Land
- Residential Dwelling

FIGURE 1.5

Land Ownership

File Name (A4): R02/3264_034.dgn
20131014 15.33



Data Source: Topo Maps: LPI NSW, Longwall Layout: Austar Coal Mine

0 1 2 3 km
1:70 000

Legend

- Layout for Approved Stage 3 Longwall Panels
- Proposed Retraction of Longwall A8 Start Position
- Proposed Extension of Longwalls A7 to A10 Finish Position
- Catchment Boundary
- Ellalong Lagoon Catchment Management Area

FIGURE 1.6

Catchment Boundaries

File Name (A4): R02/3264_029.dgn
20131010 13.33

Three soil landscapes types are found within the LWA7–A10 Modification Area, being the Aberdare soil landscape, Branxton soil landscape and the Quorrobolong soil landscape (Kovac and Lawrie 1991) (Refer to **Figure 1.7**). The Aberdare soil landscape occurs along the crests and hillslopes to the south of the Werakata State Conservation Area, while a small area of Branxton soil landscape occurs to the north of longwall A7 within the Werakata State Conservation Area. The Quorrobolong soil landscape occurs primarily to the south of longwall A10 along the creek lines and associated landforms of Cony Creek.

The Austar Mine complex is located in the South Maitland Coalfield of the Maitland Group which forms part of the Newcastle Coalfields. The mid Permian Age Greta Coal Measures outcrop around the Lochinvar Anticline, which is the dominant structural feature in the Cessnock area. Austar Mine Complex is located on the nose of the Anticline. Coal in the Proposed LWA7–A10 Modification Area is sourced from the Greta Seam at depths ranging from approximately 455 metres below the surface in the northern portion to approximately 575 metres below the surface in the southern portion. The Seam is the main economic coal seam in the Greta Coal Measures (Connell Wagner 2007).

The Greta Seam is overlain by the Branxton Formation, which comprises a series of interbedded sandstone and siltstone layers up to 20 metres thick. The Pelton Seam, which is less than 0.5 metres thick, lies at the top of the Branxton Formation and forms the upper limit of the Greta Coal Measures (Connell Wagner 2007).

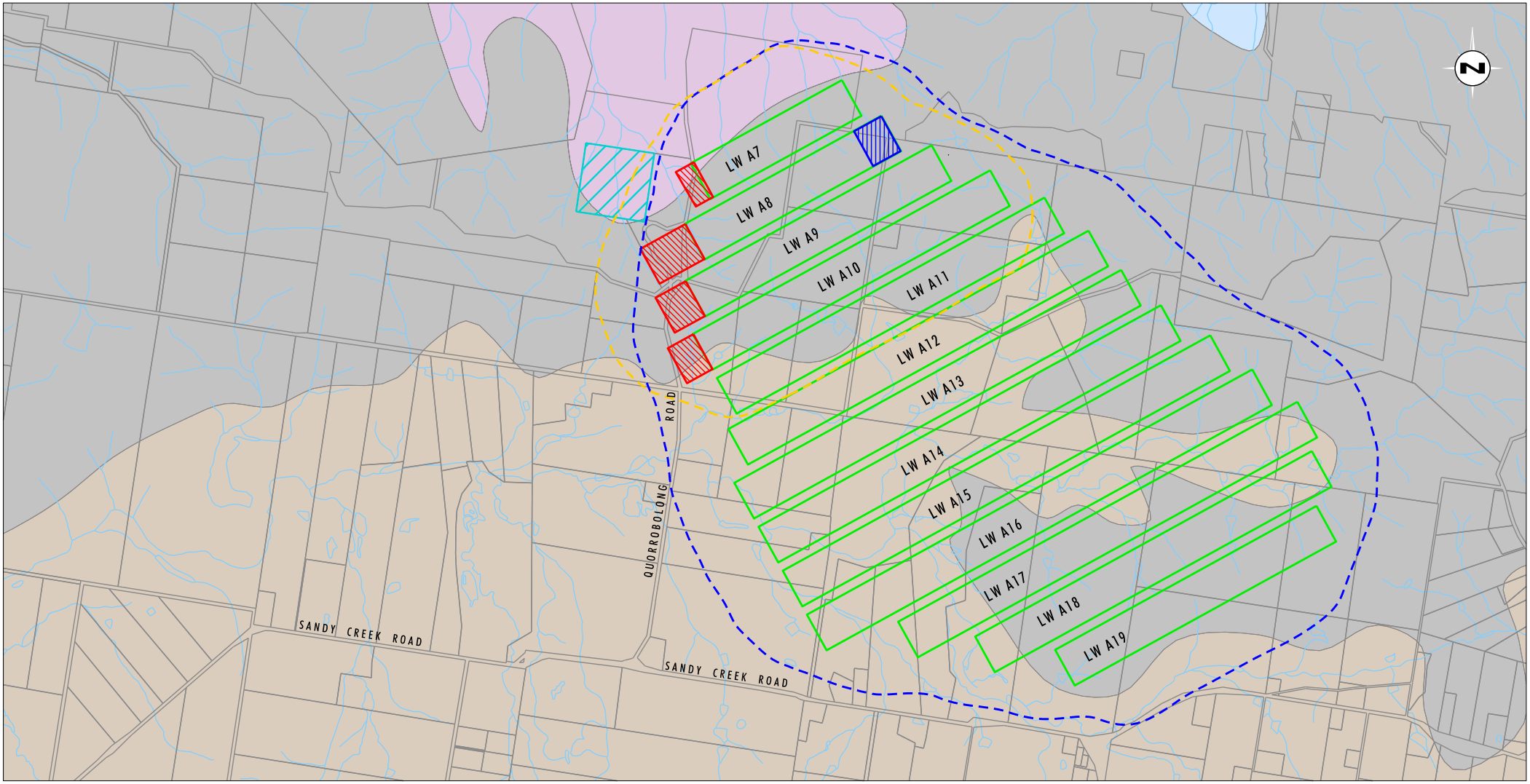
The Proposed LWA7–A10 Modification Area is located predominantly to the east of Quorrobolong Road, with the proposed extension of longwalls including additional land beneath and adjacent to Quorrobolong Road. Austar is in the final stages of formalising a subsidence management agreement with Cessnock City Council to manage subsidence impacts on Quorrobolong Road.

Land use in the area surrounding the LWA7–A10 Modification Area is primarily rural lands to the south and forested areas to the north within the Werakata State Conservation Area. The dominant land uses within and adjacent to the area include grazing, poultry production, conservation and mining. The villages of Kitchener, Abernethy, Quorrobolong, Ellalong, Millfield, Paxton and Pelton are scattered to the north and west of the LWA7–A10 Modification Area.

1.3 Project Justification and Alternatives

1.3.1 Geology, Safety and Business Continuity

Geological information obtained during the development of longwalls A7 and A8 has identified structural constraints at the eastern end of longwalls A7 and A8. In order to avoid this structural constraint, Austar retracted the starting position of longwall A7 in accordance with Schedule 3 Condition 3 of Project Approval 08_0111. The same structural constraint has been identified at the commencing end of longwall A8 and retraction of the starting position for this longwall is also required. The retraction of longwalls A7 and A8 has flow on implications in the short term for the continuity of mining in subsequent longwalls, and would result in significant business interruption while development works within longwall A8 are progressed sufficiently to recommence longwall mining. The extension of longwall finishing positions for longwalls A7 and A8 would allow sufficient development lead time to maintain longwall mining continuity.



Data Source: Cadastre: LPI NSW, Soils: Department of Natural Resources 2005, Longwall Layouts: Austar Coal Mine

0 0.5 1 1.5km
1:32 000

Legend

- Layout for Approved Stage 3 Longwall Panels
- 20mm Subsidence Contour for Approved Stage 3 Longwall Layout
- Proposed LW A7-A10 Modification Area
- Proposed Retraction of Longwall A8 Start Position
- Proposed Extension of Longwalls A7 to A10 Finish Position
- Approved Surface Infrastructure Site
- Quorrobolong Soil Landscape
- Aberdare Soil Landscape
- Neath Soil Landscape
- Branxton Soil Landscape
- Drainage Line

FIGURE 1.7

Soil Landscape Map

File Name (A4): R01/3264_030.dgn
20131010 13.36

1.3.2 Coal Tonnage and Surface Impact

The extension of longwalls A7 to A10 would provide access to an additional 1.05 million tonnes of ROM coal.

The extent and nature of surface impacts associated with the Proposed LWA7-A10 Modification have been assessed and compared to the approved Stage 3 Project impacts. The Proposed LWA7-A10 Modification represents a 1.8 per cent net increase in the total area of subsidence affectation associated with approved Stage 3 and the maximum predicted subsidence parameters are similar to those predicted for the approved Stage 3 Project. It is therefore considered that the Proposed LWA7-A10 Modification will not result in a significant increase in the surface impacts of the Stage 3 Project.

Austar notes that the current approved finishing position of longwalls A7 and A8 was deliberately set back from the approved Kitchener Surface Infrastructure Site so as to not constrain construction of surface infrastructure within this area. However, as a number of key surface infrastructure items are yet to be constructed in this location and are not required to be constructed in the short term, construction in this area can be delayed until after the majority of subsidence has occurred, allowing for the extraction of this additional resource in longwalls A7 and A8.

1.3.3 Ecologically Sustainable Development (ESD)

Austar has identified additional high quality, thick seam coal to the west of approved longwalls A7 to A10 which can be recovered without significantly increasing the environmental impacts of the approved Stage 3 Project. This resource would otherwise be sterilized under the approved Stage 3 mine plan.

The more efficient extraction of resources with no significant increase in impact due to subsidence aligns with the ESD principle of improved valuation and pricing of resources as described in **Section 8.3.4**. In addition, analysis indicates that the resource within the Proposed LWA7-A10 Modification Area can be extracted without having a significant impact on the ecology of the surrounding area (refer to **Section 6.5**). This is consistent with another principle of ESD, the conservation of biological diversity and ecological integrity as described in **Section 8.3.3**. Further detail of how the Proposed LWA7-A10 Modification complies with the principles of ESD can be found in **Section 8.3**.

1.3.4 Project Alternatives

1.3.4.1 Alternative of Not Proceeding with Modification to the Mine Plan

The current approved Stage 3 mine plan, finalised in 2011 (refer to **Figure 1.3**), was based on the available geological information regarding the stress orientation, geological structures and coal quality within the Stage 3 area. Since that time further geological information has become available as a result of Austar's ongoing exploration program and development work within LW A7 and A8, including additional information in relation to a dyke present at the eastern end of LWA8. On the basis of this further information, the mine plan can be further optimised to avoid geological constraints and recover additional resource while ensuring that the nature of environmental impacts are no greater than currently approved, with only a minor increase in the area (1.8%) of the extent of such impacts.

Austar considered seeking to mine through the dyke at the eastern end of LWA8, however due to the hardness of the dyke this was considered technically too difficult and unlikely to be successful, presenting a significant risk of business interruption. This option was therefore not considered viable at this time. Not proceeding with a modification to the mine plan would prevent the extraction of an area of high quality thick seam coal and potentially risk business viability though not being able to maintain continuity of production in an already marginal economic environment.

1.4 The Proponent

The proponent for the Proposed LWA7–A10 Modification to Project Approval 08-0111 is Austar. Austar is a wholly owned subsidiary of Yancoal. Yancoal is a wholly owned subsidiary of Yanzhou Coal Mining Company Limited (Yanzhou) and is one of the largest coal mining companies in China.

1.5 Environmental Assessment Team

This EA was prepared by Umwelt (Australia) Pty Limited on behalf of Austar with specialist input provided by the following organisations/specialists. The specialist assessments prepared for this EA and their authors are presented in **Table 1.1**.

Table 1.1 – Specialist Reports included within this EA

Report	Author
Mine Subsidence Impact Assessment	Mine Subsidence Engineering Consultants Pty Ltd
Flooding and Drainage Assessment	Umwelt (Australia) Pty Limited
Ecological Assessment	Umwelt (Australia) Pty Limited
Aboriginal Cultural and Archaeological Assessment	Umwelt (Australia) Pty Limited

The EA Statement of Authorship and a full listing of the project team members and their respective roles are provided in **Appendix 1**.

1.6 Environmental Assessment Structure

This EA has been prepared in accordance with the EP&A Act and Regulation (refer to EA Statement of Authorship in **Appendix 1**). The EA comprises a main text component and supporting studies, which are included as appendices. An overview of the layout of the main text is presented in **Table 1.2** below.

Table 1.2 – Environmental Assessment Structure

EA Section	Environmental Assessment Details
Executive Summary	Provides a brief overview of the proposed modification, the major outcomes of the environmental assessment and key project commitments to mitigate potential impacts.
Section 1.0	Provides the background and context for the proposed modification, key project components, the proponent and environmental assessment team.
Section 2.0	Describes the existing Austar operations and approvals including environmental management and monitoring at the Austar Mine Complex.
Section 3.0	Describes the proposed modification.
Section 4.0	Detailed assessment of the current planning context for the proposed modification.
Section 5.0	Describes the consultation process undertaken as part of the environmental assessment process.
Section 6.0	Provides a comprehensive analysis and assessment of the potential environmental and community impacts of the proposed modification, including the project specific and cumulative impacts.
Section 7.0	Provide an updated Statement of Commitments from Austar for the proposed modification.
Section 8.0	Provides a conclusion and justification for the project, including how the proposed modification meets the principles of ecologically sustainable development.
Section 9.0	References.