

Appendix H

Visual amenity study



Appendix H — Visual amenity study



MOUNT THORLEY OPERATIONS 2014 VISUAL IMPACT ASSESSMENT

PREPARED FOR MT THORLEY OPERATIONS PTY LIMITED
JUNE 2014



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Visual Impact Assessment

Prepared for	Mt Thorley Operations Pty Limited
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Position	Principal Landscape Architect
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Date	2 June 2014
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Document control

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Executive Summary

Coal & Allied (Operations) Pty Limited is seeking development consent for the Mount Thorley Operations (MTO) 2014 (the proposal). It is important to note that potential visual impacts under the proposal are generally consistent with those currently approved. For example, all coal extraction will occur within the limits of existing approval. The proposal will, however, extend the time frame of potential visual impacts. This visual impact assessment provides a contemporary assessment of the potential visual impacts from MTO's ongoing operations and a robust framework for their management.

Through the analysis of the existing environment surrounding Mount Thorley Operations (MTO), potential visual impacts on the surrounding landscape were assessed. This analysis has determined that ongoing operations at MTO would have a range of visual effects and that these are in keeping with those typically resulting from open cut coal mining activities in a similar rural environment. Importantly, it is noted that the environment in which the proposal is to be undertaken contains significant existing mining activity which is now part of the landscape against which it will be viewed. This results in a reduction in the general level of contrast and subsequent visual impacts.

The visual impacts of the proposal will not vary noticeably from those under the existing approvals. The visual assessment considers how these existing impacts could be mitigated over the period of operations at MTO. These impacts have largely been assessed as low; however, some sensitive assessment locations would potentially experience high impacts. The majority of the western sector will benefit from existing screening provided by the intervening topography and vegetation. Those residences which may experience high impacts are located in elevated areas around Bulga Village and are likely to require site specific mitigation measures.

Instrumental to the minimisation of the potential visual impacts is the proposed suite of mitigation measures. These measures aim to reduce the impacts of the proposal at all significant viewing points through vegetation planting and bund screening along the boundaries and site specific mitigation to individual residences where a moderate to high impact has been identified.

The progressive establishment of extensive landscape rehabilitation at MTO will reduce the level of visual impact over time and will ultimately result in a high level of integration with the surrounding visual environment.

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1. Introduction

1.1 BACKGROUND

Mount Thorley Operations (MTO) is an open cut coal mine approximately 10.5 kilometres (km) south-west of Singleton in the Hunter Valley, NSW. The mine is operated by Coal & Allied on behalf of Mount Thorley Joint Venture (MTJV). The site currently operates under Development Consent No. DA 34/95 (the development consent) issued by the then Minister for Planning on 22 June 1996 under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

Immediately to the north is Warkworth Mine. Since 2004, the two mines have integrated at an operational level and are known as Mount Thorley Warkworth (MTW), with a single management team responsible for all the operations. Equipment, personnel, water, rejects and coal preparation are all shared between the mines. The MTW operations involve an existing operation of approximately 1,300 persons, which includes full-time personnel and a small number of short-term contractors. Ownership of the two mines remains separate.

Mining activities approved under DA 34/95 have mostly been completed with the exception of Loders Pit and Abbey Green North Pit (AGN) with rehabilitation well-progressed on the east of the site. Run-of-mine (ROM) coal from MTO is transported to either the MTO or Warkworth Mine coal preparation plants (CPP) for processing. Extraction of coal from other pits has been completed; overburden emplacement is ongoing. Product coal from the CPPs is transported via conveyor to the Mount Thorley Coal Loader (MTCL). Coal loaded onto trains at the MTCL is transported to the Port of Newcastle for export.

The MTO 2014 (the proposal) seeks an approval under Part 4, Division 4.1 of the EP&A Act to complete mining and rehabilitation activities within the current limits of approval.

1.2 DESCRIPTION OF PROPOSAL

MTO has approval to mine until 22 June 2017 under its development consent. The proposal seeks a 21 year development consent period from the date of approval. If approval is granted in late 2014, operations at MTO are forecast to continue to the end of 2035, an 18 year extension over the current approval. The proposal seeks a continuation of all aspects of MTO as it presently operates and extends or alters them, including:

- > mining in Loders Pit and AGN Pit. Mining in Loders Pit is expected to be completed in approximately 2020. Mining in AGN Pit is yet to commence; however, it is anticipated to take approximately two years and be completed before 2022;
- > transfer of overburden between MTO and Warkworth Mine to assist in rehabilitation and development of the final landform;
- > maintain existing extraction rate of 10 million tonnes per year (Mtpa) of ROM coal;
- > maintain and upgrade the integrated MTW water management system (WMS), including:
 - upgrade to the approved discharge point and rate of discharge into Loders Creek from 100ML/d to 300ML/d via the Hunter River Salinity Trading Scheme (HRSTS);
 - ability to transfer and accept mine water from neighbouring operations (ie Bulga Coal Complex, Wambo Mine, Warkworth Mine and Hunter Valley Operations);
 - increase in the storage capacity of the southern out-of-pit (SOOP) dam from 1.6 giga litres (GL) to 2.2GL
- > maintain and upgrade the integrated MTW tailings management:
 - including use of the northern part of Loders Pit as a TSF after completion of mining; and
 - Wall lift to Centre Ramp Tailings Facility to approximately RL150
- > upgrade to the MTO CPP to facilitate an increase in maximum throughput to 18Mtpa with the ability to receive this coal from Warkworth Mine;
- > acknowledge all approved interactions with Bulga Coal Complex (see Section 1.4.1); and
- > continuation of coal transfer between Warkworth Mine and MTO and transportation of coal via the MTCL to Port of Newcastle.

All activities, including coal extraction will be within disturbance areas approved under the existing development consent.

The proposal is shown in Figure 1.1.

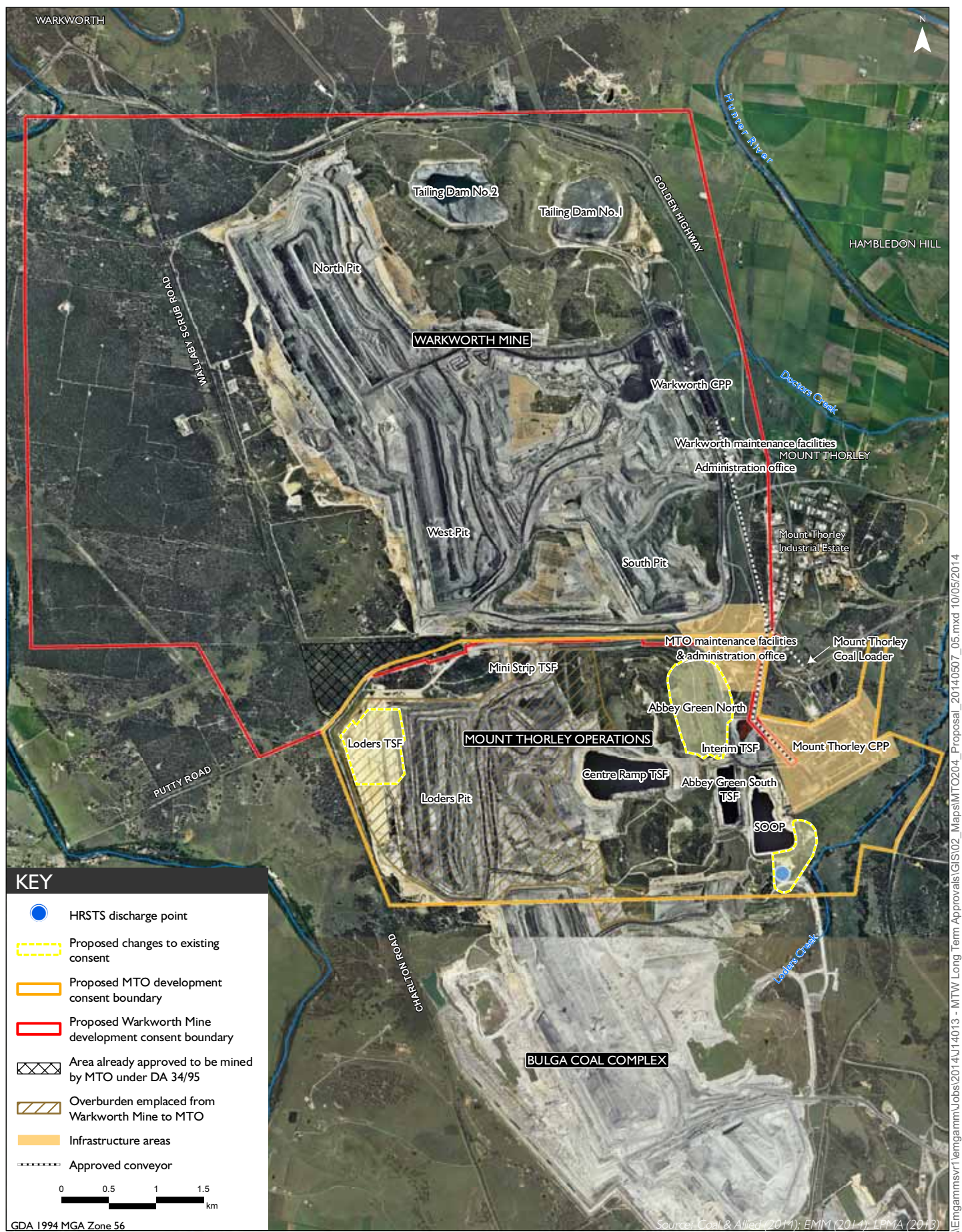


Figure 1.1 The Proposal

1.3 REPORT FINDINGS SUMMARY

This Visual Impact Assessment (VIA) has determined that the overall visual impact of the proposal is not likely to be noticeably different from those under the existing approvals. These existing impacts are generally assessed as low however there is the potential for high impacts in some areas, including elevated residential properties around Bulga Village.

Visual impact mitigation measures are recommended to be put in place to reduce the potential impacts on the overall surrounding landscape including vegetation and bund screening to the proposal site's boundaries. In addition specific mitigation measures are proposed for individual properties determined to have high visual impacts. The progressive rehabilitation of the site will reduce the level of contrast of the operations in the viewing landscape and will ultimately result in a high level of visual integration.

1.4 SCOPE OF THE VISUAL IMPACT ASSESSMENT

Integrated Design Solutions (IDS) was commissioned by EMGA Mitchell McLennan (EMM) on behalf of Coal & Allied to prepare this VIA, as required by the Secretary's requirements, to be submitted as part of the Mount Thorley Operations 2014 Environmental Impact Statement.

It is important to note that potential visual impacts under the proposal are generally consistent with those currently approved. For example, all coal extraction will occur within the limits of existing approval. The proposal will, however, extend the time frame of potential visual impacts. This visual impact assessment provides a contemporary assessment of the potential visual impacts from MTO's ongoing operations and a robust framework for their management.

The VIA utilises information from the Warkworth Extension Project Visual Impact Assessment Study (VIAS) (Integral Landscape Architecture and Visual Planning, 2010) and the Warkworth Extension Visual Impact Management Plan (Integrated Design Solutions (IDS), 2012) relevant to the proposal.

1.5 ASSESSMENT REQUIREMENTS

This Visual Impact Assessment has been prepared in accordance with the Secretary's requirements.

1.6 OBJECTIVES OF THE VISUAL IMPACT ASSESSMENT

The overall intent of this VIA is to provide an assessment of the potential impacts of the proposal on the existing landscape and visual character of the surrounding area. It provides a description of the potential visual changes that could occur, assesses the associated impacts in terms of their significance and proposes mitigation measures to reduce the level of impact where possible.

The objectives of the VIA are as follows:

- > Identify areas of the public domain and individual residences within the primary visual catchment which are likely to have significant direct views, in comparison to the current approved operations;
- > Develop management and mitigation strategies to ameliorate adverse visual impacts and appearance of structures;
- > Detail the process for implementing the mitigation strategies;
- > Provide details on the establishment and maintenance of vegetation, construction of structures and bunding for the purposes of maintaining satisfactory visual amenity; and
- > Identify potential site specific measures to be undertaken for individual residences to mitigate visual impacts.

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2. Method

Visual impact is determined by firstly analysing the existing visual environment and how it is seen from various key viewing locations. Through this analysis the visual character and its visual sensitivity can be determined. The visual effects are then determined by considering a development in this context. The combination of the visual sensitivity and the effect determines the level of impact for which an appropriate level of mitigation can be considered.

This VIA utilises a methodology consistent with that used for the VIAS (2010) as follows.

2.1 EVALUATION OF THE VISUAL ENVIRONMENT

The evaluation of the existing visual environment was undertaken in the VIAS by examining the existing landscape and determining key viewing locations within it based on the existing land uses. This analysis remains relevant to the proposal.

The existing landscape setting is defined through the areas topography, vegetation, waterways and developed features. Visual Character Units (VCUs) were defined to group areas with similar features within the landscape. This allows an understanding of the setting in which the proposal will be viewed.

2.2 ANALYSIS OF THE PROPOSAL

This analysis considers the proposal within the landscape setting defined by the VCUs and provides the basis for determining the visual effect and the sensitivity of the key viewing locations. It is based on the specific characteristics of both the landscape setting and the proposal including form, shape, colour and texture and the level of differences between them.

2.3 ANALYSIS OF VISUAL EFFECTS

The visual effect is a measure of the level of either contrast or integration, between a development and its setting. Mining activities tend to have a varied level of visual effect at various project stages. During extraction operations the pits and overburden emplacement can have a high level of contrast however as vegetation is re-established and final landforms are softened the level of integration can be higher.

In the case of MTO the existing visual environment contains extensive elements of mining operations and therefore, the proposal extends these elements which means the visual effect is reduced as the contrast to the existing landscape setting is less pronounced.

The magnitude of a development's visual effect is determined by considering the level of contrast or integration with its surroundings and the proportion of the view that includes the proposed development for the given level of contrast or integration. The proportion of the view is determined by measuring the occupied percentage of the Primary View Zone (PVZ), the area occupied by an arc created by sight lines radiating vertically and horizontally at angles of 30 degrees around the centre view line from the eye.

The visual effect on the various viewing locations and in particular individual residences may range from high to low depending on screening provided by topography, buildings or vegetation, the viewing distance and orientation towards the development (directly or indirectly).

2.4 VISUAL SENSITIVITY

The visual sensitivity is a measure of how critically the change to the visual environment will be perceived by those viewing it from different land use areas in the vicinity. For the purpose of this VIA consideration is given to both the existing environment and the currently approved operations for MTO.

The level of sensitivity varies for different land uses. Residential, tourism and recreation areas tend to have higher visual sensitivity than other land uses such as industrial, agricultural or road / transport corridors. This is because the perceived quality of these sensitive land uses is in part, dependent on the visual amenity of their surroundings. This sensitivity is also dependant on the distance of the nearest visible elements.

2.5 VISUAL IMPACT

The significance of the visual impact is dependent on the interaction between the visual effect and the visual sensitivity as defined in the VIAS (see Figure 2.1). When considering the visual impact of the proposal a significant impact is considered to be high.

The visual effect of assessment locations for the proposal was determined by review of the VIAS field assessment and examination of a GIS model and computer generated three-dimensional model. Allowance was made for the intervening vegetation, included at a height to 12m, however, detailed determination of the precise levels of vegetation screening and orientation towards views is not possible through this process. The assessment undertaken is considered conservative in this context. The levels of impact may be less should orientation be indirect or vegetation screening exist.

Figure 2.1
Visual Impact – Effect v
Sensitivity (VIAS 2010)

Visual Effect	Visual Sensitivity		
	High	Moderate	Low
High	High Visual Impact	High / Moderate Visual Impact	Moderate / Low Visual Impact
Moderate	High / Moderate Visual Impact	Moderate Visual Impact	Moderate / Low Visual Impact
Low	Moderate / Low Visual Impact	Moderate / Low Visual Impact	Low Visual Impact

2.6 VISUAL IMPACT MITIGATION

Visual mitigation measures can be implemented on-site, off-site or in combination to reduce the visual impact on an assessment location. This is typically done by reducing either the level of contrast of the development (e.g. through revegetation) or the proportion of the view in which it can be seen from the assessment location.

3. Analysis of the Visual Environment

The proposal will occur in an area where mining is an established feature of the landscape. The proposal site is located in the Hunter Valley coalfields with surrounding land uses predominantly mines and supporting infrastructure including the Warkworth Mine, Hunter Valley Operations, Wambo Mine and Redbank Power Station to the north, MTCL and Mount Thorley Industrial Estate to the east and Bulga Coal Complex to the south. To the west of the proposed site are a number of rural and rural residential properties and Bulga village. The existing visual character of the proposal site includes views of mining operations, grazing and cropping.

The landscape character of the local area is dominated by moderate to gently sloping hills with several locally dominant ridges. The highest natural points are Charlton Ridge within MTO, and Saddleback Ridge within Warkworth. From these ridges the land slopes down to the undulating land along the Hunter River and Wollombi Brook. Within this context there are open views along and across the flood-plains and cleared rural lands. Rehabilitated overburden emplacement areas are a significant feature of the existing landscape including areas within MTO, Warkworth Mine, Bulga Open Cut Spoils and the Wambo Mine.

The Primary Visual Catchment (PVC) is the area containing the majority of views of the proposal and is defined primarily by the surrounding topography. The PVC and VCUs of the proposal site were identified in the VIAS and remain relevant to the proposal (see Figure 3.7). The VCUs are areas of visual uniformity which make up the overall landscape setting. The VCUs are rarely seen in isolation, rather in combination and the mining development will combine with these to create the new view as seen from a particular location.

The VCUs within the PVC are as follows:

- > Hunter River and Wollombi Brook flood-plains;
- > Rural hills;
- > Rural footslopes;
- > Town and village areas;
- > Surrounding ranges; and
- > Mine and industrial areas.

Hunter River and Wollombi Brook flood-plains

The Hunter River floodplain is characterised by expansive river flats with green grass and croplands in contrast to the dryland grasses and scattered woodlands of the rural lands and foothills. The Wollombi Brook floodplain is less expansive than the Hunter River floodplain and is visually less dominant however it does create a contrast to the surrounding landscape. The flatness of these areas and grass crop cover allow for distant views towards the proposal.



Figure 3.1 Hunter River Flood-Plain (VIAS 2010)



Figure 3.2 Wollombi Brook Flood-Plain (VIAS 2010)

Rural Hills

This VCU includes the foothills to the north, east, south and west surrounding the proposal site. This landscape type is largely located adjacent to the flood-plains and consists of gently undulating hills. Vegetation includes open forest woodlands and scattered trees in grasslands.

The elevation rises in these areas to approximately 100m in the vicinity of the Golden Highway and Putty Road limiting visibility of the proposal from the north and east including from the Singleton urban area. The southern hills have elevations in the order of 150 – 170m and includes the Singleton Military Area which retains the rural character apart from the base which is visually similar to a village. Saddleback and Charlton ridges rising to 165m and 155m, respectively, form part of this VCU.



Figure 3.3 Rural Hills (VIAS 2010)

Rural Foothlopes

The rural foothlopes are located between Wollombi Brook to the east and the steep forested ranges to the west. The area generally has gentle topography but becomes steeper closer to the ranges in the west. It is dominated by grassland with scattered trees and woodland.



Figure 3.4 Rural Foothlopes (VIAS 2010)

Town and Village areas

Singleton, around 10.5km to the north-east and the smaller villages of Warkworth, Broke and Bulga are included in this VCU. These villages vary greatly in size and have a varying mix of residential, institutional, commercial and industrial land uses. This land use mix along with the open space creates their visual character. These towns contain the majority of residents in the area and this VCU has high sensitivity where it is exposed to the proposal.

Due to intervening topography the proposal is screened from much of Singleton however distant views are possible in some areas. Bulga is a widely scattered rural village approximately 2.5km from Warkworth Mine. Putty Road Bulga has a combination of spread out buildings, varied landscape treatments and surrounding rural areas. Wollemi Peak Road, Inlet Road and Wambo Road each lead from the village to the respective southern, western and northern rural residences within the rural foothlopes. Areas of Bulga do experience views of Warkworth Mine.

Broke is located approximately 12km to the south and is shielded from the mine by the hills immediately to the north of the village and local street features. Similarly, Warkworth is shielded by vegetation and topography including Watts Peak.



Figure 3.5 Towns (VIAS 2010)

Surrounding ranges

The surrounding mountain ranges define the edges of the PVC and are located on the western and southern sides of the Hunter Valley. These ranges are steep and have closed forest cover with elevations of 240 – 400m above the valley and foothills below.

The ranges are generally located a significant distance from Mount Thorley Operations but often create the backdrop to the views. Ridges in the Wollemi National Park rise to over 500m and overlook Mount Thorley Operations and although the proposal would be visible from some locations, the bush would restrict most views. Typically these points are only accessible to bushwalkers or horse riders.



Figure 3.6 Surrounding Ranges (VIAS 2010)

Mine and Industrial areas

Warkworth, Mount Thorley and the Bulga Coal Complex are visually dominated by the overburden emplacements which are visible from various parts of the surrounding areas. The Warkworth CPP is also visible from locations to the north and east, particularly along the Golden Highway. The mines and the Mount Thorley Industrial Estate have a strong industrial character.

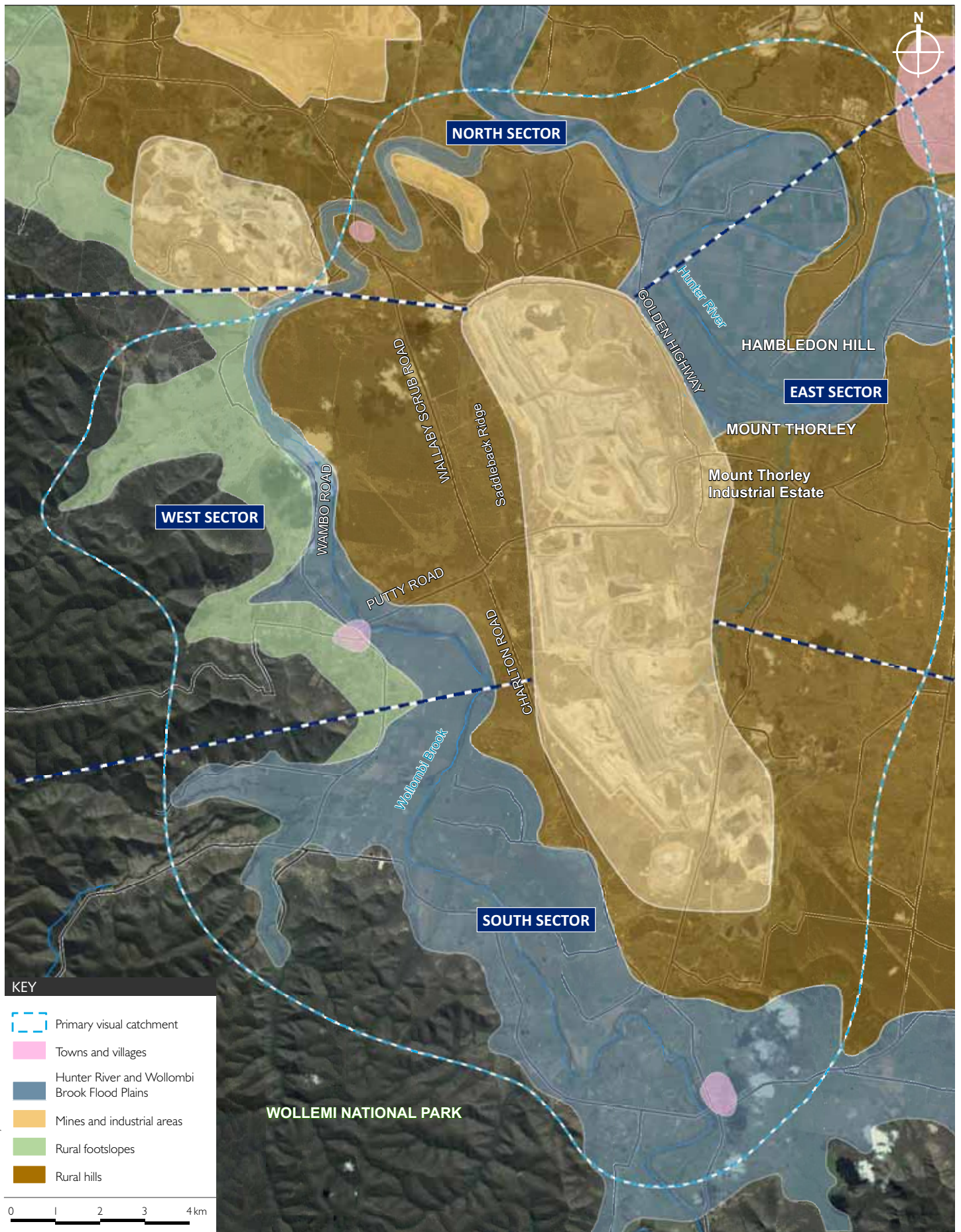


Figure 3.1 Primary Visual Catchment and Visual Character Units (VIAS 2010)

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4. The Proposal

4.1 INDICATIVE MINE PLANS

The mining operations over the life of the proposal are indicatively shown for years three, nine and fourteen in Figures 4.1, 4.2 and 4.3. The year three, nine and fourteen mine plans were chosen as representative snapshots for the EIS.

The key visual feature of the indicative year three plan is the emplacement continuing at the final height which has already been achieved under the current approval, with overburden from Warkworth Mine being hauled through the proposed underpass beneath Putty Road to MTO and the emplacement areas progressing west. The approved emplacement and subsequent rehabilitation at the common boundary landform development along the southern boundary with Bulga Coal Complex will be undertaken and completed by year three. The rehabilitation works will continue to progress from east to west as the landform is completed.

The indicative plan at year nine represents the point at which extractive mining at MTO will be complete. The mining of Abbey Green North will have been completed and tailings emplacement to the Abbey Green North void will be occurring. Mining in Abbey Green North will have required the removal of some areas of existing northern vegetation which will have been re-established in non-tailings areas by this stage. The MTO void has been infilled to 50m AHD with overburden from Warkworth Mine continuing to be hauled to MTO. The MTO emplacement areas will be progressively rehabilitated with the advancement of completed landform from east to west.

This period represents the time of highest impact for views from the west and south-west as overburden emplacement continues to its western most extent. Following year nine the progressive rehabilitation will incrementally reduce the overall level of contrast of the ongoing operations. By year nine, approximately 50% of rehabilitation at MTO is planned to be complete.

At year fourteen, the Site is almost completely rehabilitated. Overburden emplacement at Loders pit will be complete, with the western and southern faces completed to final landforms, and Tailings Storage Facility (TSF) operations occurring in this area. Tailings emplacement continues at Abbey Green South prior to completion the final landform and rehabilitation continues across the site as final landform is achieved.

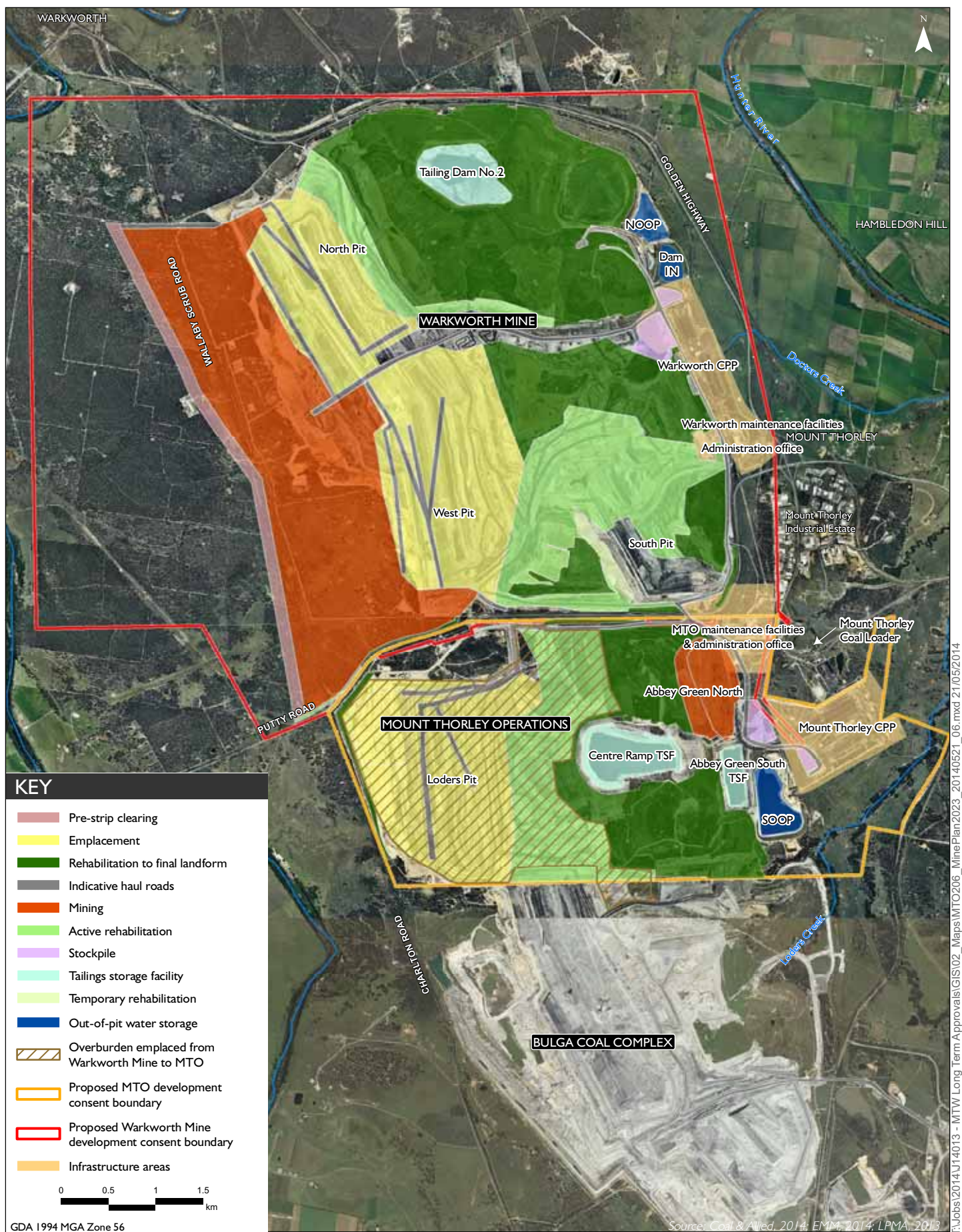


Figure 4.2 Indicative Year 9 Mine Plan

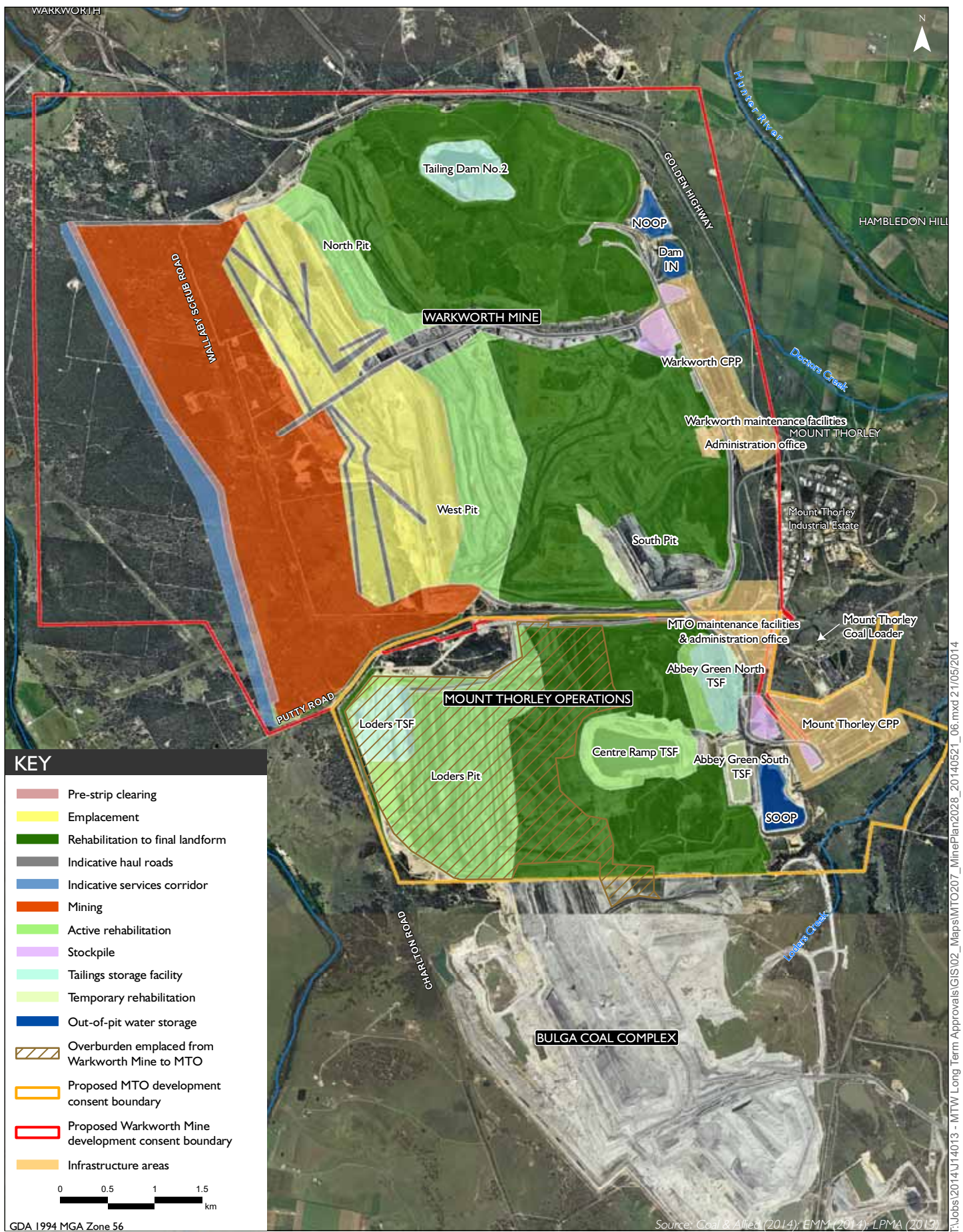


Figure 4.3 Indicative Year 14 Mine Plan

4.2 REHABILITATION

Rehabilitation will be undertaken progressively across the mined area in accordance with rehabilitation strategy presented in the MTW Mining Operations Plan (MOP). In general, the site will be rehabilitated with a mix of grassland and woodland.

4.3 FINAL LANDFORM AND LAND USE

Existing mining operations including overburden emplacement, final voids, tailings storage facilities, roads and infrastructure, have resulted in alterations to the local landform. The MOP outlines the proposed operational and environmental management of MTW, including the final landform and post mining land use vision. As described in the MOP, the conceptual final landscape across MTO is designed to provide native woodland, grassland and agricultural land predominantly for cattle grazing consistent with the pre mining land uses.

The final landform will be designed to blend in with the surrounding topography, subject to operational constraints (see Figure 4.4). Slopes will be generally 10 degrees for overburden emplacement and up to 18 degrees for internally draining areas such as low walls and ramps.

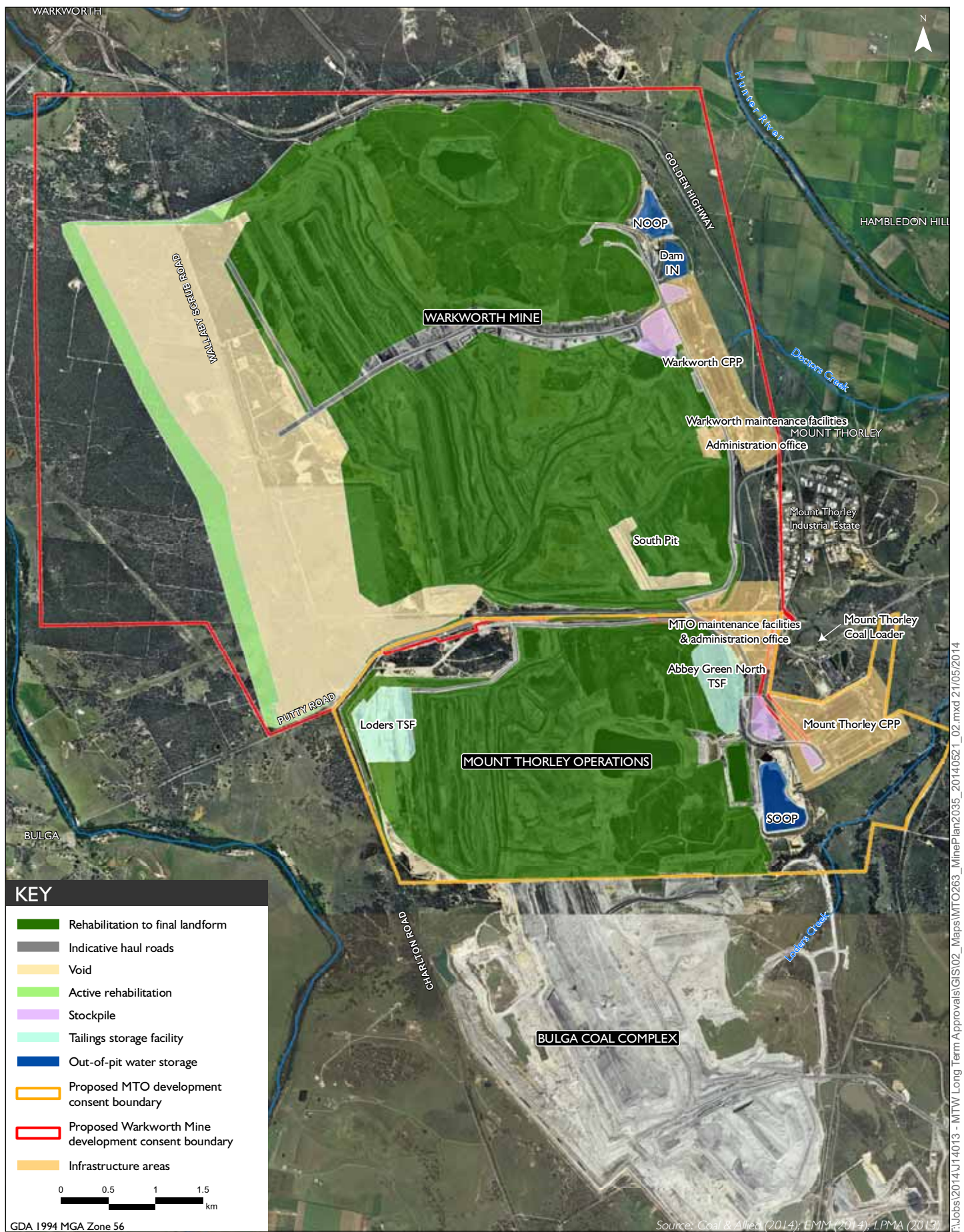


Figure 4.4 Indicative Final Landform

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5. Visual Impact Assessment

5.1 POTENTIAL VISUAL EFFECTS

Visual effect is a measure of the level of contrast a development will have within its landscape setting. The visual effect of a mine changes through time with open pits having high contrast and low visual integration, creating high impacts at low levels of exposure. Rehabilitated mined land however, creates a low contrast and higher integration levels.

Mining operations typically have visual characteristics with a high contrast with the existing landscape. In this case the continued operations at MTO will extend elements which are already present in the landscape and as a result will not contrast significantly.

The visual effects associated with the proposal considered below are all activities which will exist under current approved operations at MTO. These activities are as follows:

- > The progressive advancement of the open cut Loders pit westwards to completion (i.e. towards Charlton Road) and mining of Abbey Green North;
- > The overburden emplacement continuing west including transfer from Warkworth Mine to assist in the final landform (remaining within existing approved height limits);
- > Construction of new haul roads; and
- > Continued night lighting upon overburden emplacement areas and on large mining equipment.

The proposal includes the transfer of overburden from Warkworth Mine to assist in the final landform which represents a minor alteration to approved operations. The infill of the void in the final landform that would remain as part of the current approvals. This will create a final landform more in keeping with the pre mining environment but will not result in additional visual impacts.

The main variation compared to the existing MTO approvals will be the extension of the development consent period to 2035. Assuming the approval is granted in late 2014 this would represent a 18 year extension to the operations. This will extend the period over which the visual effects are experienced.

POTENTIAL VISUAL SENSITIVITY

Visual sensitivity is the measure of how critically a change to the existing landscape will be viewed by any particular land use within the PVC. The land uses and their sensitivity levels were defined in the VIAS and remain relevant to the proposal as illustrated in Figure 5.1.

The urban or rural residences within the PVC of the proposal are located within a range of up to 7.5km and as such the sensitivity of these residences where the mine is viewed will be high or high / moderate.

Figure 5.1
Visual Sensitivity (VIAS 2010)

Land Use	Visual Sensitivity Levels			
	Nearest visible mine elements less than 2.5km away	Nearest visible mine elements between 2.5km – 7.5km away	Nearest visible mine elements between 7.5km – 12.5km away	Nearest visible mine elements more than 12.5km away
Urban & Rural Dwellings	High Sensitivity	High / Moderate Sensitivity	Moderate Sensitivity	Low Sensitivity
Tourist destination of visually sensitive land uses e.g. horse studs, vineyards etc	High Sensitivity	High / Moderate Sensitivity	Moderate / Low Sensitivity	Low Sensitivity
Designated tourist roads & main roads (Golden Hwy and Putty Road)	High Sensitivity	Moderate Sensitivity	Low Sensitivity	Low Sensitivity
Other roads (Hambledon Hill, Charlton, Wallaby Scrub and Wambo Roads)	Moderate Sensitivity	Low Sensitivity	Low Sensitivity	Low Sensitivity
Minor local roads in rural zone	Moderate / Low Sensitivity	Low Sensitivity	Low Sensitivity	Low Sensitivity
Broad acre rural lands	Low Sensitivity	Low Sensitivity	Very Low Sensitivity	Very Low Sensitivity

5.2 POTENTIAL VISUAL IMPACTS

The significance of the visual impact will be low / moderate for the majority of the PVC of MTO. The most significant impacts will be to residences in elevated locations in and around Bulga village.

The visual impact on individual residences may range from high to low, depending on the following additional factors:

- > Screening effects of any intervening topography, building or vegetation – residences with well screened views will experience lower visual impacts than those with open views;
- > The viewing distance from the residence to visible areas of the proposal – the further the distance the lower the visual impact experienced; and
- > The general orientation of the residence to the proposal – residences with direct orientation will experience higher visual impacts than those with an oblique orientation.

The potential impacts identified in the North, East, South and West sectors, as shown in Figure 3.7, are described below.

5.2.1 NORTH SECTOR

Warkworth Mine is situated directly to the north of MTO. This mine and intervening topography and vegetation means there are no views from Warkworth village or the rural foothills to the north of the Warkworth Mine. To the north east there would be views from some sections of the Hunter River flood-plain and rural foothills. Residences in the north east will also have views to the site, however, the visual effects will not be noticeably different from those under the current approvals. High to moderate effects may be experienced from residences with views due to their high sensitivity, this would result in a temporary high impact until rehabilitation was completed.

Putty Road forms the northern boundary to the proposal site, the visual effects from this area would be low and the views will not be noticeably different from those under the current approvals. Due to its proximity it has a high sensitivity, however, the visual impact will be low.

5.2.2 EAST SECTOR

The overburden emplacement areas at MTO are screened from sensitive viewing locations in the east. Views of MTO from the east exist from minor local roads, the closely located industrial estate and rural land but will be screened by intervening vegetation. These will not be noticeably different from those under the current approvals and impacts will be low.

5.2.3 SOUTH SECTOR

Views from the south are largely concealed by topography, vegetation and the mining activities at the Bulga Coal Complex. Some exposed viewpoints, do however, exist from the southwest. From these exposed areas the existing overburden emplacements at MTO can be widely viewed as currently approved, and will continue to advance westwards. The overburden emplacement would have a high/moderate visual effect prior to rehabilitation and these locations have a high visual sensitivity. This may result in high visual impacts in comparison to the existing conditions. The visual impact in comparison to the current approvals would, however, be low.

5.2.4 WEST SECTOR

A visual bund has been constructed along Charlton Road and extending north along Putty Road. The bund has been vegetated and native trees and shrubs are establishing on the faces. This bund screens views from these roads and reduces views of the overburden emplacement from more distant locations to the west.

The extent of mine views will be dependent on the position of the viewing location. Views from some south westerly view points along Putty Road as well as from some parts of Bulga village will exist and the visual effects would range from low to high in comparison to the existing conditions but would not be significantly different to those under the existing approvals. Bulga village has a high level of sensitivity, views in the lower lying areas including Wambo Road are screened and the visual impacts would be low to moderate. More open views exist in locations around Bulga including along Inlet Road and Putty Road south of the Bulga bridge, where impacts would be moderate.

All residential properties in this area will have a high level of sensitivity and properties in elevated locations throughout Bulga may experience high visual impacts depending on the orientation of the property and intervening screening provided by vegetation. Site Specific Visual Assessments (SSVA) would be undertaken where requested by the landowner and potential site specific mitigation measures determined through this process. See Section 6 for further discussion of proposed mitigation measures.

Viewshed analysis from Bulga Village for the indicative year years three, nine and fourteen mine plans and final landform are shown in Figures 5.2 to 5.5. Following these the photomontages presented in the 2010 VIAS are presented depicting the visual effects from viewpoints in and around Bulga (Figures 5.6 - 5.10). These montages remain representative of the effects of the proposal.

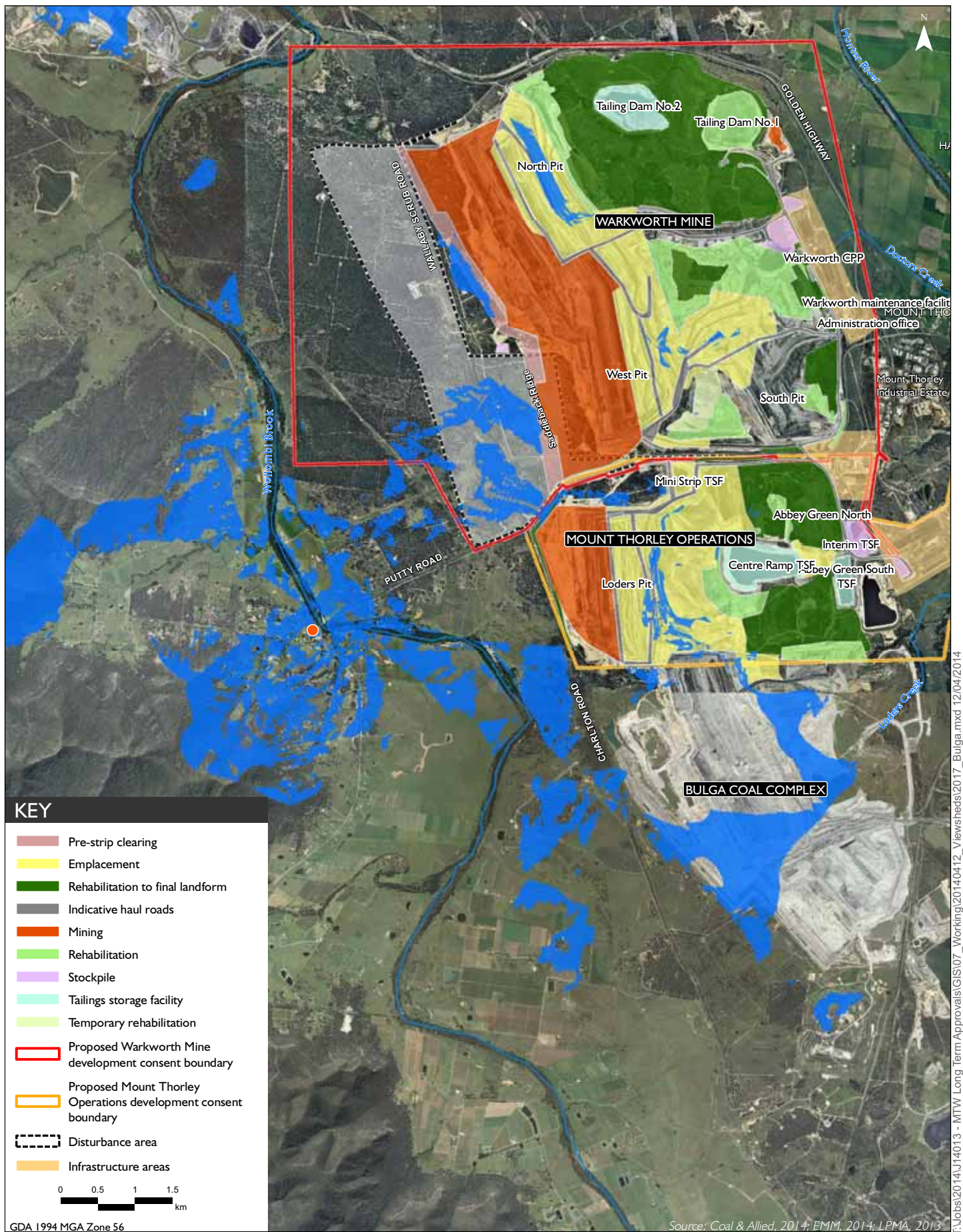


Figure 5.2 Viewshed Analysis Bulga Village (Indicative Year 3 Mine Plan)

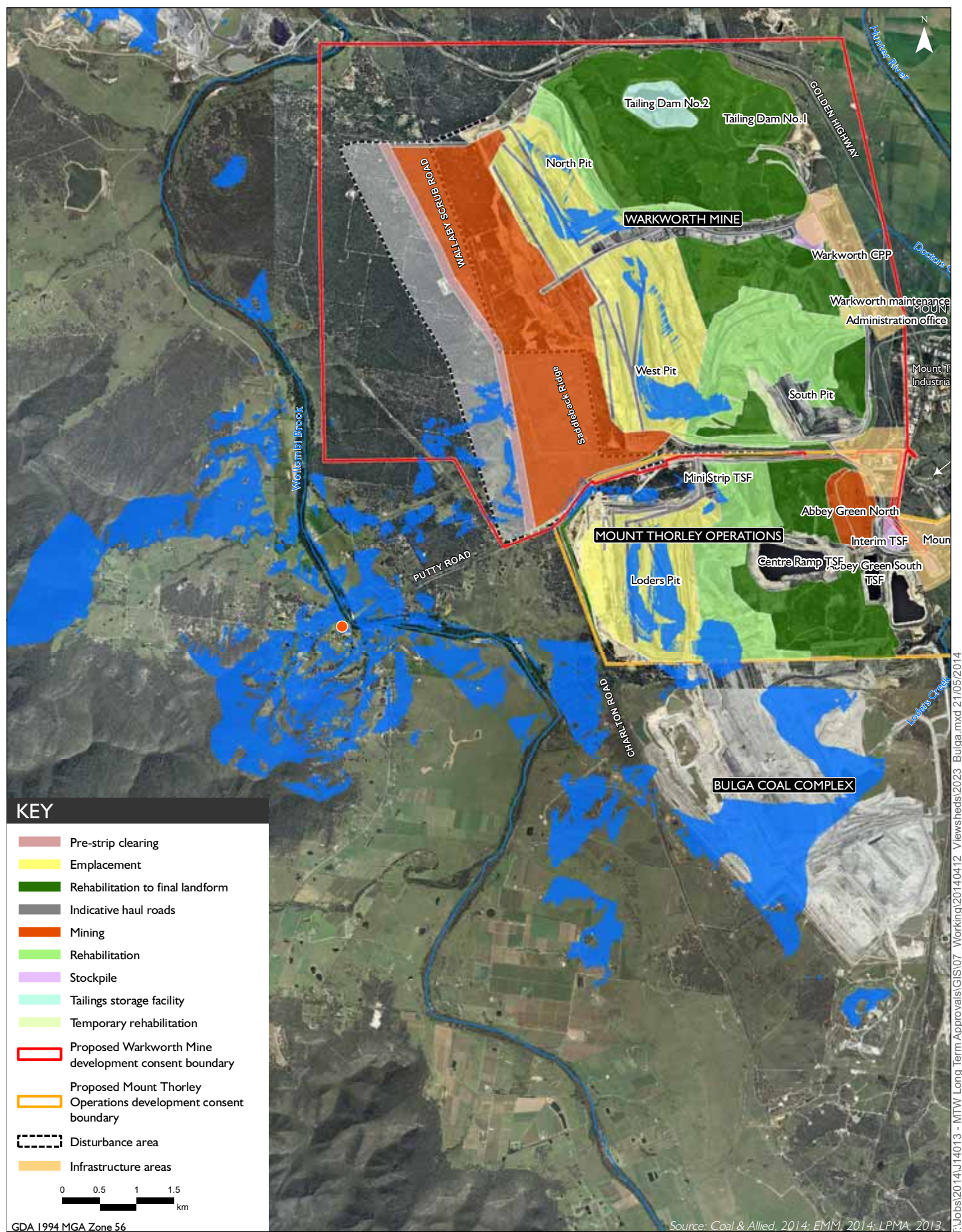


Figure 5.3 Viewshed Analysis Bulga Village (Indicative Year 9 Mine Plan)

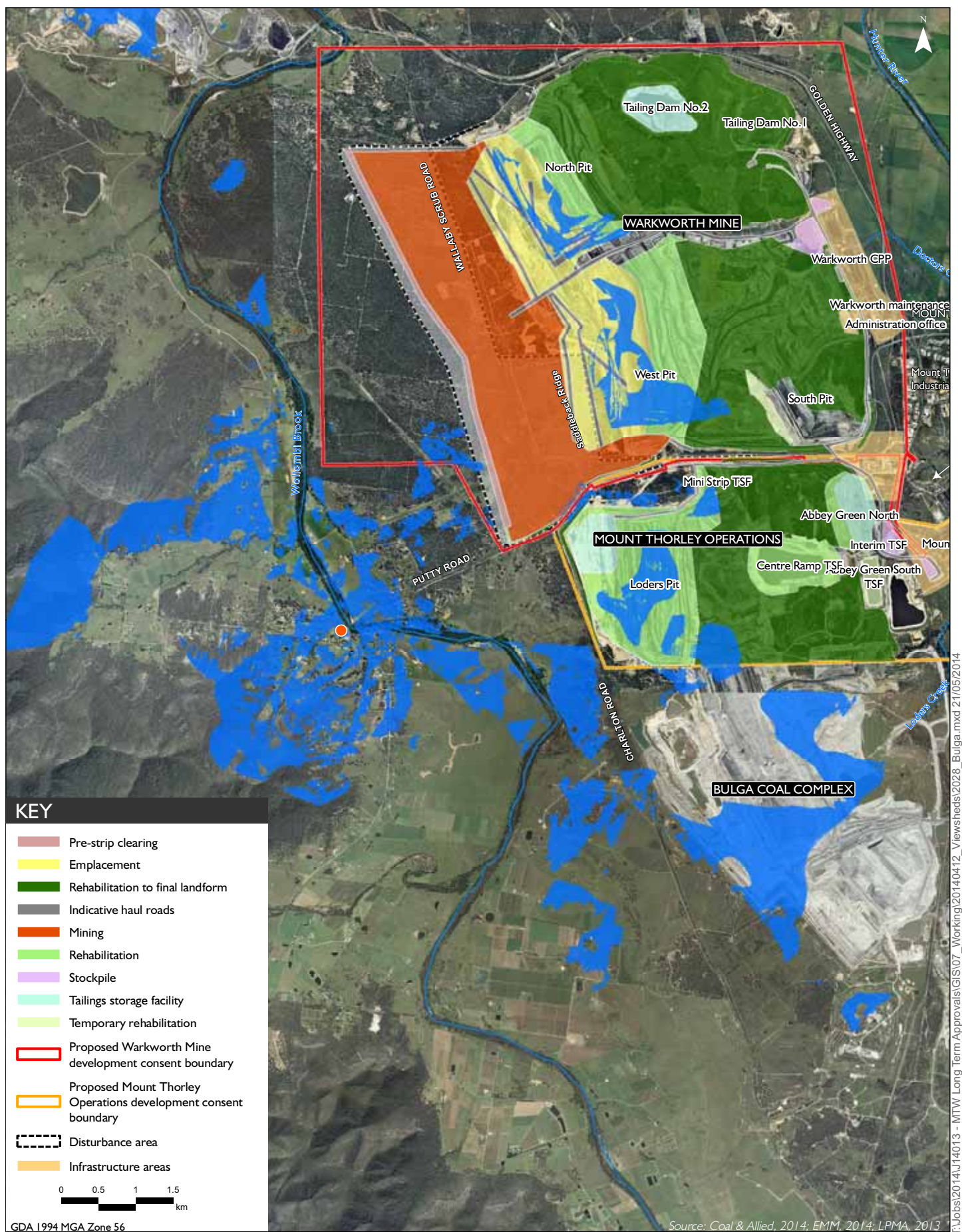


Figure 5.4 Viewshed Analysis Bulga Village (Indicative Year 14 Mine Plan)

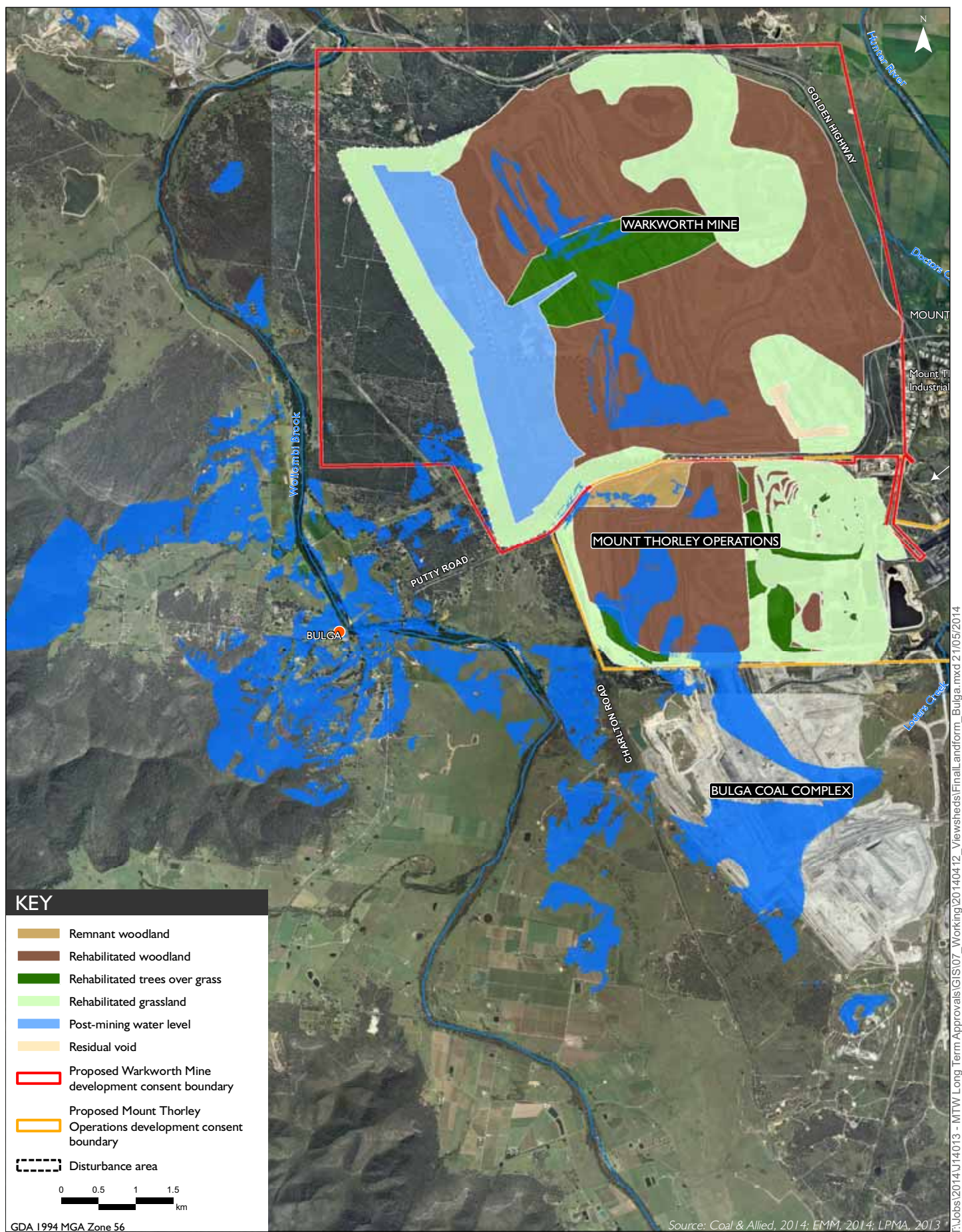


Figure 5.5 Viewshed Analysis Bulga Village (Indicative Final Landform)



Figure 5.6 Putty Road North Photo Montages (VIAS 2010)



Figure 5.7 Putty Road South Photo Montages (VIAS 2010)



Existing



Year 2



Year 9



Year 21



Final Landform

Figure 5.8 Bulga Hotel Photo Montages (VIAS 2010)



Figure 5.9 Turnbull Inlet Road Photo Montages (VIAS 2010)



Figure 5.10 Wambo Road Photo Montages (VIAS 2010)

6. Management and Mitigation

6.1 OBJECTIVES

The key elements of mitigation employed for the proposal will be the utilisation and management of existing native vegetation together with additional plantings and earthworks to achieve suitable visual screening.

The mitigation objectives include:

- > Develop mitigation strategies to ameliorate adverse visual impacts;
- > Provide details on the establishment of vegetation and bund screening for the purpose of maintaining satisfactory visual amenity; and
- > Develop site specific mitigation strategies to ameliorate significant direct views from individual residences.

6.2 PROPOSED MITIGATION MEASURES

Potential visual impacts of will generally be moderate to low, as the impact on visual amenity will be limited and localised. The existing topography and vegetation will continue to provide screening to the mine to varying extents depending on view location and elevation. Some residences west of the proposal site may have potential to experience high impacts during the operations at MTO prior to the completion of rehabilitation i.e. during active mining.

A number of mitigation measures are currently in place for the approved operations at Warkworth Mine, these include:

- > structure design to minimise visual impacts, consistent with engineering principles and practice, and any site constraints;
- > direction of lighting away from offsite areas to the greatest degree possible, and the use of sensor lighting where permanent lighting unnecessary; and
- > construction of small bunds, vegetated and built screens at appropriate locations along the Site boundary.

The additional strategies proposed to mitigate off-site visual impacts are detailed below.

- > Examine in detail any high sensitivity viewing points and determine the opportunity for relevant screening treatments including site boundary treatments or mitigation measures to individual residences.
- > Minimise the amount of pre-rehabilitation areas that are exposed to view by establishing grass cover to remove colour contrast; and
- > Establish planting patterns of trees and grasses in rehabilitation areas to create a high level of visual integration with the surrounding landscape.

In order to determine the appropriate screening treatments for any high sensitivity viewing point a SSVA will be undertaken. In the case of individual residences, the landowner of an effected property may request a SSVA, which may result in mitigation measures at the affected property or between the property and the source. A conceptual process for implementing SSVAs is documented in the Draft VIMP.

Constraints currently exist to the implementation of any mitigation measures on public land and, therefore, such measures have not been proposed. In addition mitigation on private land is expected to be more effective for the visual impacts identified. Should the existing constraints be overcome and specific works be identified to mitigate high impacts measures on public land may be considered in the future.

The Draft VIMP will be developed and will detail the management of the visual mitigation measures for MTO. The following represents the elements of the VIMP as they will apply to the proposal.

6.3 ON-SITE MITIGATION MEASURES

Specific controls that will be adopted on-site to manage the visual impacts of the existing operations, as well as the proposal, are detailed below.

6.3.1 STRUCTURES

Whilst no new buildings are proposed, if any are required, they will be designed to minimise the visual impacts on the surrounding environment, consistent with engineering principles and practice and any site constraints. Any design of buildings and infrastructure will include consideration of:

- > The location, form and height of buildings and structures;
- > The use of nonreflective and textured building materials to avoid glare;
- > The use of colours that will complement the surrounding environment. Muted greens or beige are favoured, except where bright colours are necessary for safety purposes;
- > Where practical, the design and construction of trafficable haul roads shall be such that they occur below or above the natural surface level; and
- > Infrastructure will be maintained in good order.

In general buildings will be constructed of a steel frame with metal roofs and wall cladding which would typically be Colorbond or a similar approved equivalent. As illustrated in Figure 6.1

Figure 6.1
Typical Structures and
Equipment



6.3.2 MANAGEMENT OF OFF-SITE LIGHTING IMPACTS

Under the proposal, MTO will continue to operate 24 hours a day. Lighting can impact properties either directly or through reflection off a low cloud base. The potential light sources include lighting plants, lights on mine infrastructure and the use of lights on vehicles. The MTO aims to provide enough light to safely undertake its operations whilst minimising visual disturbance to residences and public roads.

The impact of off-site lighting is minimised by directing lights away from off-site areas to the greatest degree possible, directing lights down onto work areas, using sensor lights where permanent lighting is unnecessary. Regular checks will be undertaken to observe the effects of lighting on public roads and neighbouring properties. Equipment lighting is fitted with shields where practical and is checked and adjusted to minimise the effects on adjacent areas.

Significant portions of MTO are concealed by existing vegetation and bunds that provide screening from lighting effects at night and provide visual screening during the day. The areas where this screening is less effective include those areas where vegetation screening filters views alone and when activities are being undertaken on areas which are higher than the surroundings, such as on elevated overburden emplacement areas.

6.3.3 SITE AND BOUNDARY AREAS

Site boundary mitigation measures provide reasonable and feasible measures to minimise potential visual impacts of MTO from the public domain and roads around the site.

The visual impacts of MTO will be controlled in most cases through landscape designed to integrate with the rehabilitation strategy outlined in the MOP. Typically, this will involve constructed bunds, vegetation screens, or built screens as appropriate to the location. In some cases effective screening may not be reasonable or feasible.

In most areas around the MTO boundary there is some level of existing bunding or vegetation and as such additional screening will be achieved through infill planting in areas where gaps allow views of MTO rather than new broad scale vegetation screens. The first preference for visual mitigation will be to retain existing vegetation where possible. Where necessary the existing vegetation will be augmented with additional planting to enhance the screening effects.

Bunding at the view source has many positive visual effects including its immediate screening effect, complete screening in narrow depth areas where vegetation would be inadequate to filter views and screening of vehicles and access roads.

Bunding is typically utilised in areas where views require a more prompt mitigation or where a combination of bunding and vegetation is determined to provide more appropriate visual mitigation.

Where physical or operational constraints preclude the use of vegetation or bunding on-site, structures will be considered as an alternate means to screen views from sensitive assessment locations. A number of constraints exist within the areas directly adjacent to MTO's boundaries including power line easements and Roads and Maritime Services (RMS) owned road reserves in which the opportunities for mitigation measures are limited. Movable built screens may offer a practical mitigation in these areas.

Bunding may be removed when visual impacts associated with the location have lessened following rehabilitation or other removal of the impact source. This allows progressive landscape normalisation ahead of closure rather than having a period of significant activity in the period prior to and across closure.

Areas likely to require mitigation measures to be implemented include, but are not limited to, Putty Road, which is specifically addressed below.

6.3.4 PUTTY ROAD

Impacts will occur to the views along Putty Road as a result of the existing approvals, in particular where it passes between MTO and Warkworth Mine. Bunding has been constructed in the key viewsheds and in general the area available for additional screening is limited. As such, the form of any screening will be determined as part of the detailed mine planning process.

Plantings will be undertaken to enhance the existing established vegetation which will be retained where possible. In particular, understory shrub plantings will be introduced to provide low level screening for passing motorists. Fast growing screen species will be selected, using endemic species in line with the principles of MTW's MOP.

The MTO overburden emplacement area will have a significant impact from the west. As such, a bund has been constructed along the western site boundary adjacent Charlton Road, extending around the northwest corner of the site and along Putty Road. This bund has been revegetated and tree and shrub vegetation is becoming established on the external face. The bund and associated vegetation reduces the visual impact of the overburden emplacement.

6.3.5 PLANTING FOR VEGETATION SCREENING

Visual screen plantings will include trees and shrubs of varying heights and be of sufficient width to provide sustainable and good visual screening. It is proposed that, in new screen planting areas with sufficient width, trees be planted a minimum of four rows deep (where practical), with approximately five metres between the rows with rows offset to provide improved screening from all view angles. Trees and understory planting will be tubestock with shrubs infilling between trees every metre with an additional row of shrubs between each row of trees as shown in Figures 6.2 and 6.3. A mix of shrubs will alternate with taller trees to ensure that the screening is achieved rapidly. The arrangement of native plants will be random, and unevenly distributed to create a natural character.

Where screen planting is augmenting existing vegetation to infill open areas, the same principle will be followed. However, planting will be added to create this matrix in areas where the existing vegetation is sparse. The number of rows of trees will be suitable for the area to be in filled. A typical example of this matrix is illustrated in Figure 6.4.

An indicative species list of locally endemic species is provided in the Draft VIMP Whilst preference will be given to species which are locally endemic, it is recognised that endemic species may not be commercially available in the numbers required to undertake the visual landscape screening. In this case, other appropriate native species which have performed well in the local area will be used.

6.3.6 PLANTING FOR BUND SCREENING

Visual bunds will require a program of planting to achieve a good level of vegetation cover. This program will aim for an initial cover crop followed by seeding of native grass / shrub and tree species. If the base soil conditions are suitable these phases may be undertaken as a single process.

For areas of high sensitivity augmentation plantings with advanced stock may also be undertaken. Large shrubs and small trees will be planted on the lower areas of the bund to screen at low levels with tall trees planted to the top of the bund to maximise its screening height. A typical screening bund is illustrated in Figure 6.5.

Figure 6.2
Typical Vegetation Screen
Section

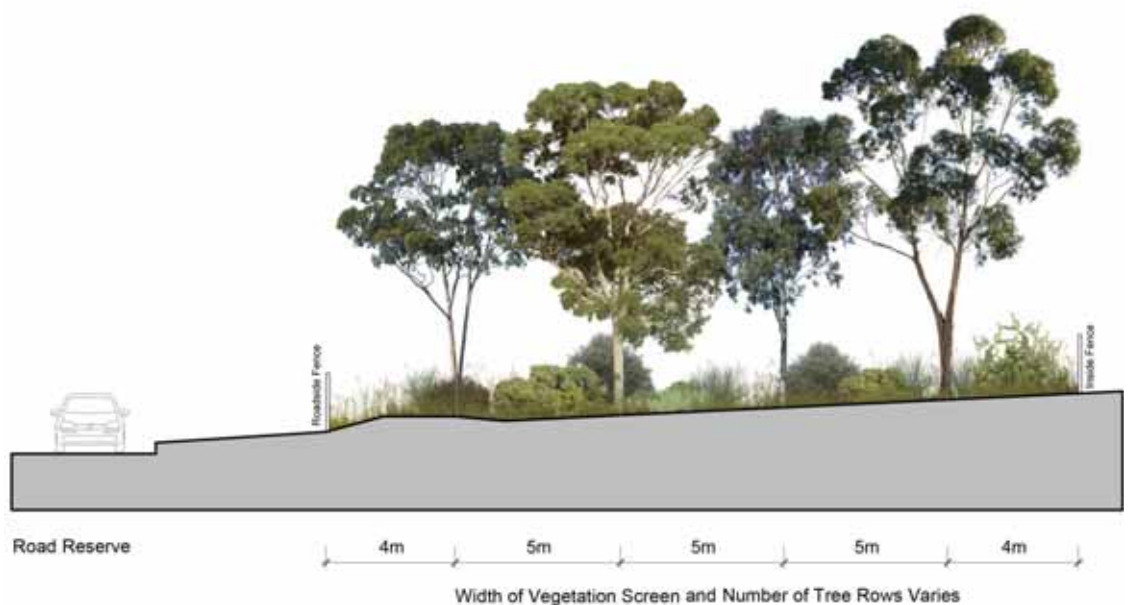


Figure 6.3
Typical Planting Matrix –
New Screen Planting

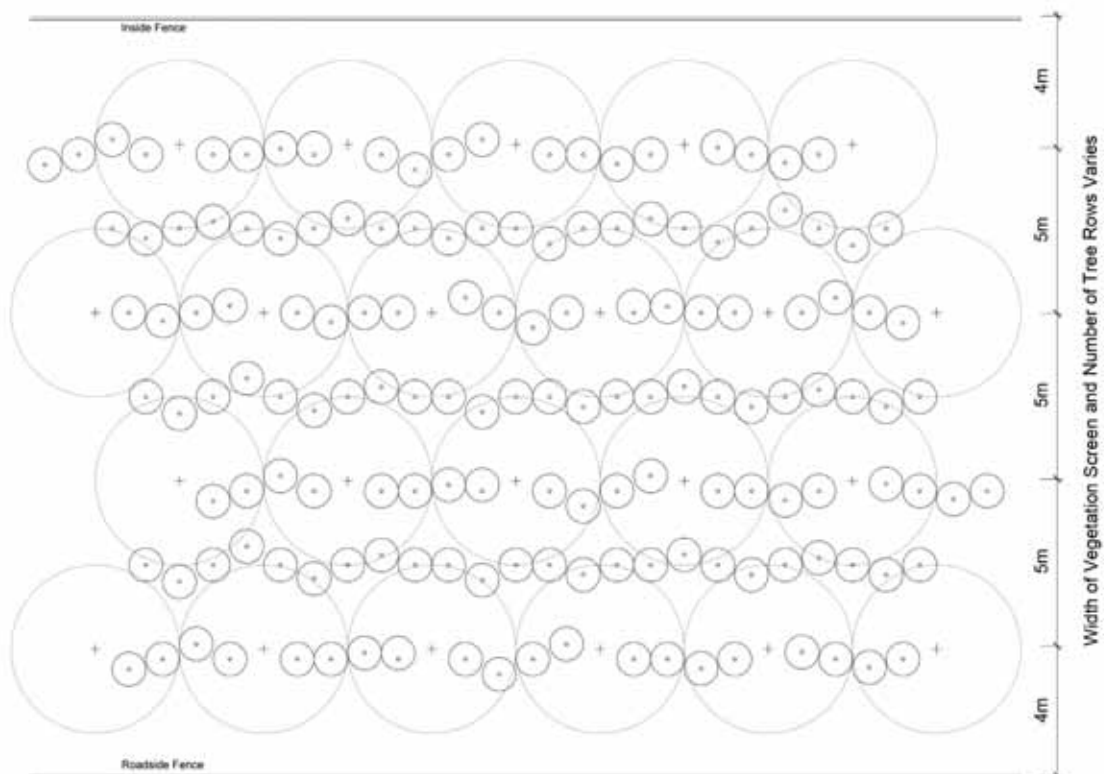


Figure 6.4
Typical Planting Matrix –
Infill Screen Planting

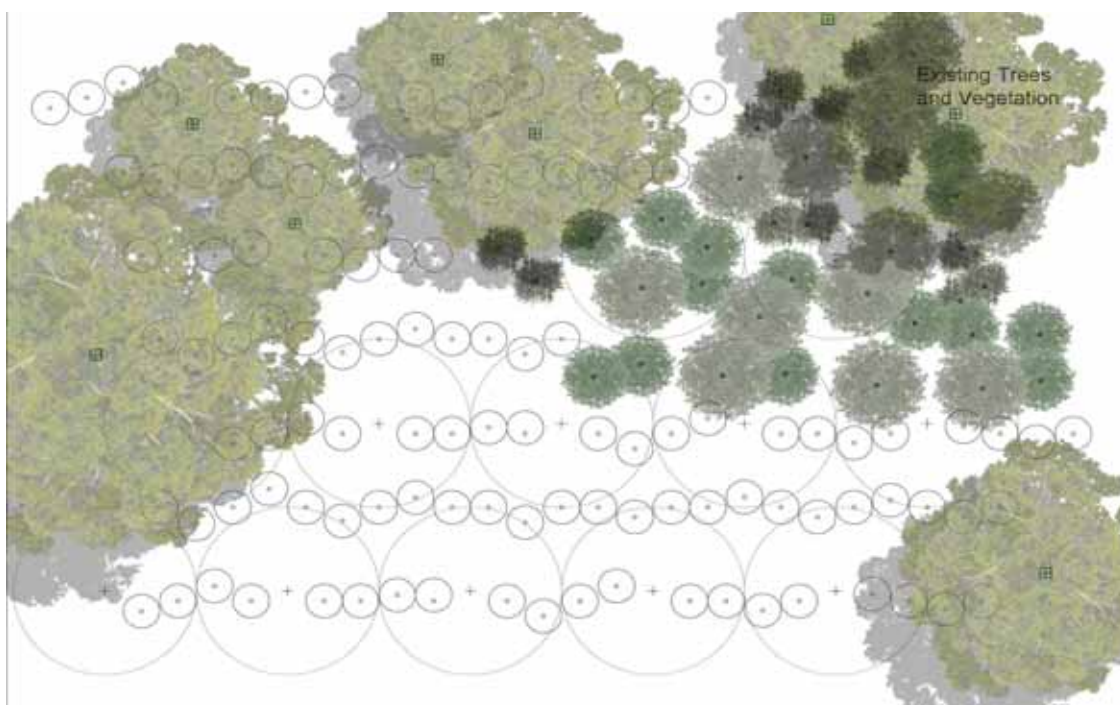
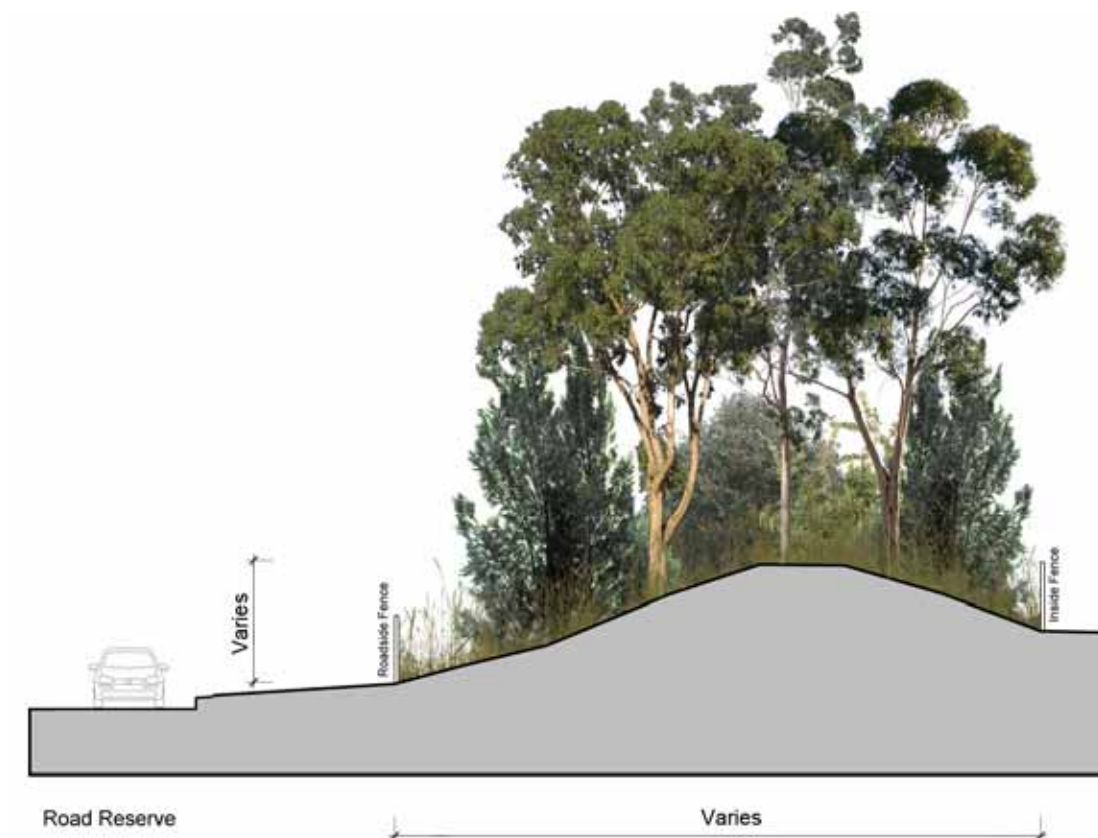


Figure 6.5
Typical Bund Screen Section



6.3.7 LANDSCAPE PROCEDURES

The general planting procedures will be as described below, though these may change based on experience and site suitability.

- > Where practical and available, topsoil will be translocated from mine advance areas with minimal stockpiling to utilise the native seed bank;
- > The method of seeding will be in accordance with site practice and may include aerial seeding, direct seeding, hand broadcasting, brush-matting or hydromulching; and
- > Best practice establishment procedures will be used as appropriate to planting sites including but not limited to consideration of: provenance and quality of seed and/or tubestock; ground preparation, planting practices, protection of plantings, and initial and ongoing maintenance.

6.4 OFF-SITE MITIGATION MEASURES

6.4.1 SCOPE

The mitigation measures described in this section apply to existing residences on existing residential allotments.

Visual mitigation of future subdivisions for the purpose of residential allotments are expected to be the responsibility of the developer or thereafter the resident.

6.4.2 SITE SPECIFIC VISUAL ASSESSMENT

Some individual residences within the PVC are likely to have significant direct views of MTO with a high visual impact at some stage during the operations.

Due to existing vegetation within the properties and the surrounding areas many of the residences within areas with potentially high visual impacts may not experience this level of impact. As the extent of existing screening is specific to each residence due to its elevation, orientation and layout, it is not possible to determine with any certainty the extent of impact on any individual residence without undertaking a SSVA. Where requested for properties in Bulga village, Coal & Allied will undertake a SSVA to determine the level of significance of the visual impact and the potential suitable mitigation measures to reduce the impact on the view. A conceptual methodology for this assessment and the process through which mitigation measures will be agreed with the land owner is outlined in the Draft VIMP.

Where possible within the permissions of effected landholders vegetation screening will be implemented as early as practicable during the development so as to allow a period for establishment of an effective screen prior to impact occurrence.

6.4.3 VISUAL MITIGATION TREATMENTS

Vegetation screening may be implemented to screen views related to the proposal from significantly impacted residences. Vegetation screening has various screening capacity depending on the significance of the impact. Coal & Allied will be guided by the recommended extent of mitigation based on the SSVA and any associated discussions and agreement with property owners. No work will occur without the owner's consent.

The design including species selection will be undertaken in consultation with the property owner. Designs will be in keeping with the character and design of the residence. All designs will be agreed and signed-off by the landowner prior to implementation.

Plant species will be selected for their suitability for the local area as well as their aesthetic properties. An indicative species list is provided in the Draft VIMP.

Landscape maintenance of planting undertaken on private land will be the responsibility of the landowner from the time of installation, although Coal & Allied will undertake fair and reasonable maintenance replanting of failed stock during the initial screen establishment period of approximately 12 months.

Figure 6.7
Example of Filtered On-Site
Planting



Figure 6.8
Example of Dense On-Site
Planting



The photomontages presented in Figures 6.9 through 6.14 illustrate the typical outcomes which can be expected from the proposed mitigation.

Figures 6.9 and 6.12 are photographs of the existing views taken from residences on Inlet Road in the Bulga area. Figures 6.10 and 6.13 illustrate the impacts without mitigation measures based on the indicative year nine view and 6.11 and 6.14 illustrate the views with mitigation measures in place.

Example Site 1 is located at 95 Inlet Road and Figure 6.11 illustrates filtered screen planting using tree and shrub species in keeping with the properties garden planting.

Figure 6.9
Site 1: Photograph of
Existing View



Figure 6.10
Site 1: Photomontage Prior
to Mitigation Measures
(Indicative Year 9)



Figure 6.11
Site 1: Photomontage Post
Mitigation Measures



Example Site 2 is located at 29 Inlet Road and Figure 6.14 illustrates dense screen planting. Given the current boundary planting on the property the mitigation planting would include augmenting the existing shrub beds with tree and shrub species in keeping with those already used.

Figure 6.12
Site 2: Photograph of
Existing View



Figure 6.13
Site 2: Photomontage Prior
to Mitigation Measures
(Indicative Year 9)



Figure 6.14
Site 2: Photomontage Post
Mitigation Measures



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7. Conclusion

The current approved operations at MTO would generate a range of visual effects that are in keeping with those that would typically be expected from the development of an open cut coal mine. The other existing mining activities in the area including Warkworth Mine, Hunter Valley Operations and Bulga Coal Complex have already created a change in the pre mining visual landscape.

The approved operations will generate an incremental change to the existing conditions and the proposal will have a low level of change in comparison to the current approved operations. The main variation will be the period of time over which these impacts will be experienced.

The visual impacts would for the most part be low; however, some sensitive assessment locations may experience higher impacts. The highest impacts occur from the west, in particular, from a limited number of residential properties in the area around Bulga Village. Impacts are partially limited by the intervening vegetation and topography; however, properties on elevated slopes are likely to require site specific mitigation measures.

The proposed mitigation measures aim to reduce potential visual impacts on the public domain through vegetation and bund screening along the site boundaries. In addition to these, specific foreground treatment measures at individual assessment locations determined to have significant impacts will also be implemented.

The progressive rehabilitation of MTO will reduce visual impacts over time with the revegetated final landform having a high level of integration into the natural rural landscape of the surrounding area.

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1. Integral Landscape Architecture and Visual, 2010, Proposed Warkworth Extension Visual Impact Assessment Study. Report prepared for Coal & Allied.
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