

Visual Impact Assessment Report

Wandoan Coal Project
Southern coal seam methane
water supply pipeline



A report prepared by

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Glossary

<i>Contrast</i>	The degree to which a development component differs visually from its landscape setting
<i>Integration</i>	The degree to which a development component can be blended into the existing landscape without necessarily being screened from view
<i>Screen</i>	The degree to which a development element is unseen due to intervening landscape elements such as topography or vegetation.
<i>Visual Effect</i>	A measure of the visual interaction between a development and the landscape setting within which it is located
<i>Visual Impact</i>	A measure of a joint consideration of both visual sensitivity and visual effect that considered together determine the visual impact of a development
<i>Visual Sensitivity</i>	The degree to which a change to the landscape will be perceived in an adverse way
<i>VMU</i>	Visual Management Unit is a landscape area with similar visual characteristics

Executive summary

The Wandoan Coal Project proposes to develop thermal coal resources situated immediately west of the Wandoan township, located in Dalby Regional Council. That Project's requirement for raw water for processing purposes requires such supplies to be sourced from areas outside the MLA areas. The southern coal seam methane (CSM) water pipeline is one of three potential raw water supply options.

This report evaluates the visual implications of the proposed southern coal seam methane (CSM) water pipeline. This pipeline will supply water for production purposes to the Wandoan Coal Project. The 101 km pipeline generally follows Leichhardt Highway and some local roads and open farm lands from Miles to the south to Wandoan.

The visual assessment of the proposed pipeline project evaluated the condition of the existing landscape and the visual character of the proposed construction of the pipeline to determine visual effects. The visual sensitivity of views on to the pipeline was considered in terms of general land use and distances of potential sensitive receptors to the pipeline project. A consideration of these two factors, visual effect and sensitivity determined impact levels.

Although high visual effects may be created during the construction process, this is limited in time and even views from sensitive receptors will experience little long-term effect or impact. The greatest visual effect will be created where there is a need to clear shrub and or tree cover. However this will be minimised if existing easements adjacent to the highway and open fields can be used.

Visual impact for this type of project is easily mitigated. A range of landscape mitigation strategies have been developed to ensure that significant visual impacts are avoided. Treatments relate to the easement. However if such treatment is not sufficient in exceptional circumstances, treatment can be carried out at the point of viewing, likely to be a homestead adjacent to the pipeline easement. A limited number of air valves will be an above ground element but will only have localised effects, because of their small scale, that are easily mitigated.

1. INTRODUCTION

As part of the assessment of the Wandoan Coal Project on behalf of Wandoan Joint Venture (WJV), Parsons Brinckerhoff (PB) has been commissioned to undertake a route selection for the proposed southern CSM water supply pipeline (the Project) between the Wandoan Coal Project area and the Condamine Power Station located approximately 101 km to the south-east of the mining lease application (MLA) areas. The Project locality is shown in Figure 1-1. The proposed southern CSM water supply pipeline forms one of three potential raw water supply options which are being considered for the Wandoan Coal Project. The other two potential raw water supply options will be investigated and reported in separate documents.

Parsons Brinckerhoff completed an assessment of four potential pipeline route options. This assessment led to Option 2 being defined as the preferred option.

This report prepared by Integral *landscape architecture and visual planning* addresses the visual and landscape aspects of the Southern CSM Water Supply Pipeline Project along Route Option 2.

1.1 Project background

The Wandoan Coal Project proposes to develop thermal coal resources situated immediately west of the Wandoan township, located in Dalby Regional Council. The Wandoan Coal Project site is located approximately 350 km north-west of Brisbane and 60 km south of Taroom as shown in Figure 1-1. The coal reserves for the Wandoan Coal Project exist within the area of three mining lease applications, MLA 50229, 50230 and 50231 and will be developed as an open cut mine and related local infrastructure. The Wandoan Coal Project covers an area of approximately 32,000 ha.

The mining of the coal resources will be developed using a combination of truck, shovel and excavator, dozer and dragline mining equipment. Coal will be mined at a rate of around 30 million tonnes per annum (Mt/a) run of mine (ROM) coal. The coal will be crushed, sized and washed before being transported by rail to ports in the Gladstone area.

The Wandoan Coal Project will include on-site coal handling and processing, which will require a constant and reliable water supply. It is anticipated that raw water requirements at the Wandoan Coal Project will be typically less than 8,400 ML/a, with demand peaking at 9,100 ML/a. A potential water resource to satisfy this demand has been identified as coal seam methane (CSM) water from the CSM gas fields south of the Condamine Power Station.

Coal seam methane gas development involves extraction of methane from coal seams by reducing ground water pressure that keeps the methane adsorbed to the coal. Water is the primary by-product of coal seam gas development and this water is often rich in salts and other constituents that render it unsuitable for many direct beneficial uses. The poor quality of the produced water makes the management of this water one of the major concerns associated with coal seam gas development.

However, in order to beneficially re-use coal seam methane wastewater and secure a water supply for the Wandoan Coal Project, it is proposed to establish the southern CSM water supply pipeline and pipe the water from the Condamine Power Station to the Wandoan Coal Project MLA areas. Current discussions indicate that full or partial treatment of the CSM water to a standard suitable for use in coal handling and processing will be undertaken prior to the water leaving the Condamine Power Station.

Initial design concepts indicate that the 101 km pipeline will require a lift pump station at the Condamine Power Station point of supply. If necessary, treatment of the coal seam methane water to a standard suitable for use in coal handling and processing will be undertaken prior to the water leaving the Condamine Power Station. The pipeline will generally be located underground, constructed using a section trench and backfill method.

1.2 Description of study area

The pipeline route alignment runs predominantly within the eastern road reserve of the Leichhardt Highway. The Leichhardt Highway is a two-lane sealed state-controlled road, which provides a north-south route through central and southern Queensland, linking Goondiwindi (NSW/QLD border) to Rockhampton.

Other roads along the pipeline route alignment are Gearys Road, Baileys Road, Fosters Road and Peakes Road. These roads are narrow two-lane bitumen and/or gravel carriageways. The pipeline route will also cross various private properties between Baileys Road and Fosters Road.

The topography along the route alignment is gentle to moderately undulating with some slight elevation in the southern area, as well as around and to the west of the townships of Giligulgul and Guluguba.

Historical land use patterns within the study area have resulted in significant clearance of vegetation. Frequent tree cover however is scattered throughout, predominantly within the road reserves. This tree cover provides a degree of enclosure and containment of views. Large tracts of wide tree cover are moderately less along the eastern edge of the highway in comparison to the western edge.

There are a number of rural allotments of varying size, which support predominantly agricultural land use activities within the study area. Some of these rural residences may have views to the pipeline route across cropping and live-stock grazing lands.



Figure 1-1
Project Location

2. METHODOLOGY OF ASSESSMENT

2.1 Relevant legislation and guidelines

The proposed pipeline, outside existing petroleum lease areas, is subject to assessment under the Queensland Integrated Planning Act, 1997 (IP Act) and Environmental Protection Act 1994, (EP Act). It is also subject to provisions of the Planning Scheme for the former Taroom Shire 2006 and the Planning Scheme for the former Murilla Shire 2006.

This visual assessment, see Figure 2-1, is part of an overall environmental assessment being completed by PB to meet the requirements of IP Act, EP Act and the local Planning Schemes. This was achieved by assessing the visual character of the receiving environments, the visual character of the development, location of sensitive receptors to define visual impacts and as needed, develop landscape mitigation strategies.

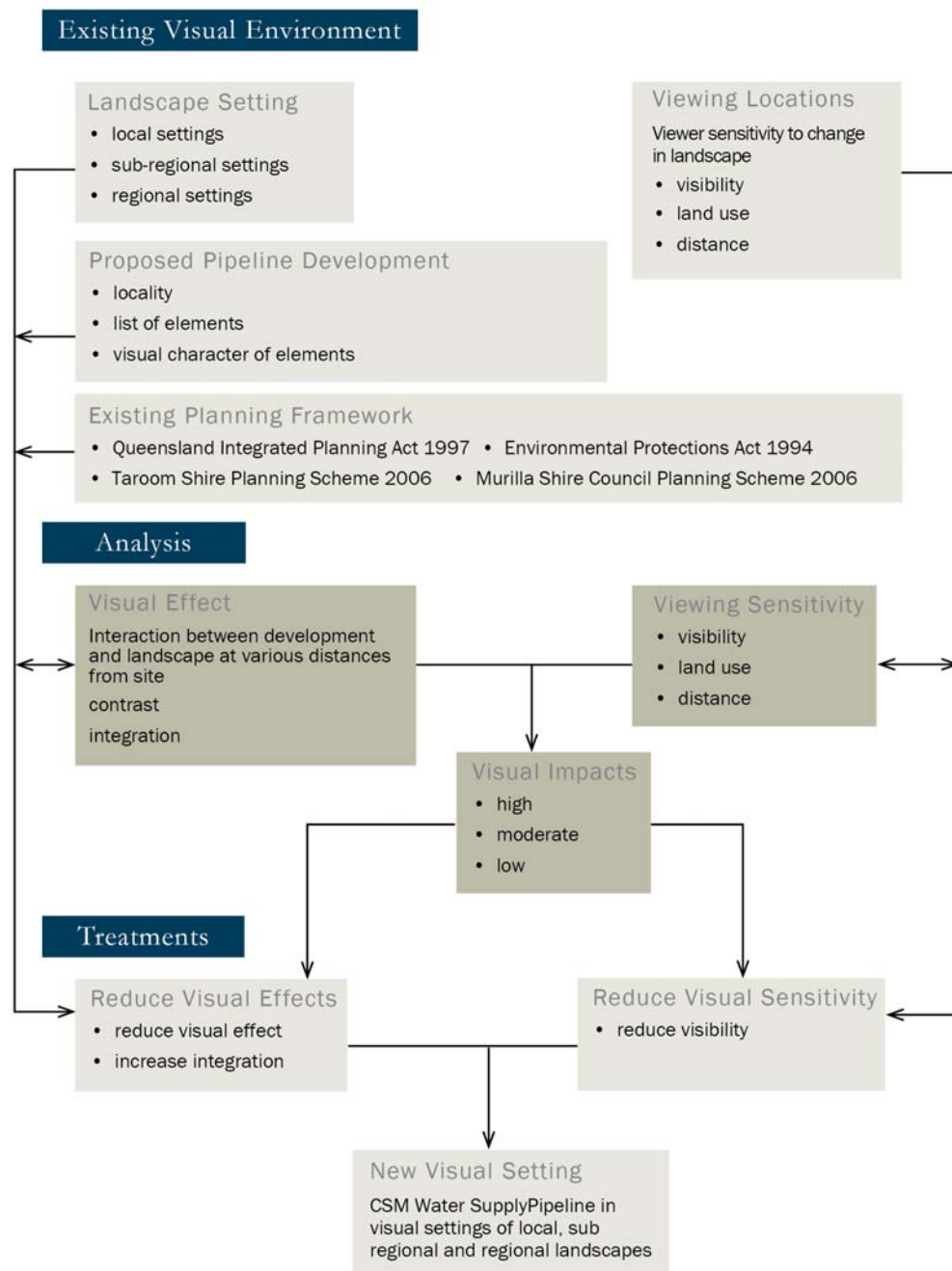


Figure 2-1: Visual Assessment Methodology.

2.2 How the study was conducted and information obtained

In order to review the visual significance and magnitude of the proposed project on the landscape, a baseline study was completed. The purpose of baseline studies is to record and analyse the existing character, quality and sensitivity of the landscape and any visual resources in the vicinity of the Project. On completion of the baseline study a comprehensive analysis and evaluation can be undertaken.

In general terms, there were four key stages to the landscape visual assessment study:

Stage 1: Desktop study

A desktop study of relevant background reports, aerial photography and mapped information was undertaken to collect data on topography, land-use, field pattern and settlement pattern. This allowed an understanding of the proposed pipeline route and the landscape characteristics of the study area.

Stage 2: Fieldwork

A comprehensive field study was undertaken and photographic records obtained. The field survey was carried out on site, by two people to gain a consensus opinion.

Field work was completed to collect visual data relating to landform, land use, vegetation, boundaries and more perceptual aspects like scale, enclosure and visual unity. At the same time information was collected on the condition of landscape features and elements that contribute to the overall character of the area.

Stage 3: Classification

This stage refined and finalised the desktop study and field work output by classifying the landscape into Visual Management Units (VMU). VMUs are large tracts of landscape based on locations of various roads, road segments and broad changes in landscape character.

Stage 4: Analysis and evaluation

The interaction of the visual character of the development and the visual character of the receiving environment create the visual effect of the Proposal. The type of land use of the visual receptors and distances from visual receptors to the pipeline defines the visual sensitivity to the project. When both visual effect and visual sensitivity are considered together the visual impact can be determined, see Figure 2-2.

These impact levels can be reduced by altering either visual effect or visual sensitivity. In the case of pipeline construction, the visual effects are generally greatly reduced following the completion of the construction phase. Visual sensitivity can be reduced as needed, by application of screening at viewing points, however this is generally not needed for pipeline construction.

To assist in the appreciation of the visual effects of the proposed pipeline route and its interactions with various landscape settings, a series of photomontage imagery was completed.

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

Figure 2-2: *Visual Impact.*

2.3 Limitations

The assessment was limited to the defined route and did not consider alternatives outside of the proposed pipeline route alignment.

Analysis of sensitive receptors was limited to evaluation of the aerial photo coverage. On site assessment was not always possible due to vegetation and in some locations topographic elements screening residences from roadside views.

Assessment was for the far greater part based on photographic data collected along the preferred option.

Assessment of the development was based on descriptions of the pipeline and construction techniques provided by Parsons Brinkerhoff.

3. EXISTING ENVIRONMENT

3.1 General

The 101 km pipeline route alignment runs predominantly within or adjacent to the road reserve on the eastern side of the Leichhardt Highway, local roads and open grazing lands.

The Leichhardt Highway is a two-lane sealed state controlled road with wide verges of up to 20m in some locations. Other roads along the pipeline route alignment are Gearys Road, Baileys Road, Fosters Road and Peakes Road. These roads are narrow two-lane bitumen and/or gravel carriageways.

Vegetation along the pipeline route alignment is generally a combination of mixed Cypress hardwood, Eucalypt woodland with shrub and grass understory. Large tracts of vegetation, on the eastern side of the Leichhardt Highway road reserves, have been previously cleared or disturbed due to various infrastructure developments including telecommunications.

The topography along the route alignment is gentle to moderately undulating with some slight elevation to approximately 360m in the southern area, and approximately 380 - 420m around and to the west of the townships of Giligulgul and Guluguba.

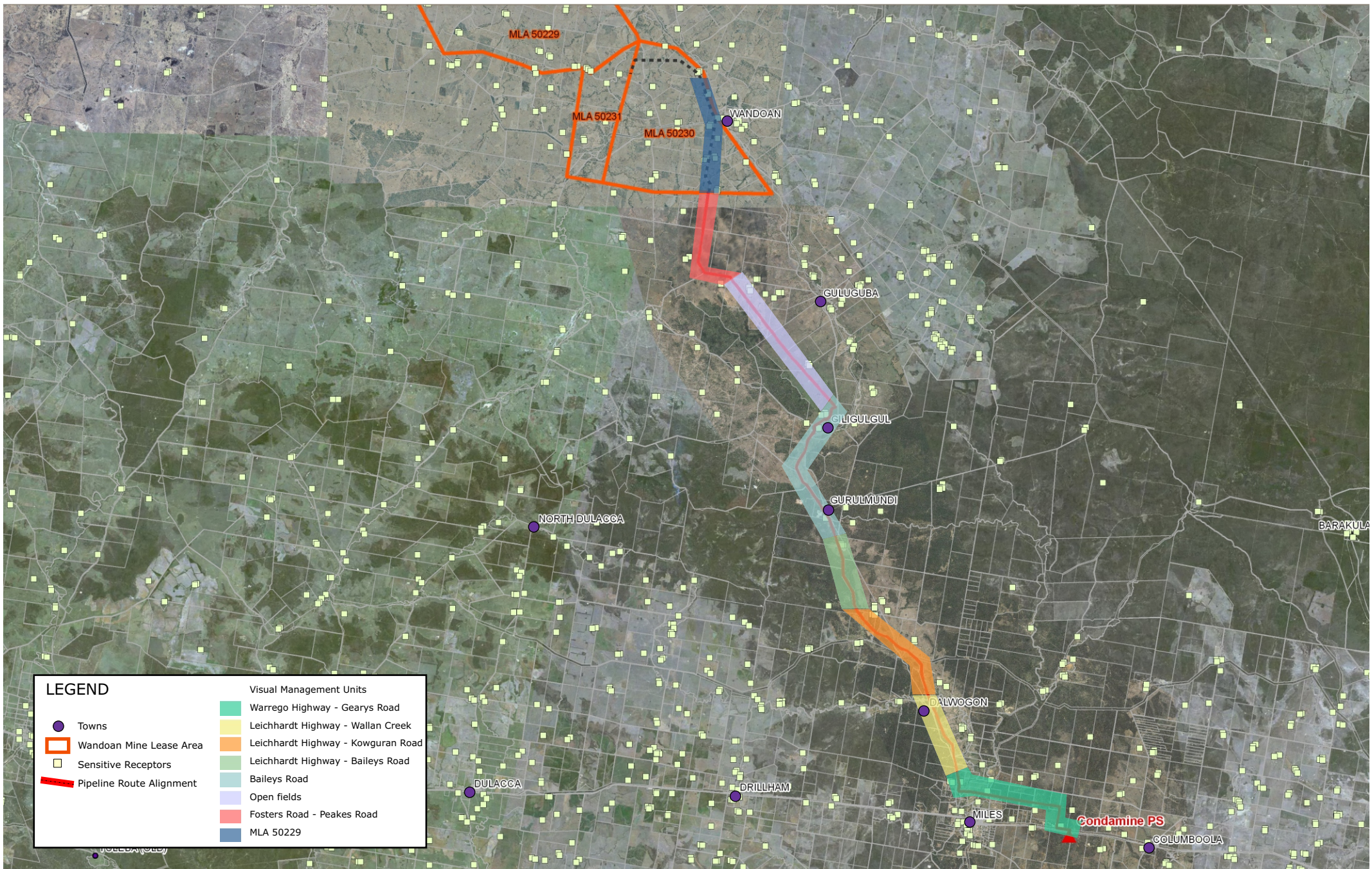
In locations where the route alignment follows the highway and local roads, the topography and existing vegetation is such that the view sheds are generally limited to the roads themselves and immediate adjoining lands. This will assist in providing enclosure and containment of views.

The pipeline route will also cross various private properties between Baileys Road and Foster Road. These properties are rural allotments of varying size, which support predominantly agricultural land use activities within the study area. The historical land use patterns have resulted in significant clearance of vegetation. Some of these rural residences may have views to the pipeline route across cropping and live-stock grazing lands. Some tree cover however is scattered throughout these properties which will provide a degree of enclosure and containment of views.

Due to the similarity of the terrain and land cover, rather than establish Visual Character Units as is normally the case, Visual Management Units (VMU) have been established based on locations of various roads, road segments and open paddock locations, see Figure 3-1. The primary characteristics of these Visual Management Units are summarised below with typical photographs shown.

Eight Local Visual Management Units include:

- Warrego Highway – Gearys Road section VMU
- Leichhardt Highway (Gearys Road) – Wallan Creek section VMU
- Leichhardt Highway – Kowguran Road section VMU
- Leichhardt Highway – Baileys Road section VMU
- Baileys Road section VMU
- Private property section VMU
- Fosters Road – Peakes Road VMU
- MLA 50230 section VMU



LEGEND

- Towns
- Wandoan Mine Lease Area
- Sensitive Receptors
- Pipeline Route Alignment

Visual Management Units

- Warrego Highway - Gearys Road
- Leichhardt Highway - Wallan Creek
- Leichhardt Highway - Kowguran Road
- Leichhardt Highway - Baileys Road
- Baileys Road
- Open fields
- Fosters Road - Peakes Road
- MLA 50229

3.2 Visual Management Units

3.2.1 Warrego Highway – Gearys Road section VMU

The southern pipeline route alignment commences at the Condamine Power Station, travelling west along the northern road reserve of the Warrego Highway for approximately 2 km. The topography is relatively level to gently undulating through this section, and generally dominated by open woodland with grass understorey. The road reserve however is cleared of vegetation.

From the Warrego Highway the pipeline progresses north along a local road to an existing high voltage transmission line easement. A western turn is made and the pipeline travels along the existing transmission line easement until it intersects with the Leichhardt Highway, see Figure 3-2. Landform is moderately undulating with elevation ranges from 360m in the eastern section to 300m where the route intersects the Leichhardt Highway. Vegetation is predominantly open woodland with regrowth understorey. Trees are cleared along the existing transmission line easement.

3.2.2 Leichhardt Highway (transmission line) – Wallan Creek section VMU

Progressing in a northern direction, the pipeline travels along the Leichhardt Highway within the eastern road reserve. The topography is typically flat through this visual management unit with a consistent elevation of approximately 320m.

This section of the pipeline route alignment is within a Significant Vegetation Area. Vegetation is predominantly a mix of tall Eucalyptus with Casuarina and mixed understorey, see Figure 3-3. Generally vegetation along the proposed route alignment is narrower than that of the vegetation corridor on the western edge of the highway. Generally views beyond the highway corridor are screened by roadside vegetation.

Part of this section of the route is within the Petroleum Lease area PL216. North of Dalwogan the pipeline route crosses Wallan Creek.

3.2.3 Leichhardt Highway – Kowguran Road section VMU

The proposed pipeline route continues to travel in a northerly direction following the Leichhardt Highway. The terrain through this section is of a similar elevation to the Wallan Creek VMU with a slight gradual elevation increase to 340m.

The vegetation buffer on the eastern edge of the highway is more dispersed throughout this VMU allowing views to open grassland areas with scattered trees, see Figure 3-4.



Figure 3-2: *The pipeline travels in an east - west direction along the existing transmission line easement.*



Figure 3-3: *Tall woodland vegetation in the Leichhardt Highway road reserve.*

3.2.4 Leichhardt Highway – Baileys Road section VMU

The pipeline route continues to travel north along the Leichhardt Highway.

As per the previous VMU, vegetation is generally narrower on the eastern side of the highway as opposed to a wider vegetation band on the western side of the corridor within this VMU. Consequently views are open beyond the highway corridor in some locations. Other areas however consist of dense vegetation on both eastern and western sides of the highway, see Figure 3-5. Vegetation consists of tall Eucalypt forest with Casuarina understorey and some pine species.

Elevation continues to rise to approximately 380m in the northern section of this VMU.

There are several homesteads close to the highway and pipeline route alignment within this VMU.

3.2.5 Baileys Road section VMU

The pipeline route deviates from the Leichhardt Highway at Baileys Road, south of Gurulmundi and travels north along Baileys Road. The pipeline route meets the rail corridor and generally runs adjacent for approximately 4.5 km before turning to the north-west.

Baileys Road is a local road being a narrow gravel two-lane carriageway. Topography again is typically flat with elevations gently decreasing to approximately 360m.

Throughout this VMU vegetation is located in road reserves with cleared open paddock adjacent. The vegetation is generally Cypress dominated with scattered tall Eucalypt, with grassland and regrowth understorey, see Figure 3-6

3.2.6 Open field section VMU

North of Giligulgul the pipeline route turns to the north-west and traverses Lot 28 CP885313, Lot 44 FT988, Lot 36 FT213, Lot 4 FT526 and Lot 39 FT1000 prior to meeting with Fosters Road.

Topography in this VMU is gently undulating from approximate elevations of 320m to 360m. This section of the route differs from the above units in that it is cropping and live-stock grazing lands with scattered tree cover, see Figure 3-7. Homestead buildings, including residences and sheds are features of the landscape character of this VMU.



Figure 3-4: *Scattered vegetation and open grassland along the eastern edge of the highway corridor.*



Figure 3-5: *Some areas of the highway have dense roadside vegetation screening views beyond the highway corridor.*



Figure 3-6: Road verges are dominated by Cypress and Eucalypt tree cover.



Figure 3-7: This VMU is dominated by live-stock grazing lands with scattered low tree cover.

3.2.7 Fosters Road – Peakes Road VMU

The pipeline alignment follows Fosters Road in a westerly direction. At the intersection of Fosters Road, Hansens Road and Peakes Road the pipeline route proceeds north to run adjacent to Peakes Road. The route continues along Peakes Road to meet the southern boundary of the Wandoan Coal Project MLA 50230.

This VMU is gentle undulating terrain with elevations ranging from 340m to 280m in the far northern section of the VMU. The land use is typically live-stock grazing and cropping land. Vegetation is scattered tree cover with linear bands of vegetation along some road verges and boundary lines, see Figure 3-8. Along Peakes Road there is generally a thin strip of roadside vegetation which includes sections of planted trees and areas of remnant vegetation.

3.2.8 MLA 50230 section VMU

The alignment across the MLA area has not yet been determined and will be dependant on mining infrastructure. The route although not fixed will cross open grassland and grazing land with scattered low tree cover, see Figure 3-9. The topography is typically level at an elevation of approximately 280m. Some linear vegetation is evident along the road verges.



Figure 3-8: *Linear strips of roadside vegetation are frequent along Peakes Road.*



Figure 3-9: *This VMU is dominated by open grassland and live-stock grazing land with roadside vegetation in some locations.*

4. DESCRIPTION OF PROPOSED DEVELOPMENT

4.1 Route Alignment

A number of route options were considered by PB as part of the route selection process and option 2 was selected as the preferred option.

Option 2, see Figure 4.1, commences at the Condamine Power Station and progresses in a northerly direction to an existing high voltage transmission line easement. A turn to the west is then made and the pipeline travels along the existing transmission line easement until it intersects with the Leichhardt Highway. A turn to the north is made and the pipeline travels along the Leichhardt Highway road reserve until the deviation (as described above) is made south of Gurilmundi. North of Giligulgul the pipeline turns to the north-west and traverses Lot 28 CP885313, Lot 44 FT988, Lot 36 FT213, Lot 4 FT526 and Lot 39 FT1000 prior to meeting with Fosters Road. The alignment then follows Fosters Road in a westerly direction and then turns north to run along Peakes Road to meet the southern boundary of the Wandoan Coal Project MLA 50230. The alignment across the MLA area from the boundary to the mine infrastructure area has not yet been determined and will depend upon finalisation of a mine layout including haul road, pit and dump locations. Option 2 is approximately 101 km in length.

The Pipeline route for a significant part of its length is along the Leichhardt Highway. The remainder of the route is in visually less sensitive locations along local roads and across open farm land.

Visual Significance of Pipeline Route

The visual significance of the selected route is focused on the section parallel to the Leichhardt Highway. Although it is not a designated scenic route, it is a major regional highway and dramatic change to the immediate foreground views from the highway would be viewed with high sensitivity. If existing pipeline infrastructure alignments adjacent to the highway can be used then the sensitivity of this travel corridor will not be impacted on.

The remainder of the route uses existing easements, local roads and open fields. Along these alignments the major visual concern is the homesteads and hamlets along the route. These locations can have high sensitivity to change in the foreground and middleground views, should such changes create significant visual effects.

4.2 Pipeline Construction

The southern pipeline will be approximately 101 km in length and will generally be located underground, constructed using a section trench and backfill method. Depth of cover will be between 0.6m to 1m and will vary subject to site specific conditions and land uses.

The pipeline will require a lift pump station at the Condamine Power Station. Air release points will be at high points along the pipeline at approximately 800m spacing as well as scour outlets at approximately 1 to 2 km apart.

The construction corridor will be approximately 20 m wide with the construction period of approximately nine months. Construction will involve delivery of pipe sections to lay down points along the pipeline route. Typical machinery used for pipeline construction and installation will

involve delivery trucks for pipe sections, trucks for importing bedding material, backhoe/excavator and mobile crane.

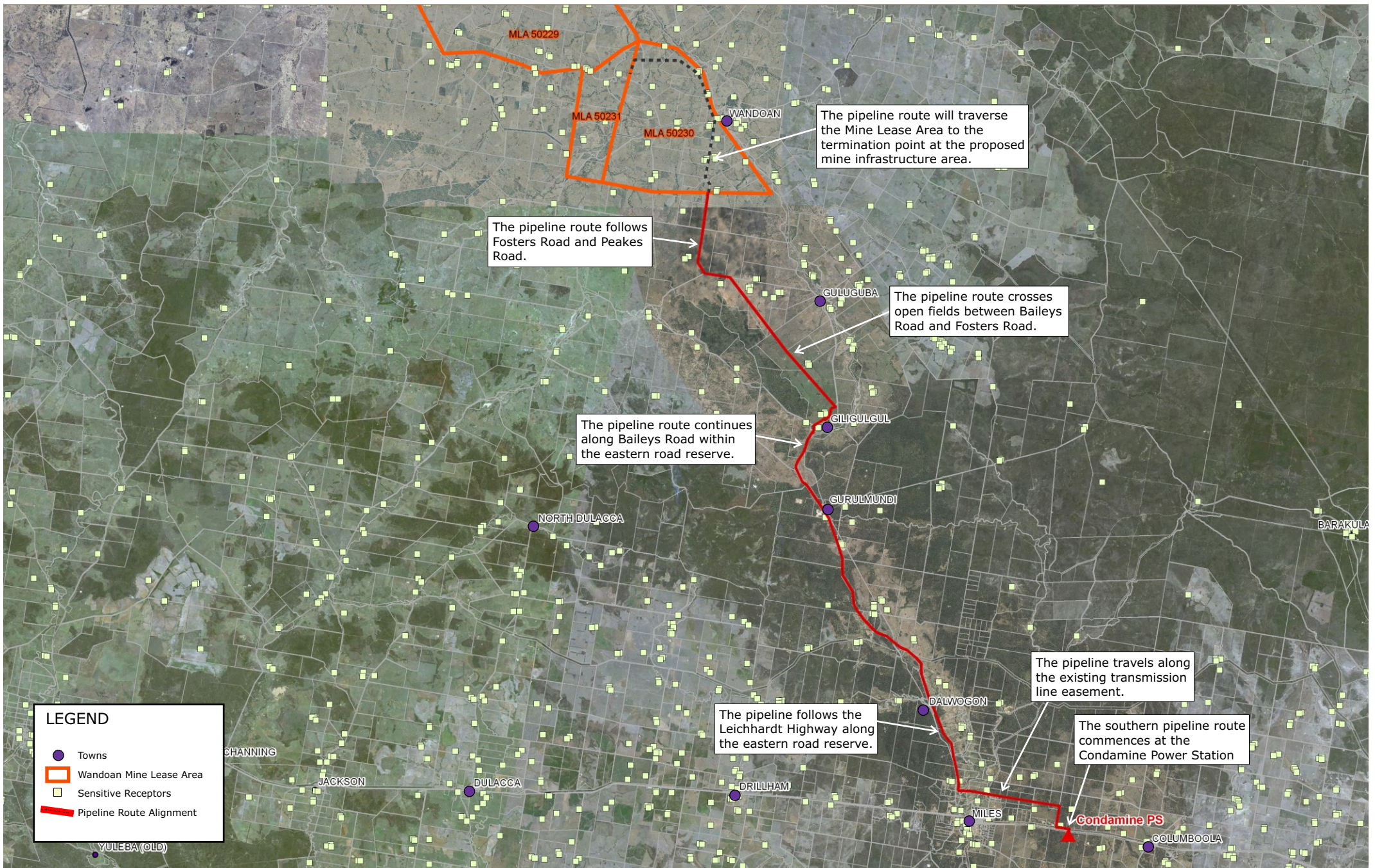
Visual Character of Pipeline Construction

The creation of a 20 m wide construction footprint and the construction of a pipeline in it can create strong visual effects.

This pipeline construction process will alter the local landscape character. This change will be created by the removal of ground cover be it grass or shrub cover. The resultant exposure and then excavation of the trench will create strong colour contrast with the adjoining landscape area. The extended linear character of this change through the landscape will create strong lineal contrast.

If tree cover occurs, the clearing of trees will also increase the level of contrast between the existing landscape and that of the pipeline easement creating a strong visual effect.

Much of the visual effect is related just to the construction period as form and colour contrast is removed when restoration of ground cover is completed. Should there have been tree removal associated with construction, the diminution of the visual effect will not be as great unless some tree cover restoration is undertaken.



5. POTENTIAL IMPACTS

Visual Impacts resulting from the pipeline in any location are a product of both visual effects and visual sensitivity as illustrated in Figure 2.2.

5.1 Visual Effects

Potential visual effects during the pipeline construction will result from the removal of ground cover in all locations and temporary earthworks associated with trenching. This removal of vegetation and topsoil will create a colour and minor form contrast to areas untouched and may detract from the landscape character of the highway, roadway and surrounding landscape settings. This contrast, at least during the construction phase will also create a strong line in the landscape. The pipeline easement will however reflect the alignment of roadways and fence lines in a locality and in this way not contrast with the established line pattern of the landscape.

In some locations in addition to disturbance of ground covers there will also be removal of shrub and tree cover generally in the form of scattered trees or open woodland or forest areas in some locations along the highway. This will increase the level of contrast and depending on the extent of “feathered edge” to the vegetation clearing may create longer term linear elements in the landscape increasing visual effect levels.

The construction of the pipeline will require up to 20m clear space. This will allow for trenching equipment, pipe laying equipment as well as pipe delivery truck and general vehicle movement. However where possible, vegetation clearing will be restricted to less than 20m.

The removal of grass, trenching, etc is temporary and the visual effect of this is removed once restoration and re-grassing is accomplished. However where woodland, dense shrub or forest is removed the linear effect of vegetation clearing will be more long lasting. Furthermore if restoration and re-grassing is not managed correctly, there is potential for weed and other pest infestation. Further information on pest management is contained within Chapter 17 Ecology and the associated technical reports.

The visual effects of the pipeline construction have been illustrated in Figures 5-1 – 5-6. These photomontages illustrate the visual effects in different visual settings along the pipeline route.

Visual effects will in the short term be high due to strong contrast created by ground cover removal, trenching and pipe laying activity. However this visual effect is short term and is reduced to low once appropriately managed restoration and re-grassing has been completed.

In treed areas, visual effects will remain at moderate levels where there is a strong edge to vegetation clearing. Otherwise similar low to moderate visual effect levels will be experienced once ground covers are re-established.

Visual Effects may also stay at a somewhat elevated level if there is a restriction to management of the easement and that this will create a linear visual difference between the easement and adjoining farm areas.

5.2 Visual Effect illustrated by Photomontage

The visual effect of the pipeline construction in various locations was illustrated with photomontage images, see figure 5.1.

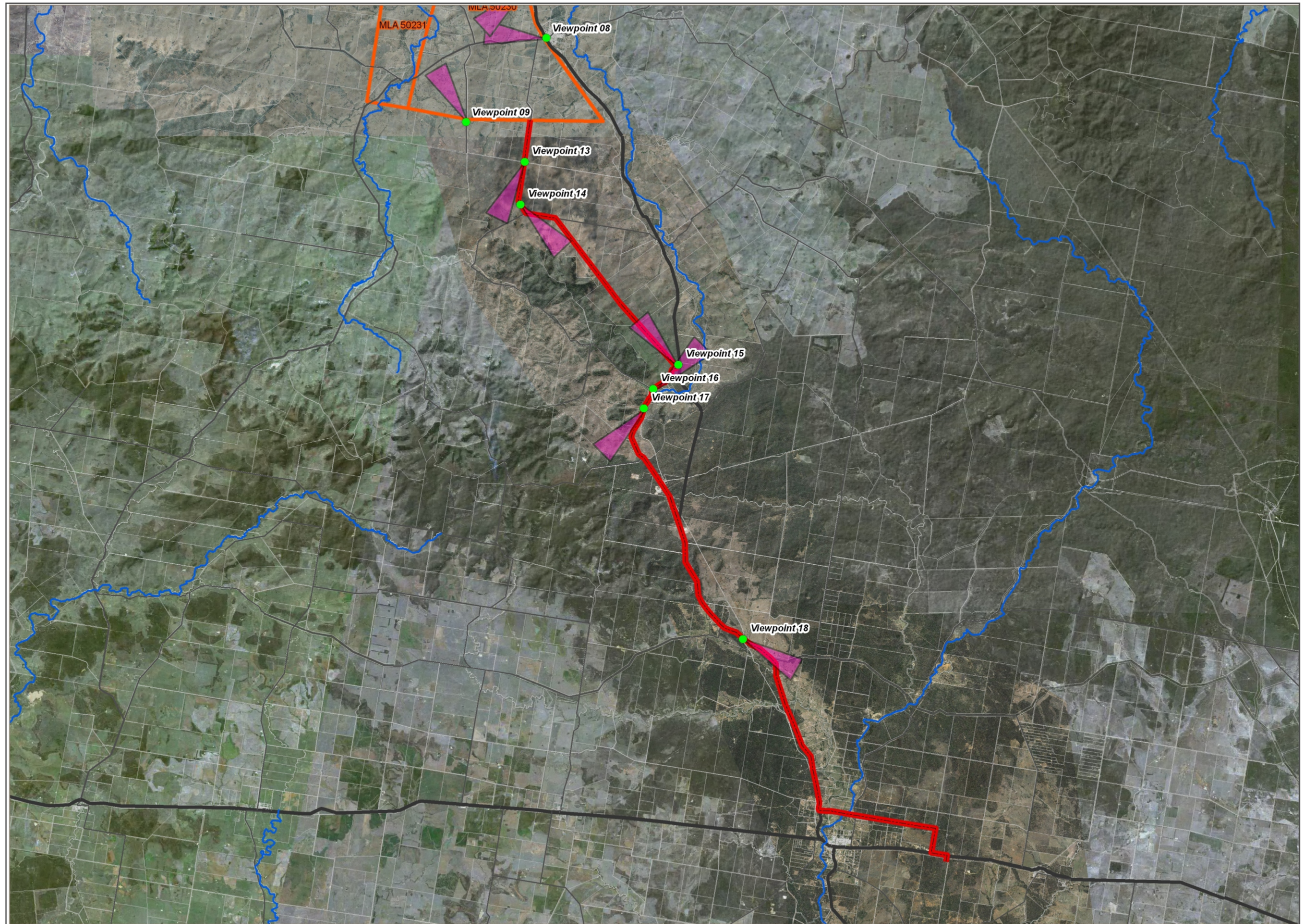


Figure 5-1
Photomontage Viewpoint Locations
A series of photomontage images illustrating what is seen of the pipeline works has been completed from various vantage points along the pipeline route.

5.2.1 Figure 5.2 Peakes Road

In this section of Peakes Road the pipeline is constructed in the middle of the road. The visual effect is to create a minor variation to the existing road surface as shown on Figure 5.2a as a result of new road material being used to rectify the road gravel surface, see figure 5.2b

The visual effect of the pipeline construction in this situation is Low

5.2.2 Figure 5.3 Peakes Road

This photomontage illustrates the effect of the pipeline utilizing a minor rural road verge. It can be seen from the existing visual setting of the road that the vegetation is relatively close to the shoulder of the road, see Figure 5.3a. This vegetation has to be cleared to enable pipeline construction and is illustrated in Figure 5.3b.

Although the vegetation clearing in this instance appears significant, retained vegetation within the road reserve retains the character of the reserve and the visual effect is moderate.

5.2.3 Figure 5.4 Open Fields north of Gilgulgul

This photomontage illustrates the effect of the pipeline construction in an open field. The continuity of the grassland, see Figure 5.4a is temporarily disrupted during the construction process and before grass cover re-establishes the grass cover and continuity, see Figure 5.4b

The visual effect is low shortly after completion of the construction.

5.2.4 Figure 5.5 Baileys Road

In this section of the route the pipeline is located on Baileys Road. This is a minor rural road in the area, see Figure 5.5a. The pipeline will generally be located within the roadway itself, negating any need for vegetation clearing. However in some cases there may be some modification of road verge conditions where the road alignment alters to dramatically to allow for the pipeline route to follow, see figure 5.5b.

The visual effect in this locality is generally low, reflecting the 'in' roadway location of the pipeline.

5.2.5 Figure 5.6 Leichardt Highway

This photomontage illustrates the most significant visual effect as it is adjacent to the highway. The existing visual setting in this location and much other highway location consists of forest vegetation adjacent to the road shoulder, see Figure 5.6a. There is however a strip of cleared land between the road verge and the beginning of the tree line as again is illustrated in Figure 5.6a.

The pipeline in this situation is located within the road verge adjacent to the tree line and for the greater part utilising the cleared verge areas. However in some locations the tree line is too close to the verge and some clearing is required, see Figure 5.6b.

The visual effect of this will initially be high but once the clearing is done and the ground levels restored, the new landscape will borrow visually from the existing one in having a varied tree edge with glympes and views to adjoining land use areas. The visual effect will reduce to low on consolidation of the restored ground levels and ground cover following completion of the pipe laying process.





















5.3 Visual Sensitivity

Visual sensitivity to the pipeline construction, that will only be constructed during the day, is due to two sources, views from the highway and the adjacent roadways and from adjoining homesteads and farm areas.

The Leichhardt Highway is considered to have high sensitivity to immediate foreground views (less than 500m), given its regional highway status and significant amounts of tourist traffic. The visual sensitivity of the highway will be affected by the degree of visibility to the pipeline easement. Generally there is good vegetation cover on the road side that will eliminate views even during the construction process. However where there is no tree cover in the road reserve there will be open views to the pipeline easement, including other existing infrastructure easements. Again however views to the ground plain will often be limited due to elevation differences between the highway and the adjoining easement lands.

Other roads are considered to have low sensitivity due to their local rural road status.

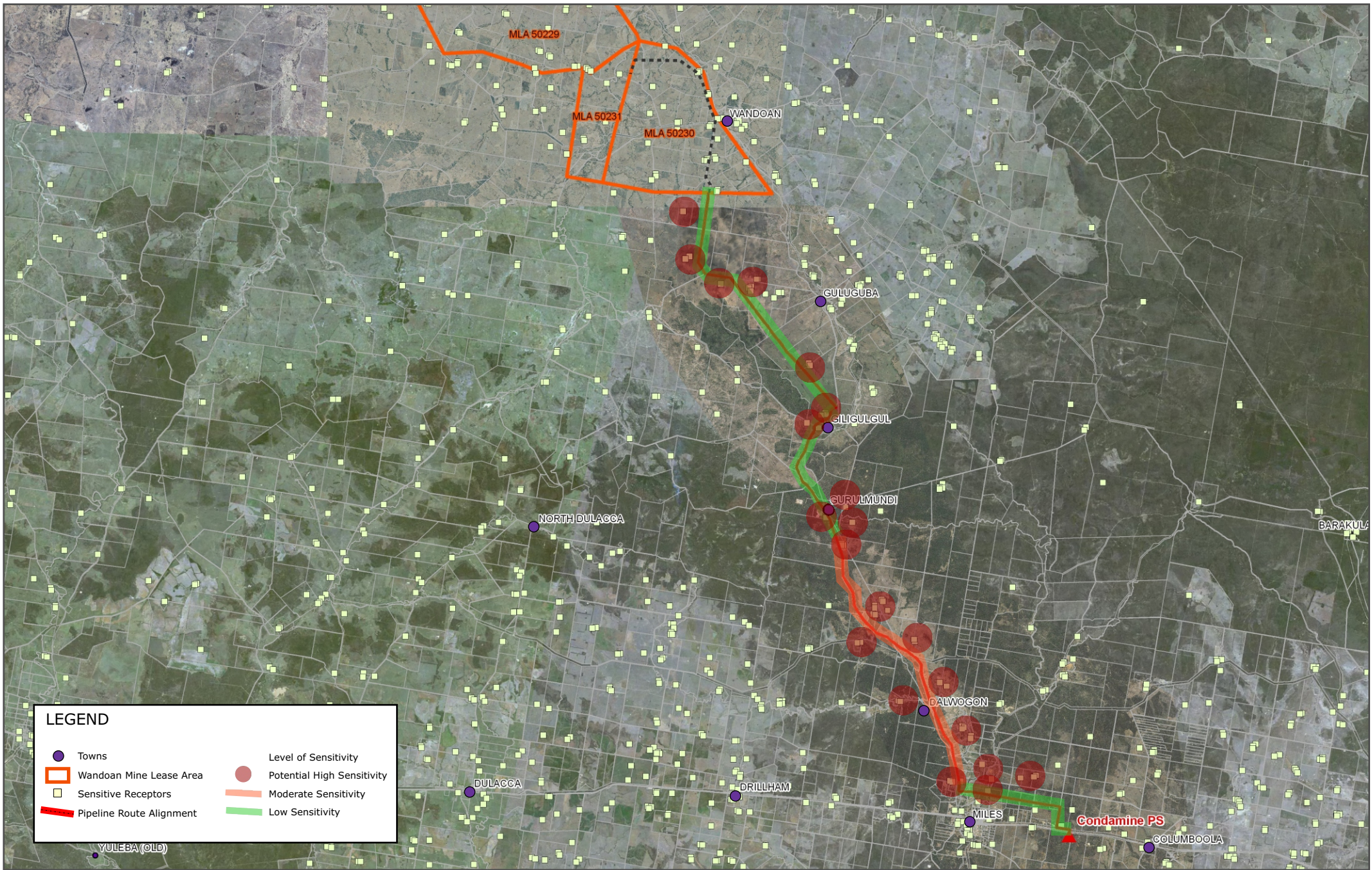
Views from homesteads are considered to have potentially high visual sensitivity to operations, if easement establishment and pipe laying operations occur in the foreground (up to 1km) and near middleground (up to 2.5km). The locations of homesteads close to the pipeline route are illustrated in Figure 5-7.

Field assessment indicated that visual exposure of the pipeline was generally very limited. Should views be visible then a high sensitivity would result which in turn would affect impact levels in relation to that viewing location.

5.4 Visual Impacts

Visual Impacts in the short term can potentially be high. Such an impact level is dependant on the easement and construction works being visible to sensitive view locations such as the highway and or homesteads. During the construction period impacts will be moderate to high due to the high visual effect levels and close proximity of the road and potentially some homesteads.

However this impact will reduce to low when appropriately managed restoration and ground cover vegetation is restored. This low impact level will also be the case in areas where trees occur unless a strong edge is created in the clearing process and view lines from sensitive receptors are close to parallel to the easement. In such cases a moderate visual impact may continue until the tree clearing line is softened due to regrowth of vegetation.



6. MITIGATION MEASURES

6.1 General

Visual Mitigation strategies will reduce the visual effect of the pipeline construction process and aim to reduce contrast created by clearing and earthworks.

Visual mitigation strategies include:

- Easement location
- Minimise easement clearing
- Sectionalising work areas
- Fragmenting construction functions in easement by multiple use of the same easement area, e.g. for truck movements and then for trenching where this is possible in sensitive locations
- Management of top soil
- Pest management (especially of weed and other invasive species)
- Re-establishment of ground cover
- Re-establishment of shrub and tree cover
- Screening of sensitive receptors.

6.2 Easement Location

The major factor that will influence both visual effect and visual sensitivity/visibility is the easement location. The main location where this is critical is adjacent to the highway.

Along the highway, the eastern side of the highway is visually preferred as it supports less vegetation that could be affected by clearing. This side of the highway is further enhanced by the existence of pipeline and communication cable easements adjacent to the highway easement itself.

Use of a widened easement, outside the road reserve is the preferred visual alignment. Failing this, use of the area at the outside edge of the highway road reserve is preferred. Should this area be required for use, development of an asymmetric easement is the desired visual development outcome.

6.3 Sectionalising Work Areas

The establishment of a pipeline has the potential to create a high visual effect along the length of the pipeline. Establishing the pipeline in sections to enable early restoration will minimise the length of impact and the time over which it is experienced.

6.4 Minimise Easement Clearing

Although an easement width of 20m will be established, not all of this easement may need to be cleared in sensitive locations. It may not be necessary in all locations to clear this width. Apart

from basic operations of trench construction, pipe delivery, pipe laying, backfilling and restoration, all other operations such as pipe lay down areas and storage areas should avoid sensitive areas.

Further as needed, staggering of operations in sensitive locations may remove the need to clear wide easement areas.

6.5 Fragmenting Construction Easement Functions

The construction easement is required for many functions that will be carried out simultaneously. This will include trenching, trucking in pipes, placing bedding materials, laying the pipe and backfilling. The functions that are not immediately involved with trenching are usually immediately adjacent to the trench, such as. trucking in pipes.

It is suggested that in sensitive locations where heavy tree cover is found that, as needed, this function and others like it could be moved laterally. This would minimise tree clearing and help to achieve the “feathered easement” edge that will avoid the creation of a visual gun barrel through wooded areas.

6.6 Feathering Easement Clearing

Where there are long and sensitive views along easements it may be possible to “feather” the easement edge to prevent hard and regular edges to clearings.

This would require marginal under-clearing in some locations to provide variety to areas that are cleared to the maximum width.

6.7 Managing Topsoil

Management of topsoil and surface mulch so that it can be reused when trenching has been completed will allow for topsoil nutrient, micro flora and fauna and seed to assist in the rehabilitation process. Similarly existing mulch will contain indigenous seed and provide good ground cover during rehabilitation.

6.8 Pest management (especially of weed and other invasive species)

Effective management of invasive species as part of ground, shrub and tree cover re-establishment will preserve the visual amenity and value of the land. Pest management strategies are detailed in Chapter 17 and associated technical reports.

6.9 Re-establishment of Ground Cover

In most cases, and unless indicated otherwise by ecology studies, initial restoration will involve the establishment of grass cover. This should be of the type that occurs in adjoining field areas or in the case of bushland areas where mulch is not used, sterile grasses that will provide soil protection values.

This will reduce the major visual effect created by colour contrast between exposed soil and adjoining grasslands or other vegetation types.

6.10 Re-establishment of Shrub and Tree Cover

Re-establishment of shrub and tree cover should be completed according to the prescriptions outlined by ecological studies. Such restoration will remove the more subtle contrast factor between the pipeline easement and the adjoining vegetation. While it is appreciated that the reestablishment of large trees on the pipeline is not desirable, use of indigenous shrubs and small trees will remove the linear visual effect of clearing through native vegetation.

Should cultural planting, such as those along property driveways be removed, such plantings should be re-established in close proximity based on mutual agreement with the landowner.

6.11 Screening of Sensitive Receptors

In the unlikely circumstance that a homestead is adversely affected by the post-rehabilitated landscape, plantings should be carried out adjacent to the affected viewing area to provide screening of visual integration of the affected landscape.

7. RESIDUAL IMPACTS

It is considered that there will be no significant residual visual impact created by the pipeline construction, especially if it is located outside of the road reserve in areas already previously cleared along the visually sensitive Leichhardt Highway. This is due to the underground location of the pipeline and the ability to restore surface areas to blend in with the adjoining landscapes.

Even where tree clearing is needed, it is considered that the open woodland character of the landscapes and the unlikelihood of critical view lines being parallel to such clearings would minimise potential for lasting high visual impacts.

If critical and ongoing visual impacts are created in isolated situations, the implementation of mitigation strategies, including at viewing points and landscape treatments will ensure that no significant residual visual impacts are experienced.

8. CONCLUSIONS

The southern coal seam methane water supply pipeline generally follows road alignments along the Leichhardt Highway, local roads and open grazing lands.

The location of greatest potential impact is along the visually-sensitive Leichhardt Highway. However, the use of land adjacent to the highway reserve or limited use of lands on the outer edge of the highway will significantly reduce visual impacts being experienced along the highway.

In other locations, impacts should be minimal following restoration of grass cover. However if impacts are incurred from homesteads in relation to tree clearing along the easement, this can be accommodated by at “view point” treatments.

The visual impacts of the Project are not considered to be significant.