

Section 7**Gas Transmission Pipeline Environmental Values and Management of Impacts****7.12 Visual Amenity****7.12.1 Introduction**

The following section provides a summary of the visual amenity assessment of the gas transmission pipeline including a description of the existing environmental values, assessment of the potential visual impacts and recommended mitigation measures. Refer to Appendix W for the full assessment report.

A full description of the gas transmission pipeline construction and operational activities used as the basis for the assessment is provided in Section 3.7.

7.12.2 Methodology

The visual amenity assessment of the existing landscape character has been carried out to provide a baseline against which the potential impacts of the proposed gas transmission pipeline development can be assessed. The results of this baseline landscape character assessment, combined with a review of proposed gas transmission pipeline development activities has allowed an assessment of potential visual impacts to be made.

The visual amenity assessment is presented by describing the works and illustrating them with annotated photographs. Comments are also presented in relation to the typical visual impacts of each component and the time frame of such impacts.

A range of typical mitigation measures has been identified that will minimise the level of potential visual impact of the gas transmission pipeline development.

7.12.3 Existing Environmental Values

The gas transmission pipeline will pass through a diverse range of landscapes along the route from the CSG fields to the LNG facility on Curtis Island, near Gladstone. The diversity of landscapes results from varying combinations of landform, vegetation and land uses. In order to understand the existing landscape character along the gas transmission pipeline corridor a baseline landscape analysis was carried out.

The landscape analysis involved identification of a series of Landscape Character Zones (LCZs) that are illustrated on Figures 7.12.1 and 7.12.2 and described below. Each LCZ comprises an area that is relatively consistent in terms of the combination of landform, vegetation and land use within the zone. While individual LCZs may incorporate some visual variation, they are relatively consistent and provide a broad baseline landscape context in which the gas transmission pipeline will be constructed.

7.12.3.1 LCZ P1 - Valleys and Mountain Range

- Strongly dissected landforms with steep sided valleys and plateaus between them;
- Remnant forest on steep slopes and along creeks;
- Plateau areas generally covered by grassland with scattered trees and some clumps of remnant woodland; and
- Views from ridge tops are typically long distance.



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Project

GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

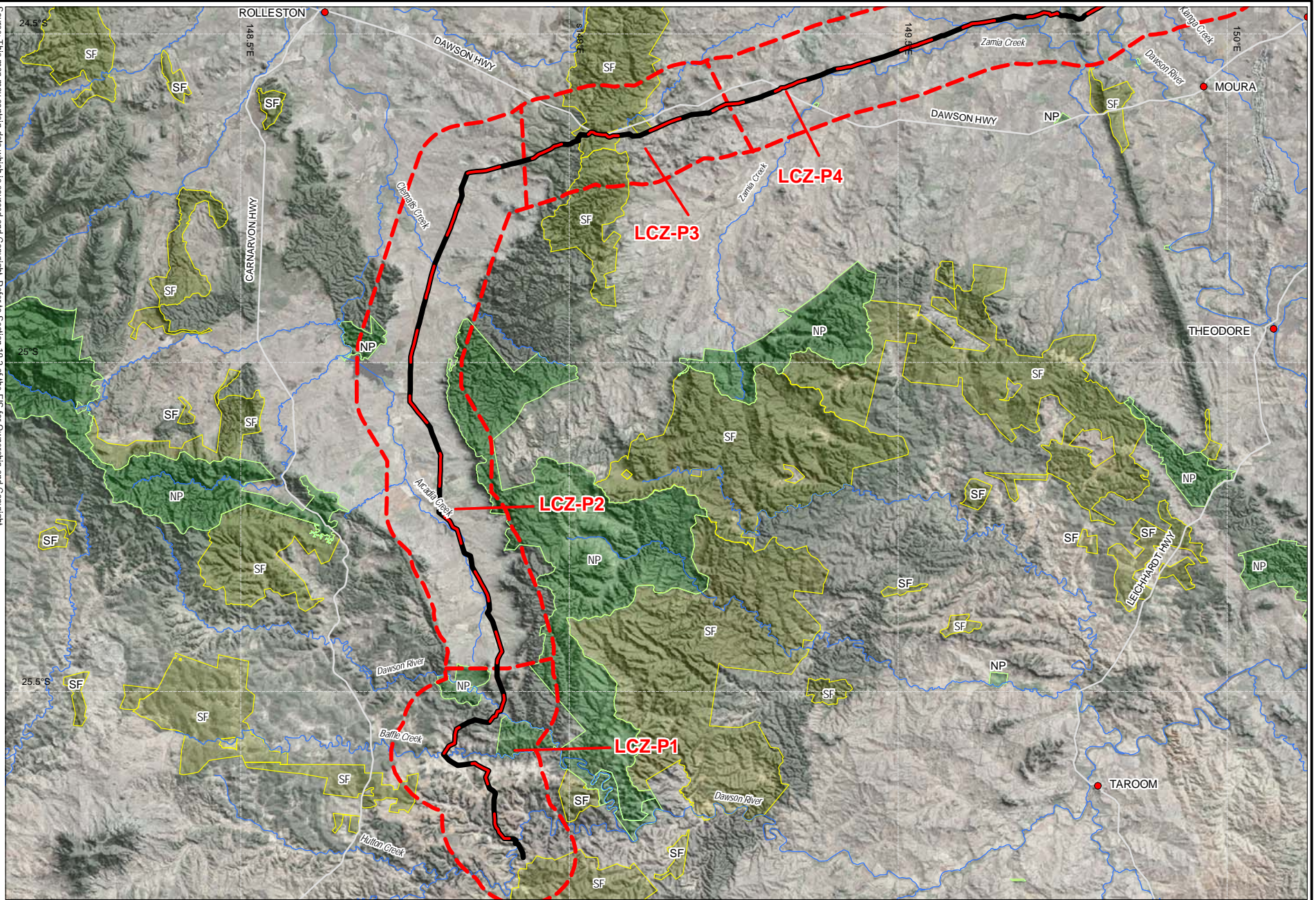
Title

GAS TRANSMISSION PIPELINE
(WESTERN SECTION)
LANDSCAPE CHARACTER ZONES

Drawn: CA
Job No.: 4262 6220
Approved: JB
File No.: 42626220-g-867 wor
Date: 04-02-2009

Figure: 7.12.1

Rev: A
A4



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Scale 1:800 000 (A4)
Datum : GDA94

- Gas Transmission Pipeline
- LCZ - Landscape Character Zone
- National Park
- State Forest
- Major Road
- Major Drainage

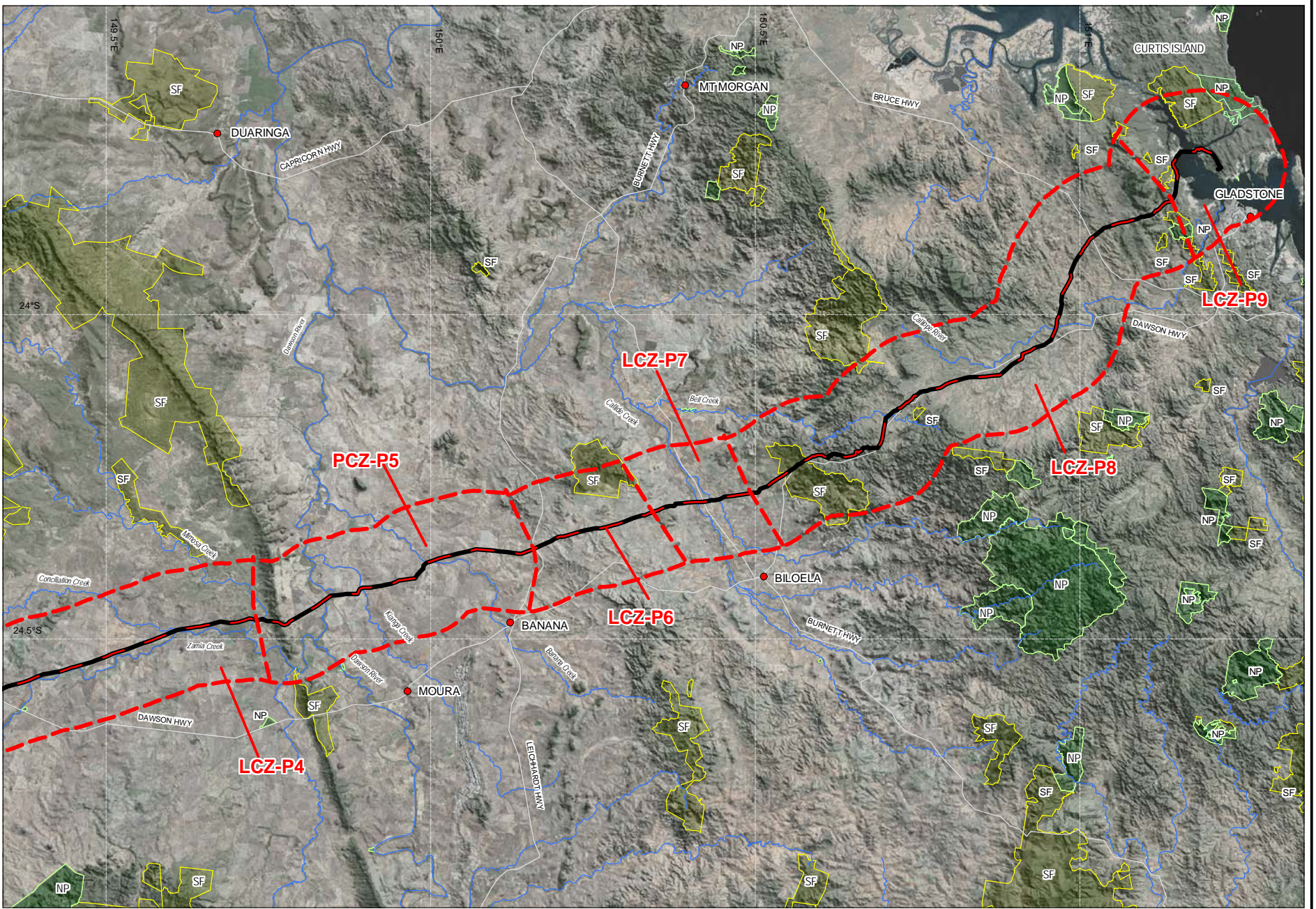


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Datum : GDA94

—●— Gas Transmission Pipeline
- - - LCZ - Landscape Character Zone

NP National Park
SF State Forest

— Major Road
— Major Drainage

Drawn: CA
Approved: JB
Date: 08-01-2009
Job No: 4262 6220
File No: 42626220-g-868 wor

GLADSTONE LNG PROJECT
ENVIRONMENTAL IMPACT STATEMENT

GAS TRANSMISSION PIPELINE
(EASTERN SECTION)
LANDSCAPE CHARACTER ZONES

Figure: 7.12.2

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7.12.3.2 LCZ P2 - Arcadia Valley

- Broad north-south valley defined by visually prominent ridge lines along eastern and western edges;
- Arcadia Creek flows north along the valley floor to Lake Nuga Nuga;
- Predominantly grassland used for grazing with scattered trees on valley floor; and
- Views from within the valley generally extend across the grassland to forest-covered ridges on the skyline.

7.12.3.3 LCZ P3 - Forest-covered Mountain Range

- Forest-covered mountain range;
- Views from the Dawson Highway, which runs approximately parallel to the proposed gas transmission pipeline corridor, vary from open long distance views to views that are visually enclosed by forest cover and local landforms; and
- Land use that is primarily forestry, with some grazing on grassland in the eastern portion of the LCZ.

7.12.3.4 LCZ P4 - Valleys of Conciliation & Zamia Creeks

- Broad valley formed by Conciliation and Zamia Creeks flowing east to the Dawson River;
- Predominantly grassland used for grazing with scattered trees on upper slopes; and
- Views from the Dawson Highway, which runs through the western portion of the LCZ, are generally across grassland to forest-covered ridges on the skyline.

7.12.3.5 LCZ P5 - Dawson River Valley

- Broad valley formed by Dawson River and tributaries (Banana and Kianga Creeks);
- Predominantly grassland used for grazing with scattered trees on upper slopes; and
- Views within valley extend across grassland to forest-covered ridges on the skyline.

7.12.3.6 LCZ P6 - Forest-covered Mountain Range

- Forest-covered upper slopes and ridge lines on mountain ranges in the western and eastern portions of the LCZ; and
- Land uses predominantly forestry and rough grazing.

7.12.3.7 LCZ P7 - Callide River Valley

- Callide River valley defined by steep slopes to the east and west;
- Extensive grassland across valley floor with scattered trees and stands of woodland; and
- Views from the Burnett Highway, which runs along the valley floor, extend across grassland to forest-covered ridge lines on the skyline.

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7.12.3.8 LCZ P8 - Forest-covered Mountains & Valleys

- Calliope River valley in central portion of the LCZ with grassland and scattered woodland vegetation; and
- Forest-covered upper slopes and ridge lines on mountain ranges in the western and eastern portions of the LCZ.

7.12.3.9 LCZ P9 - Gladstone Harbour Valley

- Broad valley formed by central ridge of Curtis Island to the east and mountain range to the south;
- Forest-covered upper slopes and ridge lines;
- The Narrows water way forming the base of the valley;
- Industrial developments generally surrounded by woodland located along western side of the LCZ; and
- Urban development of Gladstone dominates the southern portion of the LCZ.

7.12.4 Visual Impact Assessment

7.12.4.1 Gas Transmission Pipeline Development Activities

Construction of the gas transmission pipeline is expected to take 18 to 24 months. However, construction activities at any given location will generally be completed within several weeks, depending on terrain and weather conditions. Consequently, the visual impacts resulting from the gas transmission pipeline development will be relatively short term. The principal long term visible changes to the landscape will be the installation of gas transmission pipeline markers and access tracks.

The visual impact associated with the gas transmission pipeline construction will primarily result from excavation of the gas transmission pipeline trench and temporary stockpiling of soil material. This activity will result in the creation of a high visual contrast between the exposed soil and the adjoining vegetated areas, which are typically grassland or woodland. The visual impacts resulting from the gas transmission pipeline construction will be relatively short term. In situations where the gas transmission pipeline construction activities are visible from public roads and homesteads the visual impact is likely to be moderate to high depending on the distance of the view. However, even in these situations the visual impact following rehabilitation works will generally be negligible. Where the proposed gas transmission pipeline easement is not visible from public roads or homesteads then the visual impact of the gas transmission pipeline construction activities will generally be negligible.

While sections of the gas transmission pipeline corridor will run alongside public roads, a large proportion will run through rural landscape areas that are not visible from public roads. Consequently, the visibility of the gas transmission pipeline construction works will generally be limited to a relatively small number of people engaged in agricultural land management activities. The visibility of gas transmission pipeline construction activities along those sections that run parallel to public roads will vary substantially depending on the distance from the road edge and the presence of screening vegetation alongside the road. Nevertheless, the period of visual impact of the works will be relatively short.

The most significant long term visible changes to the landscape will result from installation of aboveground gas transmission pipeline markers, mainline valves and permanent access tracks that will be constructed along the gas transmission pipeline corridor. However, the visual impact of these elements will be negligible in most situations.

The revegetation techniques to be adopted by Santos have proven to be effective in re-establishing vegetation along other gas transmission pipelines. In most instances the original land use will be re-established after the rehabilitation works have been completed in accordance with the requirements of the relevant landholder and approvals issued by the relevant statutory authorities.

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The following photographs illustrate a typical section of pipeline works as well as a section of pipeline corridor that has been rehabilitated for some years.



Plate 7.12.1 Typical trench with 'pipe string' laid out ready for installation



Plate 7.12.2 Typical pipeline easement after backfilling trench and prior to revegetation works

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Plate 7.12.3 Rehabilitated pipeline easement showing pipeline marker and mainline valve

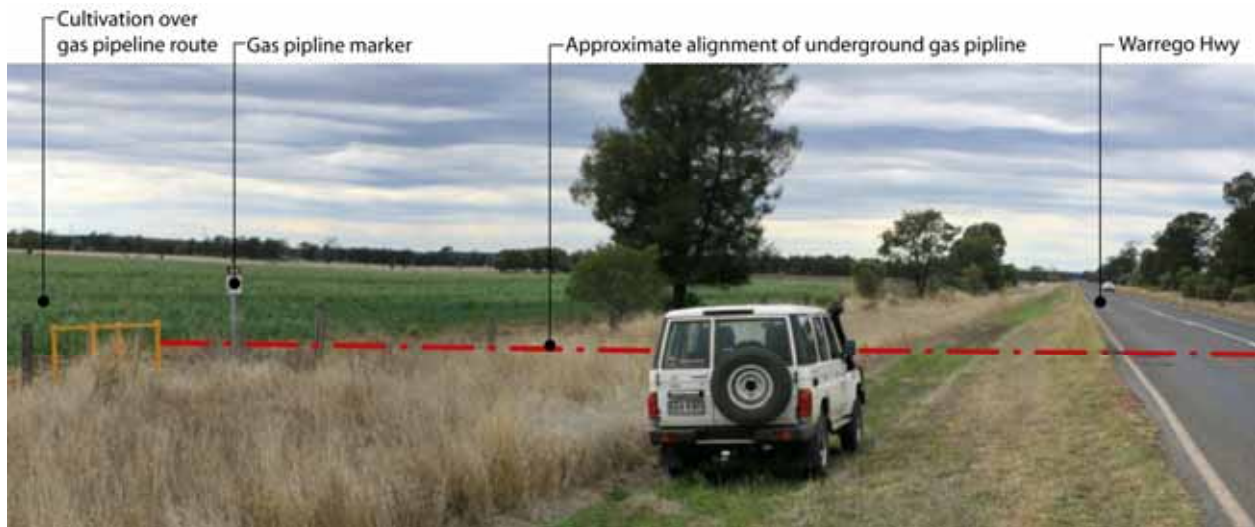


Plate 7.12.4 Existing underground pipeline crossing below the Warrego Highway

7.12.5 Potential Impacts and Mitigation Measures

The work methods employed by Santos for the gas transmission pipeline development will be aimed at minimising the visual impacts. However, these work methods will constantly be reviewed with the intent of improving their effectiveness. Consequently the mitigation measures addressed in this section include measures that will further minimise the potential visual impact of CSG field's activities.

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The mitigation measures identified below have the following objectives:

- Minimise the extent of disturbed areas that are visible from public roads, homesteads and towns;
- Minimise the degree of visual contrast between permanent structures and the landscape setting in which they are located; and
- Minimise permanent changes to the natural landform.

The following mitigation measures will be implemented:

- Take advantage of existing vegetation and local landform variations to create screening of potential views of gas transmission pipeline development activities from public roads, homesteads and towns;
- Minimise the length and width of roads and tracks;
- Use existing roads and tracks where practicable;
- Minimise the extent of vegetation clearing;
- Reuse cleared vegetation and topsoil in rehabilitation;
- Carefully place and compact excavated subsoil material to backfill the trench; and
- Spread topsoil over the area and rehabilitate.

7.12.5.1 Cumulative Impacts

Section 1 identifies other proposed gas transmission pipelines associated with other potential CSG projects. There is limited information available as to the planned development of these projects or their timing. However, a qualitative assessment can be made of the possible cumulative impacts.

Based on the information that is available it is expected the cumulative impacts related to visual amenity are limited. It is expected that there will be minimal disturbance of land especially given that gas transmission pipeline follows the existing QGP Pipeline and will be buried underground. The other potential pipeline developments could possibly involve land that has not previously been disturbed by an existing gas transmission pipeline.

In the event that the "Yarwun Neck" in the Gladstone State Development Area (GSDA) contains multiple pipelines, cooperation between the relevant pipeline development proponents and regulatory agencies will be required to minimise impacts to visual amenity.

The Queensland Government has advised that its preference is for the gas transmission pipelines for all LNG facilities proposed for Curtis Island to be located in a common pipeline corridor across the GSDA, including the Port Curtis Crossing and Curtis Island gas transmission pipeline sections. A common pipeline corridor would minimise potential visual impacts in this area.

It is expected that the other pipelines projects will include some or all of the proposed mitigation measures in relation to visual amenity described in this section. By utilising the mitigation methods it is expected that there would be a minimisation of the potential cumulative impacts.

Table 7.12.1 provides a summary of potential visual amenity and mitigation measures for the gas transmission pipeline.

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Table 7.12.1 Potential Visual Amenity Impacts and Mitigation Measures

Aspect	Potential Impact	Mitigation Measures	Objective
Construction			
Gas transmission pipeline construction	May impact residents' visual amenity.	<ul style="list-style-type: none"> Minimise the length and width of roads and tracks required; Use existing roads and tracks where practicable; Minimise the extent of vegetation clearing; Stockpile cleared vegetation and top soil for rehabilitation works; Minimise the area covered by excavated material alongside the trench; and Take advantage of existing vegetation and landform as screening. 	Minimise visual impact
Operation			
	Vehicle access for maintenance inspections.	<ul style="list-style-type: none"> Minimise vehicle movements; Maintain access roads and tracks to minimise erosion; and Observe speed restrictions to minimise dust during dry periods. 	Minimise visual impact
Decommissioning			
Removal of equipment and rehabilitation of sites.	May impact residents' visual amenity.	<ul style="list-style-type: none"> Remove all redundant plant and equipment as soon as possible; and Rehabilitate site in accordance with conditions of statutory authority approvals. 	Minimise visual impact

Section 7**Gas Transmission Pipeline Environmental Values and Management of Impacts****7.12.6 Summary of Findings**

The proposed development of the gas transmission pipeline will create both temporary and longer term changes to the visual landscape character of the areas in which it is located. These changes will result primarily from the removal of vegetation and earthworks. The most visible components will be exposed soil, new access roads and the movement of vehicles and equipment. In situations where these components are visible from public roads, towns or homesteads, the visual impact is likely to be moderate, although generally short term. In situations where the development activities are not visible from public roads or homesteads the visual impact will be negligible.

The potential visual impact of other components of the gas transmission pipeline development, which include temporary workforce accommodation facilities, lay down and storage areas has also been assessed. In most situations these components will not be visible from public roads or homesteads and therefore the visual impact will be negligible. In those situations where they are visible from public roads or homesteads, the visual impact will generally be low. Implementation of best practice mitigation measures will in most situations reduce the visual impact to a negligible level.

A range of best practice mitigation measures has been identified that will minimise the level of potential visual impact associated with the various components of the proposed gas transmission pipeline. The mitigation measures are generally consistent with current Santos work methods, which aim to ensure that any visual impacts are minimised.

Decommissioning of the gas transmission pipeline at the end of its economic life will involve removal of most of the surface facilities and rehabilitation of sites to uses compatible with the adjoining land uses. At the completion of the decommissioning process the residual visual impact of the project will be negligible.