

Section 7

Gas Transmission Pipeline Environmental Values and Management of Impacts

7.16 Rehabilitation and Decommissioning

7.16.1 Introduction

The gas transmission pipeline component of the GLNG Project (as outlined in Section 3.2) comprises a 435 km long pipeline corridor to deliver coal seam gas (CSG) from the CSG fields to the LNG facility located on Curtis Island. Rehabilitation and decommissioning will occur in a progressive manner along the pipeline corridor within the right of way (ROW) outlined in Section 3.4.3 of this EIS.

This section provides detailed information on the pipeline ROW rehabilitation and decommissioning stages.

7.16.2 Regulatory Framework

The rehabilitation and decommissioning of the gas transmission pipeline will be undertaken in accordance with the following:

- *Petroleum and Gas (Production and Safety) Act 2004* (Qld);
- *Environmental Protection Act 1994* (Qld);
- Australian Pipeline Industry Association (APIA), 2005, *Code of Environmental Compliance - onshore pipelines*; and
- The Australian Petroleum Production and Exploration Association (APPEA), October 2008, *Code of Environmental Practice*.

Refer to Section 6.16.2 for information on the *Petroleum and Gas (Production and Safety) Act 2004* and the *Environmental Protection Act 1994*.

7.16.2.1 Australian Pipeline Industry Association (APIA) Code of Environmental Compliance

This code is intended to encapsulate best practice techniques and methods presently available to mitigate or eliminate the environmental impact of pipeline activities and is based on the collective knowledge and experience of pipeline industry participants.

7.16.2.2 The Australian Petroleum Production and Exploration Association (APPEA) Code of Environmental Practice

This code covers environmental planning for the full life-cycle of oil and gas project developments from initial surveys through to eventual decommissioning.

7.16.3 Rehabilitation

7.16.3.1 Goals

The specific goals for rehabilitating the gas transmission pipeline corridor are as follows:

- **Achievement of acceptable land use suitability** - Rehabilitation will aim to create a stable landform with a post-project land use capability and/or suitability similar to that prior to disturbance, unless other beneficial land uses are pre-determined and agreed;
- **Creation of stable landform** - The pipeline ROW will be rehabilitated to a safe condition that is self-sustaining or to a safe condition where maintenance requirements are consistent with an agreed post-project land use; and

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- **Preservation of downstream water quality** - Surface and ground waters that leave the ROW will meet accepted closure criteria. Current and future water quality will be maintained at levels that are acceptable for users downstream of the site.

Objectives, indicators and closure criteria will be developed for each of these goals in a closure plan that will be prepared in consultation with the appropriate stakeholders prior to the site closure.

7.16.3.2 Land Suitability

Prior to the establishment of the gas transmission pipeline ROW, land use was predominantly grazing land. Descriptions of soil types and agricultural land suitability classes are provided in Section 7.3.

Although detailed closure options are not currently available, should no future land uses be determined prior to closure, it is assumed that the ROW would be returned to predominantly low intensity grazing use with minor areas of native habitat.

A more detailed description and definitions of the land suitability classes is presented in Section 7.3. It is intended that the same or similar percentage composition of land use suitability will be present along the pipeline ROW once rehabilitation is complete. This assumes that none of the infrastructure will be retained for alternative use (e.g. continuing pipeline activities).

7.16.3.3 Rehabilitation Strategy

The rehabilitation strategy will be flexible and will be amended as new rehabilitation techniques are developed. Where possible progressive or temporary rehabilitation of site areas will be undertaken, it is however expected that the majority of the site rehabilitation will be undertaken at site closure.

To achieve the rehabilitation objectives, rehabilitation of the ROW will be conducted so that:

- The potential for water and wind induced erosion is minimised, including likelihood of environmental impacts being caused by the release of dust;
- The quality of surface water released from the ROW is such that releases are not likely to cause environmental harm; and
- The final landform is stable and not subject to slumping or erosion that would result in the agreed landform not being achieved.

The pipeline ROW will be rehabilitated as soon as possible after completion of the pipeline installation in a progressive manner and in accordance with any regulatory requirements such as conditions of any pipeline licence and/or environmental authority.

Rehabilitation will occur in consultation with the relevant landholder and will generally involve the removal of foreign material (e.g. construction material and waste), surface contouring, respreading topsoil, respreading vegetation and reseeding. Typically the landscape is rehabilitated to pre-existing contours and natural drainage lines restored and protected (if required).

The determination of any site specific rehabilitation criteria will be influenced by the original land use and the presence of any pre-existing areas of nature conservation value in the area. Typically the ROW will be seeded with native grass or other approved native species. The rehabilitation measures will be applied to the ROW, access tracks, accommodation facility sites, borrow areas, and any other areas disturbed by the pipeline construction that are not required for the operational phase.

Where possible, the vegetation material that is cleared as part of the pipeline construction will be either mulched and reused on the site or spread across the ROW to form fauna habitat. The respreading of plant matter assists in both stabilising the ground and re-establishing vegetation regrowth. It may be necessary to dispose of some plant matter (e.g. contaminated through heavy weed infestation) and this will be done in consultation with the relevant local authority and state government agencies to ensure appropriate disposal.

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To promote vegetation regrowth and protect against the loss of topsoil, the ROW surface is normally lightly ripped prior to respreading of topsoil. Rehabilitation is undertaken in accordance with best practice pipeline construction techniques to ensure that:

- Rehabilitation of disturbed areas will be undertaken progressively as works progress;
- The ROW will be re-profiled to original or stable contours, re-establishing surface drainage lines and other land features;
- Subsoil will be respread over the ROW and compacted over the trench, and used for the construction of contour banks on steep slopes and above banks at water crossings;
- Areas of the ROW will be deep ripped prior to topsoil spreading;
- After subsoil respreading and compaction, topsoil will be respread evenly over the ROW and left with a slightly rough surface;
- Driving vehicles on freshly topsoiled ROW will be prohibited;
- Subsoil displaced by the pipe, and not utilised in backfill, may be stockpiled in locations approved by the landholder for use during operations;
- Imported topsoil, of an appropriate quality and weed free, may be required for ROW repairs, and will only be used with landholder approval;
- Flagging used to identify clearing boundaries and sensitive features will be removed;
- Erosion and sediment control measures will be installed where necessary. Existing soil erosion measures will be reinstated to a condition at least equal to the pre-existing state;
- Cleared native vegetation will be respread over the ROW to assist in the distribution of seed stock and provide shelter for fauna. Distribution of vegetation will be controlled to ensure that any erosion or subsidence that may occur will be visible during subsequent monitoring inspections;
- Native groundcover and shrubs will be encouraged to revegetate wherever appropriate to minimise habitat barrier effects in significant habitat areas;
- Trees will be permitted to grow within 3 metres of the pipeline as long as pipeline integrity is not affected;
- Environmental features such as rocks and dead timber will be replaced in the ROW where appropriate;
- Where revegetation is proposed, it will take place as soon as practicable after topsoil is spread;
- A reseeding plan will be developed based on soil types, existing local vegetation characteristics and landholder preferences;
- Seeding will be utilised in areas where rapid restoration is required e.g. watercourse crossings and areas of high erosion potential;
- Where disturbed areas are to be re-planted or reseeded, preference will be given to local native species. However, non-native and non-invasive grass seed stock may be used where approved by the landholders to provide environmentally acceptable short term surface stability;
- Trees and shrubs will be allowed to regenerate naturally on cleared areas not required to be kept tree free for pipeline integrity and maintenance reasons;
- Where applied, seed will be evenly dispersed over the entire disturbed area;
- Fertilisers and soil supplements will be used only as necessary with the agreement of landholders and authorities;
- Permanent pipeline warning signs will be erected along the easement;
- All waste materials and equipment will be removed from the ROW once backfilling and tie-ins are completed;

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- Temporary access roads not required for long term maintenance access will be closed and rehabilitated to a condition compatible with the surrounding land use or as agreed with the landholder;
- Where access routes are to be retained, but are not public access, the entry will be disguised (e.g. by dog-legging, brush spreading);
- Disused silt fences will be removed; and
- Fences or other barriers will be installed where appropriate and where approved by the landholder to minimise unauthorised access.

The EMP for the gas transmission pipeline is provided in Section 12.

7.16.3.4 Success Criteria

During the development of the decommissioning plan preliminary success criteria (or closure criteria) for the rehabilitation areas will be developed. The success criteria are performance objectives or standards against which rehabilitation success in achieving a sustainable system for the proposed land use is demonstrated. Satisfaction and maintenance of the success criteria (as indicated by monitoring results) will demonstrate that the rehabilitated landscape is ready to be relinquished and handed back to stakeholders in a productive and sustainable condition.

The success criteria are likely to include indicators for vegetation, fauna, soil, stability, land use and safety on a domain basis that reflects the nominated future land use.

7.16.3.5 Monitoring

Monitoring of the rehabilitated areas will be undertaken during the initial vegetation establishment period and beyond to determine whether the objectives of the rehabilitation strategy are being achieved and whether a sustainable, stable landform has been obtained. Monitoring will include inspections for the following key aspects:

- Soil erosion;
- Revegetation success;
- Weed infestation; and
- Integrity of water diversion drains, waterways and sediment control structures.

Monitoring will be conducted by suitably skilled and qualified persons at locations which will be representative of the range of conditions on the rehabilitating areas. Annual reviews will be conducted of monitoring data to assess trends and monitoring program effectiveness. The outcome of these reviews will be included in reporting to the relevant government authorities.

Maintenance works will be undertaken to address any deficiencies or areas of concern identified from the monitoring. This may include the re-application of topsoil, re-seeding, re-planting, weed control, additional fertiliser applications, de-silting or repair of drainage works and sedimentation dams and infill and re-grading of eroded areas.

7.16.4 Decommissioning

In the future when the gas transmission pipeline is no longer required, it and the associated infrastructure (pressure valves, metering equipment etc) will be decommissioned. The decommissioning will be in accordance with legislative requirements, Australian Standards and relevant industry codes of practice applicable at the time. A decommissioning plan will be prepared in accordance with these requirements and after consultation with relevant landholder and regulatory agencies.

The most likely options for the gas transmission pipeline decommissioning include:

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- **Moth-balling (suspension)** - this involves depressurising the pipeline, capping and filling with an inert gas such as nitrogen and maintaining the cathodic protection system to prevent the pipe corroding; or
- **Abandonment** - this involves disconnecting the pipeline from all above ground structures including the cathodic protection systems, purging the pipe of natural gas, placing plugs at predetermined intervals to inhibit groundwater flow and removing all above ground facilities. The pipe would then be left to corrode in-situ. The pipe may be filled with a stable material (e.g. concrete) at critical locations such as where it passes under a railway line or major highway. All disturbed areas will be rehabilitated in accordance with the requirements relevant at the time.

Removing the pipe from the ground is not considered to be an environmentally preferred or commercially viable option.

The associated infrastructure, where it is not required for any other purpose will be removed and either reused, recycled or disposed of. Consultation will be held with relevant stakeholders to identify alternative uses for the ROW. Should no alternative uses be identified, and in consultation with appropriate stakeholders, the ROW will be returned as near as practicable to pre-existing environmental conditions.