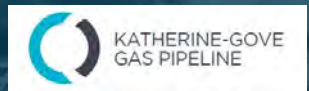


Executive Summary



PACIFIC ALUMINIUM

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Executive Summary

ES.1 INTRODUCTION (CHAPTER 1)

Pacific Aluminium (a business unit of Rio Tinto) owns and operates a bauxite mine and alumina refinery at Gove, 650 kilometres (km) east of Darwin in north-east Arnhem Land, Northern Territory. High grade bauxite is mined, refined into alumina and then shipped for smelting.

Power and steam for the Gove refinery and mining operations is generated from imported fuel oil. Gove Operations is facing challenging global market conditions due to high fuel oil prices, a high Australian dollar and a low alumina price.

The delivery of competitively priced gas and conversion of the refinery to gas would help underpin the long term operating life of the refinery and sustain the significant social and economic benefits that accrue to the community of Nhulunbuy, north-east Arnhem Land, the Aboriginal traditional owners, suppliers and employees.

Natural gas would be delivered to the refinery by the proposed Katherine to Gove Gas Pipeline (KGGP) Project. The KGGP would connect with the existing NT Amadeus Gas Pipeline at a point approximately 20 km south of Katherine, NT. The route of the new pipeline between Katherine and Gove would extend east from the NT Amadeus Gas Pipeline south of Katherine, crossing the Stuart Highway, and passing just south of Beswick. The route would then curve to the north-east, passing close to Mainoru, Bulman and Nhulunbuy before reaching the Gove mine and refinery operations (Figure ES-1).

The Project proponent of the Katherine to Gove Gas Pipeline is Alcan Gove Pty Limited (ACN 000 453 663), or a related entity of Alcan Gove Pty Limited that is controlled and operated by Pacific Aluminium.

Depending on statutory approvals and weather (including timing and nature of the 2013/2014 wet season), the construction phase would run from November 2013 to December 2014, with the majority of activities ramping up in March 2014 and peaking between July and August. The pipeline will have a 50-year engineering design life.

ES.2 PROJECT DESCRIPTION (CHAPTER 2)

The KGGP Project, subject to the scope of this Draft EIS, comprises the following elements:

- Construction, operation and eventual decommissioning of a 603 km onshore-buried gas transmission pipeline between south of Katherine and Gove.
- Construction and operation of above ground facilities including a compressor station, meter stations, scraper stations, mainline valves and other ancillary facilities.
- Construction of temporary workforce camps and laydown areas.
- Construction of temporary and permanent access roads.

The KGGP would pass through pastoral and crown land, Aboriginal freehold land and mineral and petroleum exploration tenements. The pipeline will be buried within a 30 m wide construction Right of Way (ROW). The pipeline would be constructed of high-tensile steel, with an external diameter of 324 mm, buried to a depth of 750-1,200 mm in most areas, but deeper than this under waterways, rail and road crossings.

The location of ancillary infrastructure and proposed construction camps is shown in Figure ES-2.

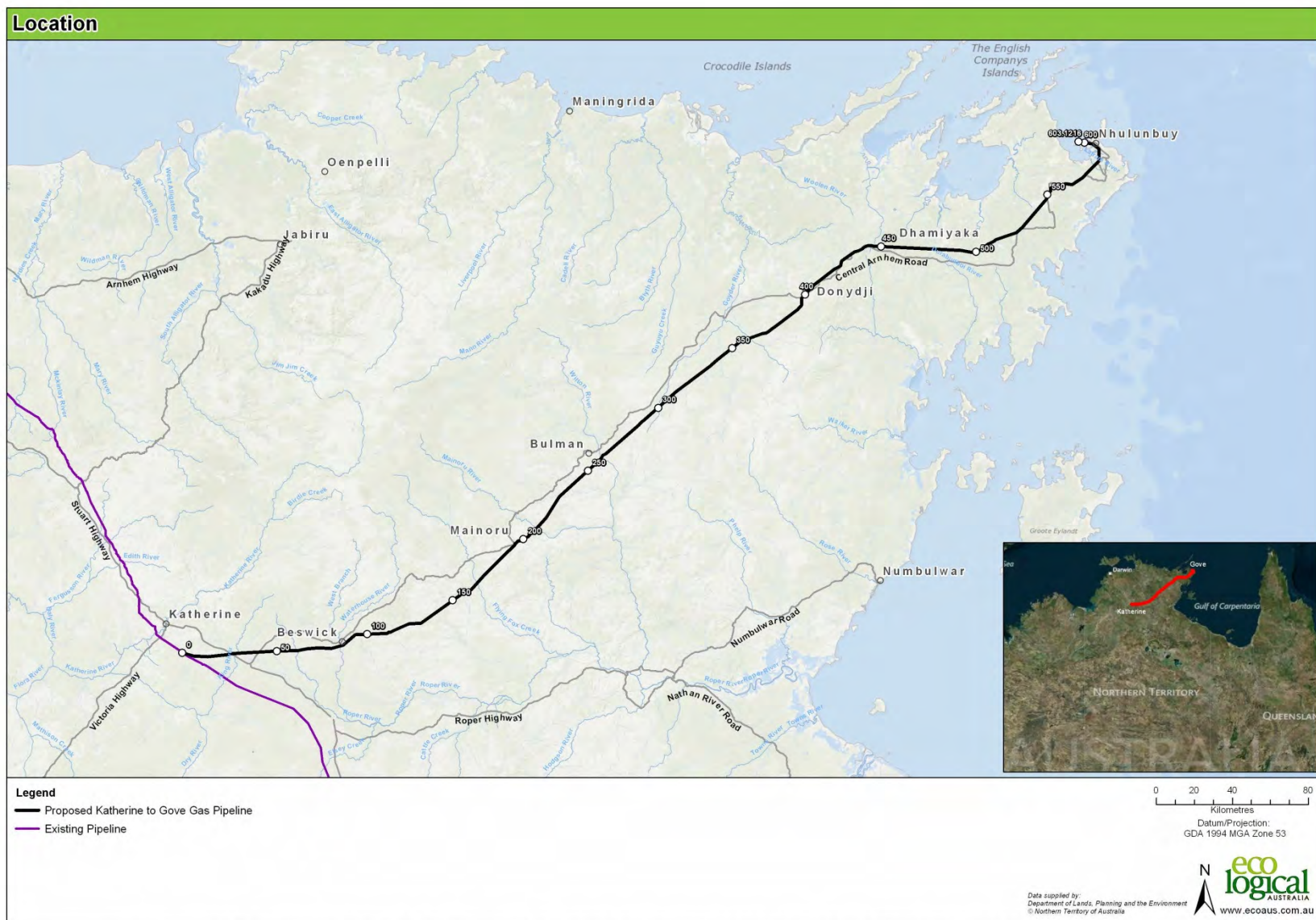


Figure ES-1: Location of proposed Katherine to Gove Gas Pipeline

ES.3 PROJECT MILESTONES (CHAPTER 2)

The KGGP Project is currently at the pre-feasibility phase. Key milestones for the proposed KGGP Project are broadly as follows:

2012-13	Environmental and land access approvals finalised.
2013	Engineering design.
2014	Pipeline construction.
2015	Gas delivery to the Gove refinery.
2016	Refinery fully converted to gas.

ES.4 ENVIRONMENTAL IMPACT ASSESSMENT PROCESS (CHAPTER 1)

The objective of the Environmental Impact Assessment (EIA) process is to ensure that potential environmental and social impacts associated with the KGGP Project during construction and operations, are identified and assessed and that potential environmental impacts are appropriately mitigated.

Pacific Aluminium submitted a Notice of Intent (NOI) to the Northern Territory Environment Protection Authority (NT EPA) on 6 December 2012. Following a three week public consultation period final EIS Guidelines were issued on 14 January 2013. The Draft EIS has been prepared in accordance with Clause 8 of the *Environmental Assessment Administrative Procedures* of the *Environmental Assessment Act* (the EA Act) of the Northern Territory.

The KGGP Project is a controlled action under the Commonwealth *Environment Protection and Biodiversity Conservation Act* (EPBC Act), reference: 2012/6605. The Commonwealth Government has determined that the project will undergo accredited assessment under the Northern Territory EA Act.

Pacific Aluminium is responsible for preparing this Draft EIS for community and government comment. The NT EPA will forward all comments received on the Draft EIS to Pacific Aluminium, which will then prepare a Supplement to the Draft EIS responding to the issues raised. Together the Draft EIS and the Supplement constitute the finalised EIS documentation.

The KGGP Project is a reactivation of a portion of a larger Trans Territory Pipeline (TTP) Project which substantially (but not completely) progressed through a formal environmental assessment process in 2004. Where relevant and appropriate, this Draft EIS utilises information generated from the earlier TTP EIS, in addition to newly commissioned studies that have been targeted to assess the KGGP within a contemporary setting. Additional terrestrial fauna studies, new economic modelling, and social impact, air quality, greenhouse gas, safety and noise assessments have been undertaken.

Pacific Aluminium has also commissioned a number of flora, fauna and archaeology surveys during the forthcoming 2013 dry season. These surveys will add to the available information and the results will be provided in the Supplement document.

Upon lodgement of the Supplement document by Pacific Aluminium, the NT EPA will prepare an assessment report for the KGGP Project and provide the report to the Northern Territory Minister for Lands, Planning and the Environment. The Minister will provide a copy of the assessment report to the Minister for Mines and Energy to inform decisions on issuing construction and operational consent for the KGGP Project under the Northern Territory *Energy Pipelines Act*. The Northern Territory Government will also provide a copy of the assessment report to the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities, for consideration of approval of the KGGP Project under the EPBC Act.

Upstream activity from the KGGP (gas supply) and downstream activity (conversion of the alumina refinery at Gove to gas) do not form part of the KGGP Project and are not the subject of this Draft EIS. Downstream activity will be undertaken by Alcan Gove Pty Limited as operator of the Gove refinery and the potential environmental impacts will be addressed through existing regulatory arrangements pursuant to current obligations under the *Mining Management Act*. Although the conversion of the Gove refinery to gas does not form part of the KGGP Project, the co-benefits arising from the transition to gas have been included where appropriate.

ES.5 COMMUNITY AND STAKEHOLDER CONSULTATION (CHAPTER 1)

Pacific Aluminium understands that effective stakeholder engagement will be crucial to managing stakeholder aspirations and expectations for the KGGP Project. This is important in ensuring stakeholders have a realistic understanding of the opportunities and impacts likely to occur as a result of the project.

To ensure comprehensive consultations are undertaken following the publication of the Draft EIS, Pacific Aluminium has undertaken a stakeholder identification process. Landholder and stakeholder engagement with a cross section of potentially impacted parties has commenced. Further ongoing consultations will also take place in parallel with other statutory processes, in addition to those required for this EIS. These include consultations in relation to Aboriginal sacred site protection and securing access to indigenous and non-indigenous land for the KGGP.

A Community and Stakeholder Engagement Plan for the KGGP Project has been developed and will be applied by Pacific Aluminium. A range of communication tools have been designed to support comprehensive communication about the project and consultation has commenced. During the eight week public consultation period, Pacific Aluminium will be conducting information sessions and community consultations.

ES.6 PROJECT ALTERNATIVES (CHAPTER 3)

A number of alternatives to the KGGP proposal were considered in relation to its location (route), design and construction.

These included:

- Not proceeding with the project.
- Alternative locations for project components.
- Pipeline design and construction alternatives.
- Alternative sources of energy for the refinery.

The alternatives were considered and assessed against a range of criteria, including environmental impacts, logistical advantages and disadvantages, cultural sensitivities and Matters of National Environmental Significance (Matters of NES).

ES.6.1 Not proceeding with the project

The implications of not proceeding with the KGGP Project include the anticipated closure of the Gove refinery and loss of the social and economic benefits from construction of the KGGP and conversion of the Gove refinery to gas.

Continued reliance on fuel oil is not considered to be economically viable and it is anticipated would lead to the closure of the Gove refinery. Bauxite mining operations would continue, with the material being exported. This change in operations would arise because fuel oil is significantly more expensive

compared to gas and is subject to greater price fluctuation. In conjunction with low aluminium and alumina prices, poor global market conditions and a high Australian dollar, this has adversely affected the current viability of the refinery operation.

The Gove refining and mining operations currently employ approximately 1,500 people (employees and contractors). The refinery provides the majority of employment, which would be lost if the refinery were closed. Closure of the refinery would lead to a substantial loss of 'value adding' to the bauxite mining operations, with the refinery currently producing 2.6 million tonnes of alumina per annum with an export value in the region of \$800 million (a value highly dependent on the alumina price) which compares to potential bauxite export value of less than half of this value.

Not proceeding with the project would mean that the construction of the KGGP and the conversion of the refinery to gas would not proceed. This would have the following consequences:

- Loss of capital expenditure benefits to the Northern Territory and Australian economies associated with the pipeline and associated infrastructure developments. The capital expenditure is expected to be over \$600 million for construction of the KGGP and over \$150 million for conversion of the refinery with a further \$786 million in capital expenditure over the life of the project, compared with \$350 million in capital expenditure through to the end of mine life for a mine-only scenario.
- Loss of local, regional and national employment and business opportunities in both the short and longer term. Employment generated through construction in 2014 is estimated at 780 persons.
- Loss of economic output to the regional economy. Over the period 2013 to 2036, conversion of the Gove refinery to gas is projected to increase the real economic output to the region by \$2,382 million (net present value).
- Loss of economic output to the Northern Territory and Australian economies. Over the period 2013 to 2036, conversion of the Gove refinery to gas is projected to increase the real economic output to the Northern Territory by \$3,629 million (net present value) or an equivalent of 19.5% of the Northern Territory's current Gross State Product (GSP). Over the same period, gas conversion is projected to add \$3,667 million (net present value) or an equivalent of 0.25% of Australia's current Gross Domestic Product (GDP).

ES.6.2 Alternative locations for project components

The planning process undertaken to determine the pipeline route involved examination of alternatives at a broad scale, with a number of corridor alignments considered before the preferred alignment was identified. Four possible route options were considered during the development of the previous Trans Territory Pipeline proposal and KGGP, and are detailed in Chapter 3. Three possible route options were eliminated because they passed through Kakadu National Park and/or Nitmiluk National Park, required major deviations because of unsuitable geological conditions, or added significantly to the length of the pipeline.

The preferred route was selected because it represents the best balance between pipeline length, engineering feasibility and avoidance of high value environmental assets such as national parks. During survey for the preferred pipeline corridor small deviations in the alignment were made wherever possible to avoid high value vegetation, wetlands or other sensitive sites, including sacred sites.

ES.6.3 Pipeline design and construction alternatives

There is limited scope for making changes to the specific design of high pressure gas pipelines. There are, however, opportunities for considering alternative construction techniques. Open trench methods

will be used for the majority of pipeline construction. Horizontal directional drilling (HDD) will be used for at least nine watercourse crossings and at any watercourse crossings that are determined by the construction contractor to be in flow during construction. This will minimise the impact on the environment and take the pipeline well below the river or creek bed. HDD is a proven technology that has been used on many pipelines. The work will be undertaken in accordance with stringent environmental procedures to protect the watercourses. When the work is completed, the area will be rehabilitated.

ES.6.4 Alternative energy sources for the refinery

The following energy alternatives capable of generating steam, which accounts for 60% of energy demand at the refinery, were the subject of investigation and analysis over the period 2009-2011. Based on these considerations, Pacific Aluminium selected natural gas as the preferred energy source to replace fuel oil to power the Gove refinery.

ENERGY ALTERNATIVE	CONSIDERATIONS
Natural gas	Cheaper and cleaner than fuel oil, and would substantially reduce risk of fuel spillage into the marine environment, were fuel oil to continue to be shipped to Gove to power the refinery
Liquefied or compressed natural gas	Technically feasible, but significantly more expensive than natural gas and requires transport by large tankers and expensive storage facilities. Conversion of the refinery to run on liquefied or compressed natural gas would increase the operational complexity at the refinery.
Coal	Although cheaper than fuel oil, coal is not suitable for the calcination process at the refinery. It would require additional capital expenditure not required for natural gas. Coal also produces more greenhouse gas emissions and requires additional facilities for storage, handling and ash disposal.
Concentrating solar thermal power	Not considered technically viable because of very high upfront capital costs, its inability for stand-alone plants to provide steam 24 hours a day, and because energy storage solutions would be required to provide continuous steam. Solar thermal power systems have not yet been tested at scale.

ES.7 RISK ASSESSMENT (CHAPTER 5)

A risk assessment approach has assisted in identifying the potential social and environmental impacts. This approach has supported the project to focus mitigation and management strategies on issues that pose higher environmental risk. The risk assessment was conducted in accordance with Australian Standards.

Through mitigation steps, all negative risks were reduced, with most risks rated as Low. Those rated Medium or higher were subject of particular attention in the development of management sub-plans in the EMP to ensure risks are appropriately managed.

For socio-economic factors the risk analysis, evaluation and treatment resulted in all negative socio-economic risks identified to be rated as Medium or Low, and all positive risks (benefits) identified to be rated at Medium to Very High. Management measures will be implemented to maintain this level of risk, which is detailed in the Social Impact Management Plan (SIMP) at Appendix M.

ES.8 ENVIRONMENTAL IMPACTS AND MANAGEMENT

Preparation of the Draft EIS included identifying the full range of relevant potential bio-physical and socio-economic impacts that could occur from activities to construct and operate the KGGP. Within each of these impact categories, the existing environment and potential impacts on each environmental factor (e.g. hydrology, vegetation, fauna, Aboriginal culture and heritage) were described, as well as the

management and mitigation measures proposed to avoid or minimise these impacts to an acceptable level. Discussion of impacts also included a summary of predicted environmental outcomes as the result of proposed mitigation and management applied to each environmental factor.

The sections below provide a brief overview of the existing environmental context drawn from Chapter 4 and the summary of predicted environmental outcomes, once mitigation measures proposed in the Draft EIS have been applied. Mitigation measures are summarised in each Chapter in the Draft EIS and expanded upon in the Environmental Management Plan (Appendix O).

ES.8.1 Landform and soils (Chapter 6)

Existing environment

Aside from some disconnected ranges, the pipeline region is relatively flat. A variety of landscape classes are represented and include alluvial floodplains, coastal sand-plains, low hills and rocky outcrops, and plateaus and scarps. Steep rocky plateaus and hills intersect the landscape where ranges occur and closer to the coast, seasonally flooded coastal floodplains and tidal mudflats dominate the landscape.

The dominant soils of the western portion of the project area, near Katherine, comprise ironstone gravels with sands and neutral red earths with acidic yellow earths. In the central portion, near Bulman, soils are mainly shallow stony sands and yellow earthy sands. Approaching the Gove region, narrow stream valleys become more common, containing ironstone gravels in a red earth matrix together with red earths and yellow earths. Saline clays dominate on flats near the coast, where shallow gritty sands and sandy loams are also common.

Acid sulphate soils (ASS) occur less commonly inland, but have been documented in waterlogged (anaerobic) and/or drained fresh water conditions where there has been a build-up of sulphidic material (e.g. rivers and stream channels, lakes, wetlands and billabongs).

A detailed desktop review to ascertain the potential occurrence of ASS in the project area determined that potential ASS is likely to be localised and form a very small proportion of the overall pipeline ROW.

Summary of predicted environmental outcomes, with mitigation and management

Mitigation measures applied during the construction and operation of the KGGP Project are expected to result in the following outcomes in relation to landforms and soils:

- The risk of soil erosion will be minimised and effective management measures applied to control erosion, if detected.
- Potential soil losses along water crossings will be minimised, with no significant long-term impact on water quality expected in adjacent aquatic, riparian or ephemeral habitats.
- No environmental impacts from the exposure of acid sulphate soils.
- The risk of accidental spills and degradation of soil quality will be minimised.

ES.8.2 Water resources (Chapter 7)

Project water needs

Pacific Aluminium has developed a preliminary Water Supply and Adaptive Management Strategy. The strategy proposes to use a combination of:

- Surface water from perennially flowing streams at the time of construction.
- Groundwater from existing or new bores.
- Municipal water supply from Katherine or Gove.

The preferred water supply source would be from surface water resources; however, given that construction is proposed predominantly during the dry season, when surface water resources are highly variable, alternative groundwater and municipal water supplies have also been considered. Water is required for the construction workforce, construction activities (such as dust suppression) and for hydrotesting the pipeline.

Surface water resources

The pipeline would pass through the upper section of the Daly River basin, the northern part of the Roper River basin, the central portion of the Goyder River basin and the upper Buckingham River basin between Katherine and Gove. The Daly River basin drains westwards to the Timor Sea, while the Roper River drains eastwards to the Gulf of Carpentaria and the Goyder River and Buckingham River basins drain northwards to the Arafura Sea. The proposed pipeline corridor would unavoidably cross a total of 217 water courses of which approximately 28 are defined as major watercourses and the remaining 189 as minor watercourses.

Surface runoff is generally limited to the wet, summer monsoon season (December to March), with most watercourses ceasing to flow during the mid to late dry season. Perennial flow is mainly restricted to the larger rivers where baseflow is supplied from groundwater.

There are many wetlands in the region including permanent swamps, most notably the Arafura Swamp in Central Arnhem Land (which lies over 20 km north of the project area) as well as seasonally inundated floodplains, permanent and semi-permanent freshwater lake systems and ephemeral saline lakes.

Groundwater resources

The proposed KGGP easement traverses the following six groundwater management units (GMUs):

- Daly River Basin – Tindall Limestone.
- Daly River Basin – Jinduckin Formation.
- Proterozoic Sedimentary Rock (North East Northern territory).
- Proterozoic Rocks low yielding (Bulman).
- Proterozoic Sedimentary (Adelaide River).
- McArthur Basin including Gove Water Control District (WCD).

Summary of predicted environmental outcomes, with mitigation and management

After mitigation is applied, the construction and operation of the KGGP is not expected to result in any significant impacts on hydrological values for the following reasons:

- Construction activities will be temporary, with areas rehabilitated as soon as practical and restored to original condition.
- Construction will occur during the dry season when many watercourses will be dry, or have much lower flow regimes.
- HDD construction methods will be used for at least nine watercourse crossings and at any watercourse crossings that are in flow during construction.
- Sediment and erosion control measures will protect downstream water quality values.
- A number of targeted management plans (e.g. Hydrology and Water Quality Management Plan and Soil and Landform Management Plan) will be developed to further mitigate any potential impacts to hydrological values.

ES.8.3 Vegetation (Chapter 8)

Existing environment

Vegetation in the pipeline region is characterised by eight broad vegetation groups (BVGs):

- Woodlands and open woodlands dominated by *Eucalyptus tetradonta* and *E. Miniata*.
- Open forests and woodlands dominated by *Eucalyptus* spp. and *Corymbia* spp. on drainage lines and alluvial plains.
- Woodlands dominated by *E. tectifica* and *Corymbia* spp.
- Low woodlands to open woodlands dominated by *C. Dichromophloia*.
- Woodlands dominated by *E. pruinosa* and *Bauhinia cunninghamii*.
- *Acacia shirleyi* and *Acacia* spp. associations on dissected residual surfaces and sandstone hills.
- Tussock grasslands.
- Open forests and woodlands of *Melaleuca* spp. associated with rivers, lagoons and swamps.
- Geographically restricted vegetation communities including riparian corridors, wetlands (swamps and floodplains), monsoon vine forests and sandstone communities occur within the region, and are potentially of high conservation value.

Threatened flora species that may occur in the pipeline region

Database searches and a review of the distribution and habitat requirements of plant species listed under the *Territory Parks and Wildlife Conservation Act* (TPWC Act) and EPBC Act identified three threatened plant species that may occur in the pipeline region (two species were discounted as erroneous records):

- *Hernandia nymphaeifolia*.
- *Pternandra coerulescens*.
- *Sticherus flabellatus* var. *compactus*.

None of these species were recorded during field surveys of the project area.

Other flora species of conservation significance recorded in the project area include the Northern Cypress Pine (*Callitris intratropica*) and two cycad species (*Cycas orientis* and *C. arnhemica*).

Weed distribution in the pipeline region is generally related to environmental disturbances caused by the construction of roads and tracks, cattle grazing and feral animals. Weed infestations are generally concentrated around infrastructure such as water points, fence lines and tracks, and also along the banks of watercourses where cattle and feral animals tend to congregate.

Summary of predicted environmental outcomes, with mitigation and management

After mitigation is applied, construction and operation of the KGGP is expected to result in the following outcomes in relation to vegetation:

- Development footprint for the project of up to 2,200 ha with a conservative expectation that approximately 60% would return to native woody vegetation over the longer term.
- No removal of any listed threatened flora species currently recorded.
- Minimal disturbance to conservation significant flora species.
- Minimal spread of weeds into the pipeline ROW.
- Progressive rehabilitation of the ROW.
- Negligible fragmentation or degradation of vegetation communities.

- Reduced potential of fire within the ROW and minimal impact from fire to listed threatened species and conservation significant species.
- Minimal impacts on vegetation from traffic, dust, groundwater drawdown, waste disposal and the presence of infrastructure.
- No impact on listed threatened or conservation significant flora, through avoidance and re-location of ancillary infrastructure if necessary.
- Potential impacts to vegetation are expected to be negligible to low and are therefore considered not significant.

ES.8.4 Terrestrial and aquatic fauna (Chapter 9)

Existing environment - terrestrial fauna and habitats

A total of 222 native fauna species (18 amphibians, 146 birds, 16 mammals, and 42 reptiles) and nine feral species were recorded during the 2004 and 2012 fauna surveys. Eleven Threatened or Migratory species listed under the EPBC Act were recorded during the surveys. An additional five threatened species identified from desktop analysis were considered likely to occur within the project area, and 12 were considered to possibly occur. The Gouldian Finch (*Erythrura gouldiae*), listed as Vulnerable under the TWPC Act and Endangered under the EPBC Act, was recorded.

Numerous other species recorded during the surveys are listed under the TWPC Act as either Near-threatened, Least Concern or Data Deficient. These species are not considered to have confirmed conservation significance status in the NT and are therefore not addressed in this Draft EIS.

Ecologically sensitive habitats - terrestrial fauna and habitats

Terrestrial and aquatic habitats considered ecologically sensitive were identified based on the following criteria:

- Areas that provide habitat for threatened flora species as listed under the EPBC Act and/or the TPWC Act.
- Endangered ecological communities as listed under the EPBC Act and areas of essential habitat listed under the TPWC Act.
- Areas that contain regionally restricted species, vegetation types or habitats with outstanding diversity.
- Vegetation types that are outside their normal distribution or have other biogeographical significance.
- Areas that have ecological importance beyond the immediate site (for example wetlands, rainforests, riparian forests, etc.).

Habitats that meet these criteria typically have a restricted geographic distribution and provide a niche for species with special habitat requirements. The factors that contribute to the conservation significance of these habitats also make them particularly sensitive to disturbance. The ecologically sensitive habitats identified in the project area from the desktop study and field surveys are:

- Riparian corridors.
- Monsoon rainforest patches.
- Wetlands.
- Late season waterholes near nesting trees provide habitat for Gouldian Finch (*Erythrura gouldiae*).
- Aquatic habitats (rivers, creeks) for Mertens' Water Monitor (*Varanus mertensi*),
- Mitchell's Water Monitor (*Varanus mitchelli*), and Pig-nosed Turtle (*Carettochelys insculpta*).

ECOLOGICAL HABITAT	ISSUES FOR CONSIDERATIONS
<i>Riparian corridors</i>	The project region comprises a number of major permanent watercourses, smaller perennial watercourses, and seasonal watercourses, many of which support distinct riparian vegetation communities. These riparian vegetation communities play an important ecological and hydrological role in maintaining the ecological functions of waterways and associated wetland environments. Riparian vegetation also provides essential habitat for terrestrial and aquatic fauna species, many of which are confined to riparian habitats for all or parts of their life cycle, or at times of adverse environmental conditions (i.e. late in the dry season).
<i>Monsoon rainforest patches</i>	Monsoon rainforests in northern Australia occur as scattered patches in a landscape dominated by Eucalypt savannas. Rainforests are not uncommon; however, they are generally small in area and contain distinct flora and fauna assemblages that warrant conservation measures. Monsoon rainforest in the project region is the primary habitat of the Vulnerable flora species <i>Pternandra coerulescens</i> (listed under the TPWC Act) and the Endangered Gove Crow Butterfly (<i>Euploea alcatheae enastri</i>) (listed under the EPBC Act).
<i>Wetlands</i>	Extensive and highly productive coastal floodplain wetlands are characteristic of the near coastal environments in the Northern Territory. Scattered isolated billabongs and seasonally inundated swamps that are floristically similar to the coastal floodplains also occur as far inland as Lake Woods. The wetlands are of regional conservation significance as they provide a niche for aquatic and semi-aquatic vegetation communities that are uncommon in the drier inland regions of the Northern Territory, and they are recognised as significant habitats for fauna. The pipeline corridor lies over 20 km to the south of the nationally significant Arafura Swamp and is in the vicinity of nine regionally significant wetlands including permanent lagoons and springs, seasonally inundated and permanent swamps and semi-permanent waterholes. Of these regionally significant wetlands, one semi-permanent swamp, and two seasonally inundated swamps will be traversed by the pipeline corridor but are likely to be dry at the time of construction. Arafura Swamp is one of the largest wooded swamps in the NT and is a significant breeding area for the Magpie Goose (<i>Anseranus semipalmata</i>), Saltwater Crocodile (<i>Crocodylus porosus</i>) and Freshwater Crocodile (<i>Crocodylus johnstonii</i>).

Summary of predicted environmental outcomes, with mitigation and management - terrestrial fauna and habitats

After mitigation is applied, construction and operation of the KGGP Project would be expected to result in the following outcomes in relation to terrestrial fauna and their associated habitats:

- No impact to significant fauna habitat areas/nests through avoidance and re-location of ancillary infrastructure if necessary.
- Clearing of approximately 2,200 ha of potential fauna habitat, with approximately 60% of this to be rehabilitated or re-established through natural re-colonisation and regrowth.
- Minimal risk of the introduction or spread of weeds or feral animals into the pipeline ROW.
- Minimal fauna mortality from vehicle strike or capture in trench.
- Minimal degradation to fauna habitat from fire ignition, dust, waste disposal or extraction of groundwater or surface water.

Anticipated impacts on terrestrial fauna and their associated habitats would therefore be negligible to low.

Existing environment – aquatic fauna and habitats

A detailed aquatic fauna study and survey was conducted for watercourses crossed by the proposed KGGP. Two aquatic fauna species that occur or are likely to occur in watercourses traversed by the pipeline are classified as Vulnerable under the TPWC Act:

- Mertens' Water Monitor.
- Mitchell's Water Monitor.

Mertens' Water Monitor was recorded from the Mainoru River, Barmguerikba Creek and Wonga Creek during the 2003-2004 aquatic fauna survey. This species is a semi-aquatic monitor that occurs across most of the Top End and Gulf region where it is seldom seen far from water. The species has recently experienced a decline in population, largely due to the arrival and dispersal of cane toads.

Mitchell's Water Monitor is usually associated with swamps, lagoons and inland rivers, and is often found on trees close to the water where it prefers to shelter in tree hollows and under bark. Although Mitchell's Water Monitor was not recorded during the 2003-2004 aquatic fauna survey, suitable habitat occurs along the pipeline. The main threatening process to this species is the presence of the cane toad. A total of 47 fish species, representing 23 families, were recorded during the 2003-2004 field survey. A further 31 species, from seven families, were identified from the desktop review. Overall a total of 78 species, comprising 30 families, are known from the aquatic systems that will be crossed by the proposed KGGP pipeline. A number of fish species recorded during the aquatic fauna survey were far outside of their known habitat range including:

- Four species in the Cato River - Aru Gudgeon (*Oxyeleotris aruensis*), Concave Goby (*Glossogobius concavifrons*), Munro's Goby (*Glossogobius munroi*), Freshwater Whipray (*Himantura dalyensis*).
- Exquisite Rainbowfish (*Melanotaenia exquisite*) in Dook Creek.
- Butler's Grunter (*Syncomistes butleri*) in both the Goyder River and Rocky Bottom Creek.

Many NT fish species are classified as Data Deficient because of the paucity of aquatic fauna surveys. Thirty-two Data Deficient fish species were identified during the surveys, and at least one Data Deficient species was present at all watercourses traversed by the pipeline corridor that were surveyed (except the seasonal Krabakuk Creek).

Five species of crustacean were recorded during the field surveys. None of the species recorded are listed under Territory or Commonwealth conservation legislation, and are therefore not considered further.

Eight species of amphibian were recorded during the survey. None of the amphibians recorded are specially protected under Territory or Commonwealth law, and are therefore not considered further.

Summary of predicted environmental outcomes, with mitigation and management – aquatic fauna and habitats

After mitigation is applied, construction and operation of the KGGP is expected to result in the following outcomes in relation to aquatic fauna and associated habitats:

- Temporary, short-term loss or disturbance to a maximum of eight hectares of riparian vegetation from major watercourses which represents a very small proportion of the riparian vegetation found across the region.
- Progressive rehabilitation completed prior to the onset of the first wet season following construction completion.

- Minor local habitat modification and/or lifecycle disruption for aquatic fauna.
- No barriers to fish passage within watercourses traversed by the pipeline.
- No substantial or long-term degradation of existing surface water quality.
- No translocation of pests and/or diseases.
- No spread of weeds or introduction of feral animals into the pipeline ROW.
- In-stream habitat restored to original condition prior to onset of following wet season.

Potential impacts on aquatic fauna and their associated habitats, as the result of mitigation and management described above, are expected to be negligible to low.

ES.8.5 Matters of National Environmental Significance (NES) (Chapter 10)

A protected matters search using the DSEWPac online Protected Matters Search Tool identified the following relevant Matters of NES:

- 26 listed threatened species (one flora species and 25 fauna species).
- One listed threatened ecological community (TEC).
- 34 listed migratory species.

A number of species known to occur, or considered possible or likely to occur, and which were identified as potentially being affected by the KGGP, were subject to detailed assessment.

Gouldian Finch

Potential impacts to Gouldian Finch have attracted detailed assessment and consideration of mitigation in the Draft EIS because of the presence of highly suitable habitat and known occurrence in the vicinity of the project area (particularly in the Beswick and Bulman localities) and the finding of a flock of 400 Gouldian Finch in the Beswick/Chambers River area in the project field surveys in 2012.

Feeding habitat between KP0 and KP140, including in the Beswick/Chambers River area, and potentially north-east of Bulman have the highest probability of actual use for feeding. The net impacts to the Gouldian Finch from clearing of wet season foraging habitat are expected to be low as the extent of clearing is small compared to the availability of similar habitat in the surrounding region.

Active rehabilitation with a focus on return of grass species favoured in the wet season should ensure any local reduction in the supply of seed is temporary. Rehabilitation in the project area following construction is anticipated to restore approximately 60% of this habitat in the long term.

Three areas of potential breeding habitat are known to occur within or adjacent to the pipeline corridor. However, resources mapping in the Beswick/Chambers River area indicate that significant patches including of more than 100 ha of potential Gouldian Finch breeding habitat and other isolated patches greater than five hectares in extent occur outside of the pipeline corridor. It is anticipated that this may be the case in other areas between KP0 and KP140 that are subject to further survey. These patches would not be impacted by vegetation clearance from construction of the ROW.

Impacts on the Gouldian Finch from the potential loss of one known group of scattered breeding trees from construction of the ROW is expected to be low and not have implications for Gouldian Finch populations, given the recorded availability of suitable breeding habitat in the surveyed areas outside of the pipeline corridor.

There remains the potential for breeding habitat to occur in unsurveyed areas through which access tracks and construction camps may be located. A 2013 dry season survey will include identification of potential nesting and dry season habitat in these areas to be avoided, where possible, in the final design and alignment of access tracks and location of construction camps.

Gouldian Finch dry season feeding habitat coincides with the occurrence of breeding habitat and rocky slopes. Based on vegetation information this is known to occur between KP0 and KP50 and in the Beswick/Chambers River survey area. It is also thought to potentially occur more broadly between KP0 and KP140 and, based on historical records, potentially north-east of Bulman. Impacts from construction of the pipeline on Gouldian Finch dry season feeding habitat is expected to be low as these rocky slopes have generally been avoided. Impacts to potential dry season feeding habitat in the pipeline corridor in these areas will be minimised during final alignment of the ROW, ancillary infrastructure, construction camps and access tracks, supported by further resource mapping surveys this dry season.

The dry season survey will confirm the extent to which water resources can be avoided in final alignment of the pipeline ROW, however it is likely that a small waterhole/watering habitat coinciding with the finding of the Beswick/Chambers River Gouldian Finch population mentioned above, has the potential to be partially directly disturbed through construction of the ROW. Construction activity in the region between KP0-140 which includes this watering habitat is scheduled for completion by mid-August, prior to the period in which Gouldian Finches were recorded utilising this site and more generally, prior to the early wet season period (October – November) in which Gouldian Finch access to water in the landscape becomes limited. It is known through resource survey in this locality that more substantial water resources that are likely to be used by this population are present nearby, outside of the pipeline corridor.

In regard to potential water sources more broadly along the pipeline corridor, open trench crossings of water courses will occur only in circumstances where there is no or minor water flow and reinstatement will ensure the river profile is to pre-construction condition. Placement or use of groundwater bores for construction water will take into account findings of Gouldian Finch resources survey and not be placed in areas where extraction could foreseeably alter the hydrological regime of the species' water sources.

Pacific Aluminium will implement a monitoring program for the known population of Gouldian Finch at Beswick/Chambers River. This will be implemented throughout construction and for the three years following completion of construction. The objective of the monitoring will be to confirm construction is not having/does not have a detrimental impact on the Gouldian Finch population and to provide further information on the population itself.

In addition to these management measures, Pacific Aluminium is looking to work with the Northern Land Council (NLC) to develop a habitat enhancement program that would be supported by funding of indigenous ranger groups. The aim of the program would be to improve habitat quality, with a focus on Gouldian Finch habitat. Indicatively, the enhancement program would involve agreeing with NLC on an area proximate to the pipeline corridor to be subject to a fire management program. This broad area would be likely to, or known to, include habitat for Gouldian Finch that is similar to habitat to be disturbed for the project. Pacific Aluminium would fund indigenous ranger groups to undertake fire management in these areas in accordance with an agreed program, for the purpose of improving habitat quality for the Gouldian Finch. The initial part of this work would include evaluating where fire processes may have caused, or continue to cause, a decline in habitat quality for Gouldian Finch. The project would design an early dry season burn program to reduce occurrence of late season fires. Suitable monitoring methods would be developed as part of this program to measure its effectiveness.

A number of other species have been carefully considered in the design and proposed development of the pipeline. The potential impacts on these species and various mitigating steps are outlined in Chapter 10.

ES.8.6 Parks, reserves and areas of high conservation value (Chapter 11)

Existing environment

National Parks and other conservation areas comprise an important land use in the region and are discussed in Chapter 11. The most significant national park in the region is Kakadu National Park located approximately 65 km to the north. This park is a World Heritage Site and an internationally designated RAMSAR site. Other parks and reserves in the vicinity of the KGGP route include Nitmiluk National Park (20 km), Cutta Cutta Caves Nature Reserve (4 km), and Kintore Caves Nature Reserve (27 km).

Indigenous Protected Areas (IPAs) are areas of Aboriginal-owned land or sea where traditional owners have entered into an agreement with the Australian Government to protect the biodiversity and associated cultural values of a region. IPAs aim to deliver benefits to Indigenous people in the form of education, training, employment and business opportunities based on natural resource management. Two IPAs lie within the pipeline region in the East Arnhem Region and include the Dhimurru IPA and Laynhapuy IPA. The pipeline corridor passes through the northern sections of both these IPAs.

An important focus for management of the KGGP Project will be to ensure that the mitigation methods for the project align and coordinate with the very significant efforts of the indigenous ranger groups that manage the two IPAs. This is particularly the case with respect to weeds, fire and feral animal management.

Summary of predicted environmental outcomes, with mitigation and management

After mitigation is applied, the construction and operation of the pipeline are expected to result in no unacceptable impacts on the conservation values or key management programs and objectives of the Dhimurru and Laynhapuy IPAs. Construction and operational activities for the KGGP would be consistent with targeted management plans. All project management plans would be developed in consultation with the DAC and LHAI, to ensure they are consistent with and support the on-going environmental management programs for fire, weeds, and feral animal conducted by the Dhimurru and Yirralpa Rangers.

ES.8.7 Air quality (Chapter 12)

While the Top End region generally experiences good air quality, episodic reductions in air quality are associated with a significant contribution of particulate matter (PM10) from annual burning of native vegetation in the dry season. No air quality monitoring information is available for the pipeline region, however particulates from fires would be expected to be the major influence on ambient air quality.

Air pollutants and airborne particulates

Dust generation will be most significant during the construction phase of the KGGP and would be generated from: vegetation clearing; earth moving activities; vehicle movement along unsealed roads and the construction corridor; blasting and trenching activities; trench padding; open stockpiles; and backfill activities. The major sources of dust would be vehicles transporting material and the workforce to the construction corridor along unpaved access tracks and main roads and from clearing and trenching activities.

After mitigation is applied, construction of the KGGP is expected to result in only localised, short term and transient airborne particulate emissions in the vicinity of the pipeline ROW, and hence the risk to

human health and vegetation is low. Birritjimi will be a particular focus for mitigation efforts as modelling indicates that without mitigation, ground level concentration of particulates could exceed the recommended air quality standards.

Airborne particulate emissions from traffic during the construction phase will increase significantly on unsealed roads (particularly the Central Arnhem Road) and other roads and tracks providing access to the ROW, however, the period during which this region will be affected is short-term. After mitigation, it is unlikely any adverse impacts will occur.

Emissions of air pollutants from the operational phase would be ongoing for the duration of the KGGP Project and were therefore modelled to predict the likely effects on ambient air quality and potential impacts. The primary source of air pollutant emissions during operation of the pipeline would be combustion exhaust from the gas turbine operating at the King River compressor station (located at KP23.6). The closest sensitive receptor to King River compressor station would be a group of single dwellings which are approximately 10 km from the compressor station. Modelled ground level concentrations of air pollutants around the compressor station indicate none are likely to approach relevant health or environmental criteria.

After mitigation is applied construction and operation of the KGGP is expected to result in minor emissions of air pollutants and no impacts on sensitive receptors. A significant co-benefit of the KGGP project would be the transition of the Gove refinery from fuel oil to gas which would lead to significant reductions of emissions of sulphur dioxide and fine particulate matter (PM10) and improvement in the local air quality in Gove.

Greenhouse gas emissions

Construction, operation and maintenance of the KGGP would directly result in greenhouse gas emissions from a range of activities including fuel combustion, losses of natural gas, venting of natural gas and clearing of vegetation. Relevant greenhouse gases would include combustion products such as CO₂, N₂O and methane.

Greenhouse gas emissions from the operational phase of the project would mainly arise from a single in-line gas compressor turbine, from fugitive gas emissions and venting activities.

A greenhouse gas assessment was undertaken for the construction and operation of the KGGP. Excluding vegetation clearance and embedded energy, total emissions from construction of the KGGP would be approximately 50,800 tonnes CO₂-e. Vegetation clearance would release the majority of construction related greenhouse gas emissions (approximately 248,000 tonnes CO₂-e).

The estimated annual greenhouse gas emissions from construction of the KGGP would comprise a 'one off' increase of approximately 2% in annual greenhouse gas emissions in the NT, or a 0.05% increase in Australia's annual emissions, during the year of construction (2014). This would be mostly attributable to vegetation clearance. Over the lifetime of the project, it is expected that conservatively, approximately 60% of the pipeline ROW would naturally re-vegetate to native woody vegetation and therefore approximately 60% of the carbon sequestration potential of the vegetation can be recovered.

The ongoing greenhouse gas emissions from the operation of the KGGP would be small (estimated 42,000 tonnes CO₂-e per annum). A significant co-benefit of the KGGP would be to facilitate the conversion of the Gove refinery from heavy fuel oil to natural gas which would result in lower greenhouse gas emissions at the refinery.

When greenhouse gas emission reductions at the Gove refinery are accounted for, the small annual greenhouse gas emissions arising from operation of the KGGP (approximately 42,000 tonnes CO₂-e per annum) would be more than offset by the significant reductions in greenhouse gas emissions at the Gove refinery. The net reduction in greenhouse gas emissions would be approximately 336,000 tonnes CO₂-e per annum. This reduction in greenhouse gas emissions is a significant co-benefit of the KGGP project.

ES.8.8 Aboriginal and historic cultural heritage (Chapter 13)

Existing environment

The pipeline region includes sites that are sacred to the Aboriginal people of the area and significant according to Aboriginal tradition. Sacred sites comprise features in the landscape such as waterholes, escarpments, hills, rock outcrops and trees that have special significance under Aboriginal social and cultural tradition. These places can also contain archaeological remains that may or may not be associated with sacred values.

The *Northern Territory Aboriginal Sacred Sites Act* (NTASS Act) protects all sacred sites and makes it an offence to desecrate a site or enter, remain on or carry out work on a sacred site except with the appropriate authorisation (an Authority Certificate).

Pacific Aluminium has initiated a process for the grant of Certificates to cover the construction and operation phases of the KGGP Project and has engaged the Aboriginal Areas Protection Authority (AAPA) to consult with Aboriginal traditional owners with a view to identifying the sacred sites in proximity to the project area. Upon notification from the AAPA, Pacific Aluminium understands that appropriate Restricted Work Areas would be established for all phases of the project.

Field surveys of the majority of the proposed pipeline corridor for archaeological sites and objects were undertaken as part of the Trans Territory Pipeline studies in 2003 and 2004. These archaeological surveys consisted of both vehicular and pedestrian transects.

The surveys identified 17 Aboriginal archaeological sites and 54 background scatters of isolated stone artefacts in the vicinity of the pipeline. The most common archaeological sites were open stone artefact scatters with smaller numbers stone arrangements and a potential site containing human skeletal remains reported by the traditional owners on the survey. None of these sites are considered to have a high archaeological value.

Two areas along the proposed pipeline corridor have not yet been surveyed for Aboriginal archaeological material. The areas include the region between KP400-KP440 (approximately) in the Mitchell Ranges of north-east Arnhem Land and approximately 15 kilometres of the route between Annie Creek and the Goyder River. There is a high potential for the presence of archaeological sites at both of these areas and with traditional owner consent, Pacific Aluminium aims to survey both locations during the 2013 dry season.

A search of the National Heritage List indicates that there are no national heritage sites protected under the provisions of the EPBC Act, within the project area. A search of the NT Heritage Register indicates that there are no declared NT heritage places protected under the provisions of the *Heritage Act*, within the project area.

The pipeline corridor would cross the remains of the North Australian Railway line at KP26. The area that would be disturbed consists only of the gravel base on which the line was laid. This site is not protected under Federal or Northern Territory heritage legislation.

Summary of predicted environmental outcomes, with mitigation and management

After mitigation is applied, the construction and operation of the KGGP is expected to result in no disturbance to Aboriginal sacred sites or breach of cultural protocols associated with these.

Pacific Aluminium will conduct the construction and operation of the KGGP so as to avoid interference with known Aboriginal sacred sites and in accordance with Authority Certificates and associated Restricted Work Areas, issued by the AAPA. Implementing management measures outlined in a Cultural Heritage Management Plan (CHMP) will ensure that Aboriginal sacred sites are not inadvertently damaged or subject to unauthorised access. Pacific Aluminium will maintain ongoing consultation with Aboriginal traditional owners over the life of the KGGP development.

After mitigation is applied, construction and operation of the KGGP is expected to result in the following outcomes in relation to Aboriginal archaeology:

- No direct disturbance of archaeological sites of high significance.
- Some archaeological sites of generally low archaeological significance will be directly disturbed within the project area. Disturbance will be in accordance with the provisions of the *Heritage Act* and will have the consent of the NTG Heritage Branch, in consultation with the relevant Aboriginal traditional owners.
- Protection of archaeological sites of moderate to high archaeological significance through protective measures such as reduced working widths, temporary fencing and work restrictions. If this is not possible, disturbance will be in accordance with the provisions of the *Heritage Act* and will have the consent of the NTG Heritage Branch, in consultation with the relevant Aboriginal traditional owners.

After mitigation is applied, construction and operation of the KGGP is expected to result in no impacts on heritage places protected under Federal or Northern Territory heritage laws. A 30 m section of the North Australia Railway Line would be disturbed by construction of the KGGP. Implementing the management measures of the CHMP would reduce disturbance to the North Australia Railway line to as low as reasonably practical. Pacific Aluminium would maintain ongoing consultation with the NT Heritage Branch.

ES.8.9 Land Use, infrastructure and amenity considerations (Chapter 14)

Existing environment – land use and infrastructure

The KGGP would pass through pastoral and crown land, Aboriginal freehold land and mineral and petroleum exploration tenements. Construction of the KGGP would require communications systems, supply of water and power, a waste management system, and access to medical and other services that meet the needs of the project; are reliable and suited to the remoteness of the project area; and do not result in unacceptable impacts on current users of these systems.

The key roads currently proposed for use by the KGGP Project to transport personnel and materials include sections of:

- Stuart Highway.
- Tiger Brennan Drive.
- Berrimah Road.
- Central Arnhem Road.
- Melville Bay Road.
- Local Government roads.

The Central Arnhem Road runs parallel with the proposed KGGP corridor and would be the road most heavily impacted by project traffic. This road would be used for the delivery of materials to the ROW and temporary construction camps and for the movement of the workforce between the temporary construction camps and the ROW and between temporary construction camps and the Katherine or Gove Airports.

The Central Arnhem Road is a Northern Territory Government controlled arterial road that extends from the Stuart Highway to Nhulunbuy. It is a predominately unsealed gravel, two-way, rural road. The road condition is generally described as poor with corrugations, dips, washouts, bulldust and loose gravel for the majority of its length. As a result of inadequate flood capacity, sections of Central Arnhem Road are often closed for six months during the wet season.

The local roads would generally be used by traffic generated from the KGGP Project to:

- Provide access for materials and personnel to the ROW.
- To provide access for the movement of personnel to / from the temporary construction camps and the ROW.
- To provide access for the movement of materials to the temporary construction camps.
- To provide access for the movement of FIFO workforce to / from the temporary construction camps and the Katherine and Gove Airports.

There are two regional airports that are proposed to be used by the KGGP Project. These are located at Gove and Katherine. Construction materials including pipe would be received through the Port of Darwin (East Arm Wharf) and the Port of Gove.

Summary of predicted environmental outcomes, with mitigation and management– land use and infrastructure

After mitigation is applied, construction and operation of the KGGP would result in a low impact on current and future land use. Minor restrictions on excavation of land or construction of buildings immediately above the buried pipeline would occur over a small area.

After mitigation is applied construction of the KGGP is expected to result in a low impact on road infrastructure and negligible impacts on air transport and shipping (port) infrastructure. A program of road assessment, strategic upgrade, maintenance and rehabilitation conducted in consultation with local road authorities and with financial contribution from Pacific Aluminium would ensure all road pavements are suitable for use by construction traffic and that road pavements are returned to a condition equivalent to that at commencement of construction.

After mitigation is applied construction and operation of the KGGP Project is expected to have no unacceptable impacts on existing communication systems, power, water, waste, medical facilities or other services used by the communities in the vicinity of the project.

Existing environment – noise and vibration

Noise and vibration has the potential to cause nuisance and discomfort to surrounding sensitive receptors such as residences, communities, public localities and terrestrial fauna. A noise and vibration assessment (including modeling) for the KGGP Project was conducted. No residential receptors were identified within five kilometres of the proposed construction camps.

Due to the low traffic volumes on Central Arnhem Road and Melville Bay Road and also the small increase of traffic on Stuart Highway it was considered inappropriate to model noise emissions from

traffic. However, given the relatively significant temporary increases in traffic from the construction activities at Burunga and Nhulunbuy, a qualitative assessment of noise impacts was undertaken.

Summary of predicted environmental outcomes, with mitigation and management – noise and vibration

The location of the KGGP and associated construction activities are sufficiently distant from the majority of sensitive receptors that noise would be within the relevant noise criteria. Daytime noise from construction activities close to Birritjimi and night time construction noise from hydrotesting near Nhulunbuy, Galupa and Birritjimi could exceed noise criteria. Infrequent venting during the operational phase may exceed noise criteria at Nhulunbuy.

Mitigation measures addressing timing and location of noise generation and implementation of noise attenuation controls would reduce these potential exceedances to an acceptable level. Vibration and airblast levels from any blasting during construction are predicted to be within the relevant criteria and are therefore unlikely to cause impacts on any sensitive receptors.

ES.8.10 Social and economic considerations (Chapter 15)

Major towns and communities: Katherine and Nhulunbuy

Katherine and Nhulunbuy, situated at opposite ends of the proposed pipeline route, are the larger population centres within the region proposed to be traversed by the KGGP. Both towns function as regional service centres, providing a range of government services, such as health and education.

Outside of the town centres of Katherine and Nhulunbuy, communities along the proposed pipeline route are small, remotely located Aboriginal communities.

Workforce

A construction workforce of up to 780 personnel may be employed at any one time (with numbers distributed across two work spreads). The construction roster is likely to be a 28-day work cycle, followed by nine days' rest, on a fly-in/fly-out (FIFO) basis, with workers using Katherine and Gove Airports. Each working day would typically comprise a 12-hour shift during daylight hours. Each spread is expected to 'grow' at three to five kilometres per day.

Construction workers are proposed to be accommodated at five construction camps located adjacent to main roads near the following locations:

- Beswick Camp – KP72.
- Mainoru Camp – KP193.
- Annie Creek Camp – KP295.
- Buckingham Camp – KP447.
- Wonga Creek Camp – KP548.

Up to 390 personnel would be accommodated in a single construction camp. All five camps would operate simultaneously for the majority of the construction activities and be sequentially demobilised.

Summary of predicted social and economic outcomes, with mitigation and management

The KGGP Project would have a range of direct and indirect benefits for local communities. Directly, the creation of employment opportunities would be an important benefit for the broader economy and labour force, although opportunities would be short-term over the construction phase (approximately 12 months) and would likely involve a highly specialised workforce.

A range of appropriate and targeted management measures would be applied to ensure that a degree of benefit is experienced by local and affected communities. Indirectly and over the longer term, the primary benefit of the KGGP Project would be through its role in sustaining the ongoing operations of the Gove Refinery. This would facilitate the ongoing viability of approximately 1,100 jobs and a range of associated local business and household income opportunities.

Some potential negative impacts may be experienced by local and regional communities. The majority of these would be particularly prevalent during the construction phase and over the short-term, where construction activities and the presence of a primarily non-resident workforce may impact community wellbeing. In particular, stakeholders have raised concern about increased unauthorised access to Aboriginal traditional lands, as well as the possibility of local communities not having the capacity or capability to engage in project-related opportunities. Concerns have been raised that a non-local workforce and increased non-local access into the area may compromise community safety through increased road traffic risks and the potential increase in substance abuse that may be facilitated.

Over the longer term, during operations, it is not likely that significant negative impacts would be experienced as ongoing maintenance activities would require the presence of only a small workforce. Pacific Aluminium will apply a range of management and mitigation measures to enhance benefits of the KGGP Project and minimise negative impacts, such as:

- Implementing local employment and business participation plans, advertising local business opportunities and maintaining a database of local businesses.
- Developing a Land Access Protocol in consultation with traditional owners and the Northern Land Council and acquiring an 'Authority Certificate' under S19B of the Northern Territory Aboriginal Sacred Sites Act.
- Ensuring all direct and contracted employees adhere to the Land Access Protocol and conditions and requirements of the 'Authority Certificate'.
- Effective traffic management plans to mitigate impacts. Mitigation measures would include providing bus transportation for all employees to and from construction camps to minimise use of private vehicles in the project area and engaging with the Northern Land Council and Northern Territory Road Safety Branch to develop community safety awareness materials.
- Proactive communication with nearby neighbours ahead of work to ensure 'no surprises'.
- Establishing and enforcing a Code of Conduct for all employees and contractors working on the project.

Social management and mitigation measures are detailed in the Social Impact Management Plan for the project.

ES.8.11 Health and safety (Chapter 16)

Risk assessment of health and safety issues for the public and pipeline workforce from the project have targeted general health risks, the potential and consequences of pipeline failure and public and worker safety.

Key aspects of the KGGP project that could impact health and safety include:

- Biting insects.
- Pipeline failure resulting, for example, from third party interference.
- Workplace hazards resulting, for example, from extreme weather.

The primary approach to managing the public and worker health risks arising from construction and operation of the KGGP will be to ensure construction activities do not create or expand mosquito breeding areas, to supply water and waste treatment to Australian Standards, and to develop a Health Management Program and associated management plans during detailed design. Specific health management measures are proposed for solar radiation and heat; biting insects; fauna encounters; soil/water-borne pathogens and noise. A project specific Health and Safety Management Plan will formalise these arrangements.

Once mitigation measures are applied, the health risks to workers and the public from constructing and operating the KGGP will be as low as reasonably practicable. No exacerbation of public health issues in the region are anticipated to arise from the KGGP Project.

Safety of the project to workers will be delivered through the use of industry accepted methods and controls and compliance with the relevant Pacific Aluminium's OH&S policies and procedures and Northern Territory legislation. The project will comply with the latest revisions of AS/NZS 4804 Occupational Health and Safety Management Systems – General Guidelines on Principles, Systems and Supporting Techniques, and AS2885 Pipelines – Gas and Liquid Petroleum.

Safety Management Plans will be implemented to address the specific aspects of each stage of the project. The plans will be approved prior to the work commencing. The plans will ensure that all risks and threats are identified, and that all appropriate resources, measures and procedures will be in place to reduce the risk rating to low or negligible, and ensure that a risk level of 'as low as reasonably practicable' (ALARP) is achieved. The project Safety Management Plan will be revised regularly to reflect the activities to be conducted during each phase of the project.

A preliminary pipeline safety risk assessment was undertaken and determined risks to public and worker safety associated with pipeline failure, in line with the requirements of AS 2885.1. Forty five threats were systematically assessed against the Rio Tinto risk matrix.

No Class IV (extreme) risks were identified from the risk assessment.

The highest risks identified for the pipeline relate to interference by third parties. These were identified as having a Class III (high) level of risk as follows:

- Farming activities (deep ripping, fence posting).
- Public developments and maintenance (road and drain maintenance).
- Mining development (including exploration drilling and blasting).
- Road / highway maintenance.

Examples of specific mitigations and safety measures that will be applied to reduce risks include:

- Depth of cover determined in context of current and potential land uses.
- Above-ground facility perimeter fence and firebreak margins.
- High visibility signage (indicating location of buried pipeline).
- Regular testing of pipeline integrity using 'intelligent pig' runs.
- Registration of easement and pipeline licence.

Identified risks are the subject of recommendations that will be addressed in the design phase. Implementation of these recommendations is anticipated to reduce risks further to as low as reasonably practicable.

ES.8.12 Management framework (Chapter 17)

Management systems

Pacific Aluminium conducts its operations within a culture of continuous improvement (consistent with the ISO 14001 EMS framework). ISO14001 is an internationally recognised continuous improvement model, the key elements of which include assessing environmental risk and legal requirements, developing objectives and targets for improvement, training, operational control, communication, emergency response, corrective actions, audits and reviews.

The EMS is designed on the principles of continual improvement and adopts the methodology of 'Plan, Do, Check and Review (Act)'.

Environment Management Plan

An Environment Management Plan (EMP) has been prepared to provide a consolidated plan for the environmental management of the KGGP Project. Implementation of the KGGP Project in accordance with the EMP will aim to ensure that the KGGP Project meets all environmental obligations including legislation, regulations and conditions of approval.

The EMP comprises a series of management sub-plans describing measures to be applied to avoid and minimise the environmental impacts of the KGGP Project, monitoring to track and assess management performance against targets, and contingency measures to mitigate unavoidable or accidental impact. The risk assessment was used to guide the identification and priority accorded to management sub-plans.

The EMP has been developed during the feasibility stage of the development of the KGGP project. Accordingly, the management sub-plans are conceptual and have been termed 'provisional' in acknowledgement that as the project enters the design and implementation phases, there will be more specificity around aspects of project construction and operation and the management plans will likewise become more detailed.

The EMP would also continue to be developed and refined following the conclusion of the assessment process, taking into consideration the proposed timing of development activities, comments on the draft EIS and incorporating the recommendations and conclusions of the Environmental Assessment Report. A key element of the transition to more specificity around management measures will be arrangements to be put in place by the construction contractor. Wherever possible these have been foreshadowed in this EMP and the detailed construction and operational EMPs will be submitted as part of the Pipeline Management Plan process required as part of the consent process under the *Energy Pipelines Act*.

Key regulatory controls

Pacific Aluminium has identified the regulatory controls that would be applied to ensure appropriate management of the proposal. The key controls include (but are not limited to):

- Environmental conditions of consent to construct and consent to operate the KGGP granted by the NT Minister for Mines and Energy under the Energy Pipelines Act and addressing recommendations made by the NT EPA in their assessment report for the project, made pursuant to the EA Act.
- Environmental conditions in any Approval issued by the Commonwealth Minister for Sustainability, Environment, Water, Population and Communities allowing the KGGP Project to be implemented under the EPBC Act.
- Conditions of consent to disturb archaeological material issued pursuant to the Heritage Act.

- Restricted Work Areas established to protect Aboriginal sacred sites under the Northern Territory Aboriginal Sacred Sites Act.

Environmental awareness, training and inductions

An induction will be a pre-requisite before accessing the construction site and / or commencing any work on the KGGP Project. Induction would include a familiarisation with the KGGP Project, and to the applicable environment, health and safety; and cultural heritage management policies and procedures. Inductees will be specifically introduced to the detailed project Construction EMP (CEMP), and to their roles and responsibilities as defined in that document. Similar processes will be followed during the operational phase, consistent with the Operations EMP (OEMP).

Incidents and corrective action

Pacific Aluminium is committed to meeting its community and stakeholder responsibilities and recognises that a clear grievance process is an important tool to assess the KGGP Project's overall environment and social performance as well as gaining an understanding of perceptions and concerns around day-to-day activities.

Pacific Aluminium's existing *Community Observation and Feedback Management Procedure* (March 2012) will be applied to the KGGP Project and will be outlined in a Communication Stakeholder Engagement Plan (CSEP). All project and contractor staff will be required to adhere to the procedure to ensure the timely capture of any community observation, requests and concerns, and ensure that feedback is provided.

Auditing

A key consideration for the environmental management of the KGGP project will be to ensure that systems are in place to ensure that the measures in the provisional management plans are accounted for in the preparation of the detailed CEMP and OEMP that would be the subject of authorisation. Systems should ensure there is sound reasoning if changes are made to the measures outlined in this EMP and that during construction, the commitments of the management plans are being adhered to.

This will be achieved through project controls implemented by both Pacific Aluminium and the construction and operations contractor including:

- Third party review of detailed management plans for their conformity with EIS commitments.
- Contractor environmental controls.
- Inspection and third party auditing of construction of the project (regular inspections and two formal compliance audits).
- Third party compliance auditing of project operation (annual).

Decommissioning

The KGGP would be designed with an operational life of 50 years. Decommissioning of the pipeline at the end of this period would entail closing down operations and decommissioning.

There are typically three options involved in the decommissioning of a pipeline. These are:

- Removal (involving excavation and land disturbance).
- Suspension (disconnecting and filling the pipeline with an inert material and maintaining as per an operating pipeline).
- Left *in situ* (disconnecting and leaving the pipeline to degrade).

Removal of the pipeline would not be environmentally preferable as it would involve excavation and considerable land disturbance. It is likely that the KGGP would remain buried (suspension or left *in situ*).

PROVIDING COMMENT ON THE DRAFT ENVIRONMENT IMPACT STATEMENT

Interested persons and organisations wishing to comment on the draft EIS are invited to make written submissions on or before Friday 28 June 2013 to:

Alana Mackay, Environmental Assessments
Northern Territory Environment Protection Authority
GPO Box 3675
DARWIN NT 0801
Email: eia.ntepa@nt.gov.au

Submissions will be treated as public documents unless confidentiality is requested.