

1. EXECUTIVE SUMMARY

1.1. Introduction

The Power and Water Corporation (PWC) has negotiated an agreement with Eni Australia Pty Ltd (Eni) to source replacement gas supplies for existing power generation assets in the Northern Territory. The source of the gas supply will be the Blacktip field located offshore in the Joseph Bonaparte Gulf. Gas supply is required in Darwin by 1 January 2009.

The Australian Pipeline Trust (APT) proposes to construct the Bonaparte Gas Pipeline (BGP) from the Eni plant near Wadeye to Ban Ban Springs Station in the Top End of the Northern Territory, a distance of approximately 280km (Figure ES-1). APT is the major Australian Stock Exchange listed energy transmission company in Australia (ASX listing APA) with interests in more than 10,000km of gas transmission pipelines in Australia including a significant presence in the Northern Territory. The BGP will be an underground high pressure gas pipeline that will connect to the existing Amadeus Basin to Darwin Gas Pipeline (ADP).

This Public Environment Report (PER) addresses the potential impacts and proposed safeguards associated with APT's development of the BGP and includes environmental, social and economic issues associated with:

- Construction, operation and decommissioning of approximately 280km of onshore-buried gas transmission pipeline between Wadeye and the ADP;
- Construction and operation of above ground facilities directly associated with the BGP including a meter station, scraper station, mainline valves and ancillary facilities (e.g. Supervisory Control and Data Acquisition {SCADA} and a future compression station;
- Construction of temporary accommodation camps; and
- Construction of temporary and permanent access roads and laydown areas.

1.1.1. Objectives, Benefits and Justification

The current gas supplies for the majority of the Northern Territory electricity supply come from the Amadeus Basin, west of Alice Springs. These supplies will begin to decline in 2008, and are unable to continue to provide the quantities of gas for Northern Territory electricity generation into the future. This Project ensures that the main electricity producers in the Northern Territory continue to use gas as opposed to other more expensive and Greenhouse Gas polluting fuels such as fuel oil. The Project also has the potential to provide long term access to increased gas supplies to existing and potential customers, which is crucial for driving ongoing development in the Northern Territory.

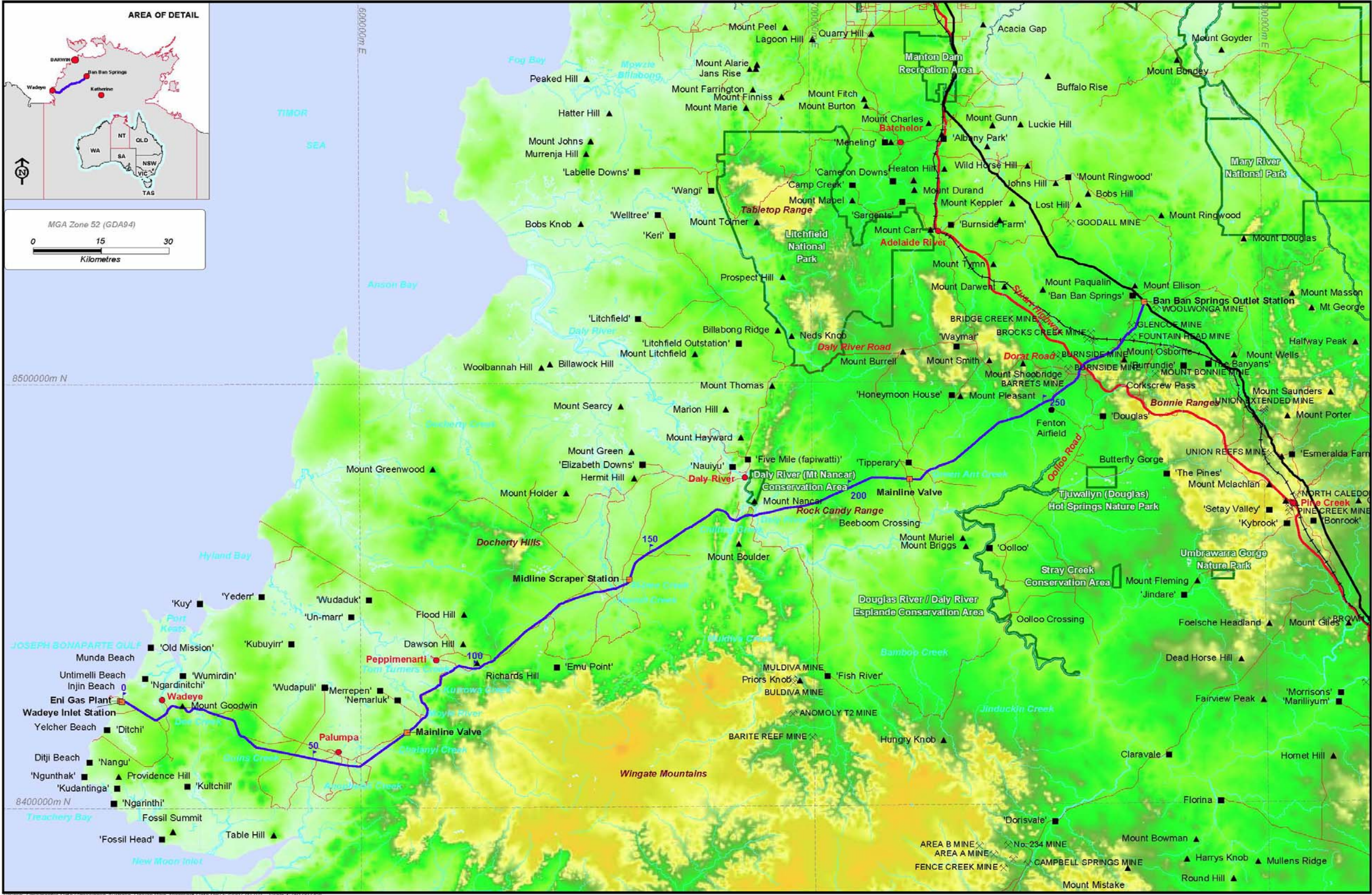
1.1.2. Environmental Approvals Process

This document has been prepared to provide the Northern Territory Government, other organizations, and the public with information necessary to inform them of the Project, and enable them to assess the potential environmental impacts and the associated preventative and management measures proposed.

While the area traversed by the pipeline falls under the jurisdiction of the Northern Territory, the BGP has been declared a 'controlled action' by the Commonwealth Government under the *Environmental Protection and Biodiversity Act 1999* (EPBC Act) because it was considered possible that there could be an impact on threatened species and communities, and migratory species listed under the EPBC Act. Under a Bilateral Agreement, however, the EPBC Act allows for the Commonwealth to rely on the Northern Territory environmental assessment process so that a single assessment process can be carried out to satisfy both jurisdictions.

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Figure ES-1: Map of Pipeline Route



The Northern Territory environmental assessment process is based on the *Environmental Assessment Act 1982* (Environment Assessment Act). Under this Act, and based on information provided, the Minister for Environment and Heritage has determined the level of assessment for the BGP to be set as a Public Environment Report (PER), and the Northern Territory Environment Protection Agency has prepared Guidelines against which the APT have prepared this PER.

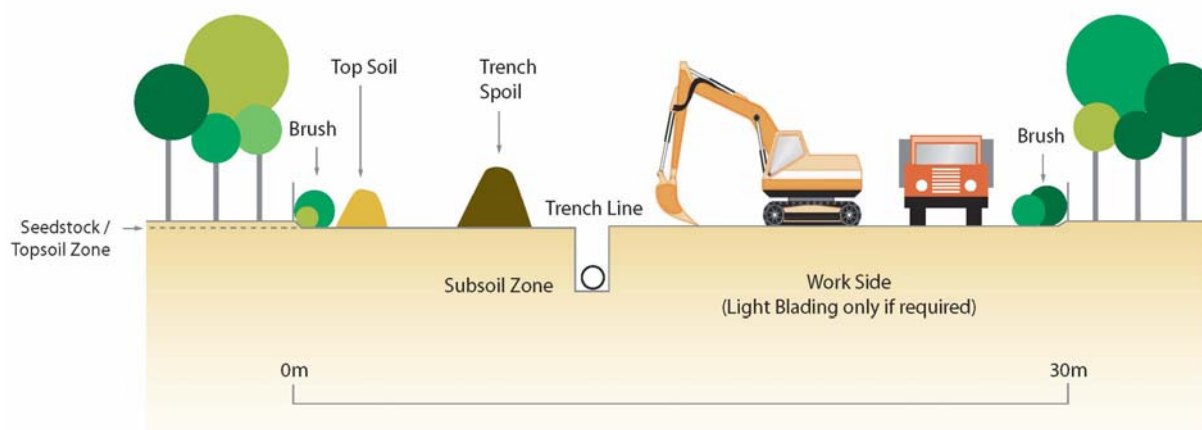
1.2. The Proposal

The proposed BGP route starts at the Eni Blacktip Gas Plant near Wadeye on the south-west coastline of the Northern Territory. The proposed pipeline will extend inland approximately 280km, generally in a north-east direction to just east of the Stuart Highway at Ban Ban Springs. The entire pipeline route sits between the latitudes of 13.39°S and 14.38°S, and between the longitudes of 129.44°E and 131.53°E. The BGP will initially traverse Aboriginal land (the first 130km) and then traverse predominantly pastoral land to its end point. About halfway along the route, it crosses the Daly River.

The BGP, which will initially be capable of delivering 30PJ/year, will consist of a buried 300mm (12”), class 900, high tensile steel pipe located in a 30m wide construction corridor. The pipeline will have an initial design life of 50 years.

The proposed construction corridor will be the principal area for construction of the pipeline and it will be fully cleared and reinstated. This width is based on the need to store cleared vegetation, topsoil and subsoil with sufficient separation distance (to prevent mixing), to safely carry out construction activities (e.g. welding) and provide sufficient space for the movement of other vehicles and plant (e.g. pipe trucks) (refer Figure ES-2).

Figure ES-2: Construction Corridor Layout



The construction corridor is itself situated within a 100m wide surveyed area which has been surveyed by a team of experts incorporating design engineers, ecologists, archaeologists and Traditional Owners. The surveyed area has been agreed with the Northern Land Council (NLC) and other land holders, and as well as the construction corridor and pipeline and

ancillary facilities such as main-line valves and cathodic protection arrays, contains temporary work areas and truck turning areas.

The pipeline will be designed, constructed, operated and maintained in accordance with Australian Standard 2885 Pipelines – Gas and Liquid Petroleum. Construction is planned for the 2008 Dry Season with commissioning following in the last quarter of 2008.

The Project will be largely self-sufficient with respect to services and infrastructure. The workforce will be accommodated in up to four dedicated campsites, although there will be no more than two operational at the same time, which will be powered by diesel generators. On-site diesel generators may be used at the Inlet Station when attended by BGP staff. There is a potential that power to the Inlet Station may be provided by Eni. Solar panels will be used at all other BGP facilities. Water supply for the Project is expected to be from existing dams, bores and watercourses.

Typical equipment used in pipeline construction includes bulldozers, graders, trucks, excavators, loaders, sideboom tractors, padding machines and wheel ditching machines. Specialist plant and equipment (e.g. pipe bending machines, side booms and padding machines) may be sourced from interstate, depending on their location at the time of construction, while the bulk of the earthmoving equipment (e.g. excavators, graders, water trucks) will generally be sourced locally.

Pipeline construction requires the following procedures to be undertaken consecutively: surveying and temporary fence and gate installation; set up of temporary facilities; clear and grade of the construction corridor; trenching; pipe stringing and bending; pipe welding and inspection; joint coating; pipe placement in the trench (i.e. lowering in and laying); backfilling and compaction; hydro-testing and reinstatement. Pipe will be supplied to the construction corridor pre-coated and a pipe coating plant will not be required.

Open cut, horizontal directional drilling (HDD) and horizontal boring are the preferred construction methods for installation where the pipeline route crosses roads, the Alice Springs-Darwin railway line, an existing optic fibre cable, or significant watercourses. HDD ensures the pipeline goes underneath significant waterways including the Daly River, as well as sealed roads and the Alice Springs to Darwin Railway, thus avoiding environmental damage.

1.3. Alternatives

Two main alternatives were assessed: the no development option, and an alternative energy supply option. No development would mean that the Territory would have significant power shortages post 2009. No other gas source provided market certainty and security of supply in the required timeframe.

Alternative routes were considered including a subsea option which would have been longer, more expensive and presented an unacceptable risk factor of unexploded ordnance. The proposed BGP route is a direct route using existing linear corridors such as roads and stock routes where possible, avoiding steep rugged terrain and as much as possible major river crossings, and areas of conservation significance.

1.4. Existing Environment

As part of the baseline data collection process, environmental studies and surveys were undertaken to provide detailed, up-to-date information, and to provide a benchmark for a number of environmental aspects.

Biophysical studies and surveys undertaken for the BGP include:

- Desktop assessment of geology;
- Desktop assessment of soils and land systems;
- Desktop assessment of acid sulfate soils (ASS);
- Desktop assessment of hydrology and water quality;
- Desktop assessment of existing flora and rainforest datasets;
- Desktop assessment of existing fauna datasets;
- Desktop assessment of biting insects;
- Desktop assessment of existing aquatic ecology information;
- Desktop assessment of existing archaeological datasets;
- Archaeological survey of proposed pipeline route; and
- Terrestrial vegetation and flora surveys of proposed pipeline route.

1.4.1. Landform Features

Baseline

The topography of the proposed pipeline route is mostly flat or undulating. There are numerous minor creeks and some more significant watercourses flowing generally north and north-westerly from the disconnected low but rugged hills and ranges to the south and east. Broadly speaking, the geology of the area traversed by the proposed BGP is composed of rocks that can be divided into two general groups; those associated with the Bonaparte Basin and those associated with the older Pine Creek Orogen. Rocks of the Daly River Group outcrop on Tipperary Station.

Apart from the south western and north eastern ends, the majority of the BGP route traverses the Moyle and Daly River catchments. Some smaller creek catchments occur in the west and centre, and the eastern most end of the route touches the Adelaide River catchment.

Potential Impacts

Potential impacts as a result of the geology of the region are likely to be insignificant and restricted to the following construction activities:

- HDD under selected watercourses;
- Blasting associated with pipeline trenching through hard rock areas;
- Accessing of material from borrow pits and quarries; and
- Uncovering karst caves or sinkholes.

There are sections of the route with soils that are moderately to highly susceptible to erosion as a result of land clearing, soil disturbance and vehicle movements. Streams and stream banks have also been identified as areas of significant erosion risk requiring special attention.

Management

Route selection has focused on very gently sloping landforms with irregular grained soils, to reduce erosion risk to as low as practicable. Some sections, however, have a high risk particularly on steeper slopes or where more dispersive soils occur. A comprehensive Draft

Construction Environmental Management Plan (CEMP) has been prepared as part of this PER. It incorporates a number of auditable measures for construction including:

- Ensuring reinstatement is completed prior to the first storms of the wet season;
- Guidelines for the protection and reuse of topsoil, root and seed stock;
- Installing and maintaining both short and long term erosion and sediment control measures (e.g. whoaboys, contour banks, earth banks, turn off drains, silt fences);
- Re-contouring landforms to their original condition, including any erosion controls established prior to construction; and
- Avoiding vehicle movement on restored easement until the vegetation has re-established.

Specific erosion and sediment control management associated with watercourses will include:

- HDD (geotechnical constraints permitting), at the main watercourses (e.g. Daly River, Green Ant Creeks and Tom Turners Creek)
- Grading soil away from the watercourses;
- Use of containment structures as appropriate; and
- Use of trench breakers, silt fences and temporary and permanent earth banks.

In addition certain sites, such as Dee Creek near Wadeye, have been identified as needing special attention in the form of Special Area Plans (SAP).

Monitoring will be undertaken during both construction and operation, particularly after the first wet season of operation.

1.4.2. Water

Baseline

Surface Water

The BGP proposed construction corridor crosses five catchments, and several smaller creek systems. Two of these are major river catchments. The catchments include Anopheles Ck (including Chalanyi Ck), Moyle River (including Kurrowa and Tom Turners Cks), Hermit Creek (including its minor tributaries and Ti-Tree Ck), Daly River (including Chilling, Green Ant, Sandy and Hayes Creeks), and two tributaries of the Adelaide River catchment (Howley Ck and Margaret River).

The main catchments traversed by the proposed BGP construction corridor are the Moyle River Basin, of 7,020km² and the Daly Basin, of 52,940km². In the Moyle catchment typically only the Moyle River and Tom Turners Creek have measurable flow at the end of the dry season. Stream gauging stations, however, are sparse and some other creeks may support continuous stream-flow.

The Daly River is the major river in the proposed construction corridor. The main tributaries of the Daly River which are traversed by the proposed construction corridor are Chilling Creek, Green Ant Creek, Sandy Creek and Hayes Creek. Chilling, Green Ant and to a lesser extent Sandy Creek maintain good flows for much of the year, depending on the previous season's rainfall.

The mean annual runoff at Mt Nancar gauging station (G8140040), just upstream from the highest tidal influence on the Daly River averages 6,900,000ML/yr. The basin is largely

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unmodified. Total licensed extractions are in the order of 47,000ML/yr from surface and groundwater sources, mainly for agriculture.

Ground Water & Hydrology

The ground water and hydrology have been examined in the three hydrologic regions traversed, namely the Wadeye region, the Peppimenarti-Naiyu region and Hayes Creek region. Bores located within 10km of the proposed construction corridor are concentrated at Wadeye, Palumpa and Naiyu and Hayes Creek communities and while there are significant numbers of bores, the paucity of data means that it is difficult to determine the likely bore yields and performance of the bores over time.

Eleven bores have been identified that potentially can provide water for construction activities. Licences to use bores are required where bores yield more than 15L/s. Only one bore, on Tipperary Station, yields higher than this, and will require a licence from the Northern Territory Controller of Water Resources. The other bores will not require licensing for use.

Areas of shallow groundwater depth are of interest to construction of the pipeline as dewatering of the trench will be required if the water table is intersected. Shallow groundwater depth is associated with wetlands, floodplains and drainage lines. Logged information from bores mostly indicated that standing water levels were greater than 2m below the surface, below the depth that the pipeline would normally be buried.

Potential Impacts

There are three main requirements for water for the proposed BGP: hydrotest water, camp (consumption) water, and water for construction track maintenance.

Hydrotest

Hydrotesting of the pipeline requires large single volumes of water to be pumped into the pipe in sections, and pressurized to above the maximum allowable operating pressure. For the BGP it is anticipated that the pipe would be tested in about 5 sections with a total upper limit of about 23ML of water being needed. It is however anticipated that water from sections being hydrotested could be re-used, significantly reducing the total required. Potential rivers which could be used to provide water, subject to licensing and suitable flow monitoring, include Dee Creek, Anopheles Creek, Moyle River, Kurrowa Creek, Tom Turners Creek, Chilling Creek, Daly River and Green Ant Creek (the latter 3 in the Daly River catchment).

The flow rate in the Daly River when extraction is required in the 2008 dry season has been assumed to be around the minimum daily average for the 40 year period (around 3,000ML/day). Based on this rate around 0.1% (1/1000th) of the flow would be extracted for around 1.4 days to fill a single test section. The number of extractions will vary depending upon the number of times the water can be re-used with the maximum number being 5. Should multiple extractions be required it is anticipated that these can be achieved from other water sources than just the Daly River (e.g. Moyle River), however this will be dependent on flow rates at the time of construction.

Disposal of the BGP hydrotest water will be to land, as this has generally been found to be a suitable and robust management technique. Disposal water properties are mostly dictated by the original properties of the source water, such as nutrient content, salinity and the concentration of certain metals and ions.

Camp (consumption) water

Water is required for cooking, cleaning and drinking. Much of this water needs to be of good quality, especially for drinking and cooking. Estimates of consumption average around 250L per person per day for up to 250 people, with the total estimate of 7.5ML based on an estimated 120 construction days. This use will be spread over the length of the proposed BGP since one to two of four construction camps will be operating at any one time. Sources of water for human consumption include a number of bores and open water, such as larger clean water rivers and creeks. It is unlikely that any source will be used for more than a month or two. The water must meet the Department of Health Guidelines and the *Australian Drinking Water Guidelines* 2004. Treatment of water may be required.

Construction Maintenance

Construction tracks and access tracks are best managed by spraying water on the surface to help hold the soil together. Up to 50ML will need to be sourced from a combination of bores (and turkeys nest or watercourse dams), or from flowing creeks and rivers. If all the water were taken from the Daly River the impact on flow rates would be minimal.

Management

Only one bore within the vicinity of the pipeline yields a flow greater than 15L/s, and a licence will be sought for the use of this bore for a short term; probably for no more than two or three months. To minimise impact on yield for other bores in the region extraction will be spread over a number of bores, and other water sources. Management of open water sources, such as creeks and rivers will be in accordance with a Water Extraction Licence issued by the Northern Territory Controller of Water Resources under the *Water Act*.

Hydrotest water will be disposed to land, well-separated from any water bodies. The water will be filtered with geofabric, and spray aerated, in accordance with best practice treatment recommended by CSIRO. Sediment fences will be used in addition to geofabric aprons to prevent erosion and to filter sediments. After disposal, the geofabric filtering frame will be removed and the site left to rehabilitate.

1.4.3. Ecology

Baseline

Vegetation

The proposed BGP traverses four bioregions - areas that have a common set of ecological attributes - namely Darwin Coastal, Victoria-Bonaparte, Daly Basin, and Pine Creek. The vegetation along the proposed BGP corridor is predominantly woodland and open forest dominated by *Eucalyptus tectifica* Darwin Box and *Corymbia spp.*, *Eucalyptus tetradonta* and *E. miniata*, with native sorghum (*Sarga*) grass species in the understorey. Only one species of plant of listed conservation significance, *Cycas armstrongii*, is known to occur within the BGP corridor. The species is locally very abundant and not considered to be at risk.

The vegetation is predominantly (83%) woodland dominated by *Eucalyptus tectifica* (Darwin Box) and *Corymbia spp.*, with *Sarga* and *Sehima nervosum* grass species in the understorey. The BGP also traverses low open woodland of *Melaleuca viridiflora*, and *Eucalyptus spp* (14%) and a small patch of *Eucalyptus tintinnans* woodland (6%), which is important habitat for the endangered Gouldian Finch. Botanical data and environmental parameters were collected at 115 sites, at intervals of no greater than 5km along the pipeline corridor. All other supporting infrastructure or activities were also surveyed, including the mid line scraper station, at least 4 construction camp sites, all proposed access tracks and existing quarries. The field survey data are summarised in a technical report.

The surveys generally supported the interpretation of vegetation mapped on the Savanna map (Qld EPA 2001). Differences were observed, however, at the finer scale from ground inspections. These include stands of open forest and some tall open forest of Darwin Stringybark and Wollybutt in the western part of the route.

Flora of conservation significance were reported from NT Herbarium records within the vicinity of the pipeline route. None of these were found during field surveys.

Weed distribution in the region is generally related to roads and tracks, cattle grazing and feral animals. The major exotic species recorded during field surveys of the BGP proposed construction corridor in December 2006 included:

- *Hyptis suaveolens* (a noxious forb known as Hyptis or Horehound),
- *Xanthium strumarium* (a noxious forb, commonly known as Noogoora Burr),
- *Sida acuta* (Spinyhead Sida)
- *Stachytarpheta* sp. (a noxious forb, commonly known as Snakeweed),
- *Jatropha gossypifolia* (commonly known as Bellyache Bush),
- *Mimosa pigra* (Giant Sensitive Plant, a weed of national significance),
- *Calotropis procera* (a declared noxious weed commonly known as Rubber Bush), and
- *Andropogon gyanus* (an introduced grass, known as Gamba Grass).

Terrestrial Fauna and Habitats

The BGP proposed construction corridor traverses a range of habitats that support a diverse fauna, many of which are widespread and highly mobile. Fauna species of conservation significance that possibly occur along the proposed construction corridor include:

- Bare-rumped Sheath-tail Bat *Saccolaimus saccolaimus nudiclunatus*;
- Northern Quoll *Dasyurus hallucatus*;
- Gouldian Finch *Erythrura gouldiae*;
- Water Mouse *Xeromys myoides*;
- Brush-tailed Phascogale *Phascogale tapoatafa pirata*;
- Partridge Pigeon *Geophaps smithii smithii*;
- Masked Owl (northern) *Tyto novaehollandiae kimberli*;
- Hooded Parrot *Psephotus dissimilis*;
- Beach Thick-knee *Esacus magnirostris*; and
- Red-cheeked Dunnart *Sminthopsis virginiae nitela*.

Due to the habitat preferences of some of these species, including the Water Mouse and Beach Thick-knee, for instance, they are highly unlikely to be found along the route. The Bare-rumped Sheath-tail Bat has not been recorded in the area, and has not been recorded within the vicinity of the pipeline route.

Migratory Species

The floodplains of the Moyle and Daly River catchments retain some water all year round in billabongs and several large permanent swamps. Route selection avoids areas of open water,

where possible, and provides a buffer to open water areas to minimize the potential short term construction impacts on Migratory birds.

Migratory species likely to occur along the proposed construction corridor include:

- Melville Cicadabird *Coracina tenuirostris melvillensis*;
- Gouldian Finch *Erythrura gouldiae*;
- White-bellied Sea-eagle *Haliaetus leucogaster*;
- Barn Swallow *Hirundo rustica*;
- Derby White-browed Robin *Poecilodryas superciliosa cerviniventris*;
- Rufous Fantail *Rhipidura rufifrons*;
- Oriental Plover *Charadrius veredus*;
- Oriental Pratincole *Glareola maldivarum*;
- Little Curlew *Numenius minutus*; and
- Estuarine Crocodile *Crocodylus porosus*.

Other migratory species have been recorded on the EPBC database, but they are unlikely to be found along the route due to their habitat requirements not being present.

Feral and Invasive Species

Introduced feral vertebrate species recorded in the general region include: the Cane Toad, Pig, Water Buffalo, Horse and House Cat.

Aquatic Environments

There have been few studies undertaken in most of the Northern Territory river systems other than the Daly River and Katherine River. Surveys of the Moyle River and Tom Turners Creek produced a variety of fish species, including the Primitive Archerfish *Toxotes lorentzi* in the Moyle River and Tom Turners Creek, and the Penny Fish *Denariusa bandata* in Tom Turners Creek. Both these species were outside their known range, which may be due more to data deficiency than a range extension. No species of conservation significance were recorded from those surveys, although they could be present. Many Northern Territory fish species are classified as Data Deficient because of the paucity of aquatic fauna surveys. Freshwater Crocodiles *Crocodylus johnstoni* and the Estuarine Crocodile *Crocodylus porosus* also occupy these rivers.

No introduced species of aquatic fauna or flora were found in either the Moyle River or Tom Turners Creek, nor in the Daly River.

Emergent aquatic vegetation is the most common type of aquatic vegetation within the Daly River. The river is significant habitat for eight species of turtles, especially the pig-nosed turtle, macro-invertebrates and 48 species of fish. Within the Daly River, species of conservation concern include: Freshwater Whipray *Himantura chaophraya* (vulnerable); Katherine Gudgeon *Hypseleotris* sp (data deficient); Midgely's Grunter *Pingalla midgleyi* (Near Threatened); and Freshwater Sawfish *Pristis microdon* (Critically Endangered). Freshwater Crocodiles *Crocodylus johnstoni* and the Estuarine Crocodile *Crocodylus porosus* also occupy this river.

Aphelocheirus australicus, an uncommon aquatic bug, is known to occur in the Daly River. Known from only a few sites in northern Australia, this genus is thought to be restricted to well oxygenated water, and is a reliable indicator of high quality water.

Ecologically Sensitive Habitats

Rainforest communities (monsoon vine forests) - the BGP construction corridor was aligned to avoid most of these patches. Only two minor patches with monsoon forest elements are crossed by the proposed route.

Riparian systems & Wetland of Significance - the BGP proposed construction corridor passes through a few patches of riparian vegetation including a small patch on the upper reaches of Sandfly Creek; 3 small patches along the Moyle River; a riparian zone on Green Ant Creek which will be drilled under using HDD; and two small patches on unnamed creeks.

The proposed construction corridor traverses the upstream section of the Moyle Floodplain and Hyland Bay System at its outer extremity. This is a 'Wetland of National Significance' under the *Ramsar Convention 1971*, most notable for its waterbird fauna. The pipeline route has been chosen to avoid permanent floodplain swamps.

Species of Indigenous Conservation Significance

Many species of flora and fauna are important to the Indigenous people of the region. While no specific studies were conducted for this report, Indigenous Traditional Owners guided the survey team in order to ensure that impacts on significant species and habitats were kept to a minimum.

Potential Impacts

The BGP Project has the potential to cause disturbance to sensitive vegetation communities and habitats, loss of vegetation, introduction and spread of weed species and disturbance to species of conservation significance in a narrow corridor as a result of:

- Required vegetation clearing;
- Earthworks;
- Vehicle and traffic movement; and
- Road construction/upgrade and borrow pit use.

Vegetation

Construction of the pipeline will clear trees from a corridor 30m wide. This amounts to around 600ha. Most (~80%) of this will be allowed to grow back to trees after construction, and grass will grow back across most of the pipeline after it has rehabilitated. A track and the pipeline itself will be maintained clear of trees.

Weed species

Linear projects, such as pipelines, are disturbances that have a high risk of weed spread. Weed species can compete with native flora species, and grassy weeds may increase fuel loads, thus changing fire behaviour and frequency.

Terrestrial Fauna and Habitats

The main impact of the construction and operation of the pipeline and above ground facilities on fauna will be associated with the short-term disturbance to animals and habitats during construction. Earthworks are likely to disturb native fauna species, and restrict their normal home range and feeding activities.

Wildlife can be affected by infrastructure through substantial noise, disruption of the physical environment, alteration of the chemical environment and introduction of exotic species. Pipeline construction is likely to temporarily displace local fauna species, which could, in turn, affect their breeding and foraging success, and alter their normal home ranges.

Construction of the BGP, camps, and above-ground facilities will result in the temporary disturbance of up to 910 ha of habitat, about 600ha of which is woodland or forest, which, for species currently inhabiting the areas proposed to be cleared, will not create a long term disturbance. A large proportion of the habitat occurring on the pipeline route is in good ecological condition. Clearing a 30m corridor through mostly grassland, open woodland and occasional forest dominated by grassy understorey, which dominates the proposed BGP construction corridor, and allowing 80% of the woodland and forest along the construction corridor to regenerate is not anticipated to create pronounced long-term effects.

Construction activities may injure or kill individual animals, for example those that fall into the pipeline trench. Animals unable to escape from trenches are exposed to various impacts such as stress, predators, over-heating and subsequent dehydration.

The potential impacts on fauna species of conservation significance that have been observed in the project area, or that may occur in proximity to the project area based on habitat preferences are discussed below.

The Bare-rumped Sheathtail Bat, Masked Owl, and Beach Thick-knee are unlikely to occur in the BGP area, thus the likelihood of impact on these species is very low.

The Gouldian Finch's preferred grasses and nesting trees will naturally grow back along the constructed pipeline, so impacts are expected to be low.

The Water Mouse has been recorded twice within the BGP surveyed area, however the alignment of the pipeline has been chosen to avoid its preferred habitat types, thus presenting a low potential impact.

The Northern Quoll, Partridge Pigeon, Hooded Parrot, Red-cheeked Dunnart, and Brush-tailed Phascogale are likely to occur within the construction corridor. They are unlikely to be affected by the BGP as their preferred habitat, open forest and open woodland, is widespread within the region, and the small amount of clearing necessary for the proposed construction corridor is not likely to have any more than negligible impacts on the species in the short or long term.

Feral and Invasive species

The construction of the BGP is likely to have little impact on feral and invasive species, provided that adequate measures are put in place to insure that some, such as Cane Toads and Yellow Crazy Ants are not inadvertently carried into the area.

Aquatic Environments

The main potential impacts on aquatic ecosystems within the proposed BGP construction corridor include:

- Disturbance to and loss of aquatic habitats;
- Changes to aquatic species composition;
- Reduced fecundity and death of aquatic species;
- Restriction of fish passage;
- Translocation of pests and diseases; and
- Increased sediment loadings and chemical contamination of waterbodies.

Ecologically Sensitive Habitats

Any of the sensitive habitats that are traversed by the BGP proposed construction corridor could potentially be impacted upon through disturbance and clearing. Some of the activities associated with construction and operation of the pipeline could occur in proximity to some ecologically sensitive habitats, and there is potential for indirect impacts to occur through changes to hydrology and increased sedimentation in watercourses.

Management

Management strategies to minimise the impact of the pipeline project on the ecology of the region include:

- All works will be conducted according to the CEMP designed for this Project;
- Crew leaders and superintendents will follow Alignment Sheets that are populated with information relating to known environmental aspects;
- Construction activities will disturb only the minimum area of vegetation necessary to enable safe construction of the pipeline;
- The boundaries of the pipeline corridor and all construction sites will be clearly indicated in construction drawings and marked out on the ground in relevant areas;
- Clearing, reinstatement and rehabilitation will be undertaken progressively over the construction period, according to the rehabilitation measures outlined in the CEMP;
- Access during construction and operation will be via Project approved access tracks and the pipeline construction corridor only;
- Induction given to all staff and contractors will include training on procedures designed to meet Project obligations for protection of native vegetation and fauna;
- The extent to which these obligations are followed will be audited according to the processes outlined in the CEMP; and
- Sites for additional infrastructure or clearing found to be necessary, closer to the Project start date will be subject to the same environmental, archaeological and cultural assessments as outlined for the existing route.

Vegetation

Most riparian vegetation will be avoided at the Daly River, the two channels of Green Ant Creek and at Tom Turners Creek through the use of HDD.

Clearing and reinstatement will be undertaken progressively over the construction period.

Weed Species

Existing major weed infestations have been identified, and the Weed and Exotic Species Management Plan will be implemented during construction. Weed washdown bays will be installed and managed by the construction contractor.

Terrestrial Fauna and Habitats

The potential impacts of habitat loss on biodiversity values have been minimised as much as possible by avoidance, and where habitat is disturbed, by quick reinstatement. Large trees will be protected wherever possible within the construction corridor. Construction activities will be confined to the dry season when the activity levels of reptiles are lower due to the cooler weather. Fatalities of animals that fall into the trench will be minimised by installing

temporary refuges or escape routes at regular intervals, and frequent clearing of the trenches by experienced wildlife handlers.

Feral and Invasive Fauna Species

All equipment and material introduced to the work area from outside the region will be screened for invasive fauna species before entering the region.

Aquatic environments

Construction camps and fuel and chemical storages will be located away from watercourses. Construction activities will be confined to the dry season when flows in regional watercourses are low or absent. Removal of large trees on river banks will be avoided where possible. Each watercourse crossing has been assessed by surveyors and environmental scientists during field surveys, and the appropriate crossing type and construction techniques have been chosen based on site-specific conditions. HDD, which involves no direct impact to the watercourse and immediate riparian vegetation, will be used for crossing the Daly, Tom Turners Creek, and two crossings of Green Ant Creek.

Reinstatement of watercourse crossings will occur as soon as possible following construction.

Potential negative impacts imposed on the endangered Freshwater Sawfish, and other species of conservation status will be minimised through the adoption of specific environmental guidelines for the design and construction of watercourse crossings.

Ecologically Sensitive Habitats

The proposed construction corridor was selected to avoid direct impacts on ecologically sensitive vegetation communities. Where it is not possible to avoid sensitive habitat, specific preventative and management measures will be implemented to minimise potential impacts.

1.4.4. Biting Insects

Baseline

Biting Midge Species and Sources

The main species likely to be present within the construction corridor is the mangrove biting midge species *Culicoides ornatus*. This midge breeds in the upper tidal creek mangrove areas within 3.5km of the proposed construction corridor where it nears the west coast of the Northern Territory at Wadeye. Moderate biting midge pest problems are likely along the BGP gas construction corridor, mainly in the months between and including August and November.

Mosquito Species and Sources

The main mosquito species likely to be present along the pipeline route will be *Ochlerotatus vigilax* (Salt Marsh Mosquito), *Culex annulirostris* (Common Banded Mosquito), *Ochlerotatus normanensis* (Floodwater Mosquito), and *Anopheles farauti* s.1. (North Australian Malarial Mosquito), *Anopheles bancroftii* (Black Malaria Mosquito), *Coquillettidia xanthogaster* (Golden Mosquito), *Mansonia uniformis* (Waterlily Mosquito) and *Anopheles annulipes* s.1. (Australian *Anopheles* mosquito).

All but the Waterlily Mosquito and Golden Mosquito are vectors of diseases including the most important potential endemic mosquito borne diseases in the area, namely Murray Valley Encephalitis Virus (MVEV), Ross River Virus (RRV) and Barmah Forest Virus (BFV). As there is no vaccine against these diseases, the best method of prevention is self-protection from mosquito bites.

Main sources of mosquitoes include a large brackish water and freshwater reed swamp near the south-western most limit of the proposed pipeline route; poorly draining floodways associated with creeks and rivers, and vegetated seasonal swamps. The highest abundance generally occurs in the post wet season months of April, May and June, and can occur until August nearby to larger creeks that hold water permanently, or for extended periods after the wet season.

Potential Impacts

There is a small risk to construction workers of contracting Dengue Fever from *Aedes aegypti* mosquitoes. Although *A. aegypti* is endemic to North Queensland, there is a potential that larvae may be imported to the area contained in materials, provisions, and equipment.

Peak virus transmission risks for RRV, BFV and MVEV is outside the construction period.

While malaria is no longer present in the Northern Territory, it is potentially transmitted by the North Australian Malaria Mosquito, and the Australian *Anopheles* Mosquito, and there is a risk of re-introduction if a proportion of the workforce is mobile and sourced from countries where malaria is present.

The main risk of creating new mosquito breeding sites is through laying the gas pipeline, as it will cross many natural flow-paths, and there is a risk that the natural flow of surface water will be interrupted to the extent that new mosquito breeding sites will be created.

Management

A biting insect control plan has been included in the Draft CEMP, and strategies include:

- Disposal of any items of equipment or debris, which may hold water, as soon as possible;
- Weekly inspection of campsites for potential breeding sites and evidence of breeding; and
- Elimination or treatment of breeding sites if breeding is detected.

Construction Camps will be located as far as possible away from major mosquito breeding sites such as seasonally flooded areas, creeks, rivers, ponds and tidal swamps. After installation, the pipeline route will be finished to a level surface in order to prevent ponding of water and therefore creation of mosquito breeding sites. All borrow pits will be rendered free-draining to prevent water pooling, and no borrow pits are planned to be constructed within 5km of human settlement. Personal protection measures will be encouraged for construction workers.

1.4.5. Air Quality and Noise

Baseline

Noise

The proposed BGP passes through almost entirely remote areas where there are very few sensitive receptors. The closest community to the proposed construction corridor is Palumpa less than 3km.

Air

The ambient air quality along the proposed pipeline route is anticipated to be pristine except for dust generation in the vicinity of unsealed roads.

Potential Impacts

Noise

Typically, construction and commissioning activities result in the most significant sources of noise emissions for a gas pipeline with operations noise being limited to maintenance activities. While construction is 'very noisy' (90dB - 110dB) for those receptors located immediately adjacent to the machinery, the construction of the pipeline will be transitory (3 - 5km per day) and the progression of the construction crew along the corridor will result in noise impacts being limited in duration to small sections of each spread. Likewise, commissioning will be 'very noisy' for a few hours close to the pipeline.

Potential noise impacts from construction camps located along the pipeline route are likely to be minimal given that no residential receptors have been identified within 5km of the camps.

The main potential noise impact to sensitive receptors during construction is likely to be associated with vehicle movements. Minor traffic noise disturbance is therefore likely to be experienced at residential receptors in close proximity to access routes and roads.

Air

The main source of gaseous emissions during pipeline construction would be from vehicle and mobile plant and equipment exhausts as well as combustion emissions from power generation at accommodation camps. During commissioning and operation, natural gas will be emitted from the pipeline and above ground venting operations.

The main particulate emission associated with all phases of the BGP will be dust. The major sources of dust will be trucks transporting material and the workforce to the construction corridor along unsealed access tracks and main roads and construction activities such as earth moving; trenching; padding; backfill operations and open stockpiles.

Management

Noise

The key noise management measure has been locating the proposed pipeline route and above ground facilities well away from sensitive receptors. Transport movements, which have the most potential to impact sensitive receptors, will be managed through the Road Use Management Plan (RUMP) to minimize impacts.

Air

Regular maintenance of above ground facilities will be carried out to ensure that the control, safety and operating systems are functioning correctly and reliably. Sensing devices, including pressure sensors and flow meters, will be in place for the detection of accidental gas release during operation. Signals from these sensors are transmitted to the central control system and monitored full time by the SCADA system.

A range of measures will be employed to manage potential impacts resulting from dust including the early reinstatement of the construction corridor, controls on vehicle speed and restricting travel to that required for construction.

1.4.6. Waste Management

Baseline

There are two main sources of wastes generated during construction – the construction activity itself, and the wastes generated by the workers from day-to-day living. Wastes generated at the construction camps are managed on-site, until they are removed to

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appropriate outlets. Wastes generated on the construction corridor are removed back to the construction camps for sorting and consolidation. No wastes are left on the line.

Fluids from the HDD process will be collected in an on-site tailings dam. This will be left to evaporate, leaving bentonite clay mixed with cuttings from the drill hole. This residue will be buried and the site rehabilitated prior to the onset of the next wet season.

Potential Impacts

The main potential impacts from wastes handling and disposal include contamination of soils and groundwater from wastewater, affecting the capacity of existing waste management facilities and entanglement or ingestion of litter and waste by native fauna and livestock.

Management

The waste management strategy for the Project will be based on the principles of “Reduce, Reuse, Recycle”, and appropriate disposal. Segregation and recycling of wastes (depending upon the availability and capacity of local facilities) will be encouraged to minimise disposal to landfill. A high emphasis will be placed on housekeeping and all work areas will be maintained in a neat and orderly manner.

A transportable waste water treatment system (WWTS) will be used at the construction camps for the period of the construction works. A number of systems are available and have been used on major projects in the Northern Territory in recent years. Discharge from the septic system will be by spray irrigation, in accordance with Northern Territory Environmental Health requirements and Waste Discharge Licence conditions to be issued by the Environmental Protection Agency.

1.4.7. Fire

Baseline

Bushfires are frequent and widespread throughout the grassy savannas of Northern Australia. Within the extensive region traversed by the proposed BGP, they occur annually throughout the dry season from March or April through to November or December, and can cover from a few hectares to hundreds of square kilometres.

Potential Impacts

To people inexperienced with fires in this environment, they can be very frightening. They present a risk to life and property, both directly from being burnt, and indirectly from reduced visibility from smoke and a threat to health from smoke inhalation.

Bushfires may be caused by construction activities, if sufficient care is not taken.

Management

The proposed BGP traverses the Arafura Bushfire Region, which is managed from Bushfire Northern Territory’s Batchelor Office. The Bushfires Regional Committees plan annual prescribed burning program for their regions. These prescribed burns include aerial control burning and ground-based burning. Bushfires staff have been consulted about this Project.

Fire management measures will be in accordance with the CEMP, and will include; spark arrestors, exclusion zones for combustible materials, and firewater tankers located near activities requiring naked flame.

1.4.8. Greenhouse Gas Emissions

Baseline

Greenhouse gases will be emitted throughout the lifecycle of the BGP Project. The emissions will vary according to the stage of the Project. During construction, the main emission source will be the burning of diesel fuel by the mobile equipment required to carry out construction work. Additional emission sources include propane heating fuel, combustion of unleaded petrol, and use of jet fuel for aerial surveys. During hook-up and commissioning, the predominant emissions will be the venting of gas for blowdown purposes. This venting will be kept to a minimum.

During operations, there will be emissions from both the burning of diesel fuel in mobile equipment as well as occasional venting for blowdown purposes. Gas blowdown during operations is expected to be a rare event. Additionally, diesel fuel use during operations is expected to be minimal due to the use of solar / battery powered systems at the metering station.

Potential Impacts

Project Emission Sources

The greenhouse gas emissions for the BGP Project have been calculated using nationally accepted emission factors and fuel volumes. The construction and commissioning phases are short-term, one off events. As such, their emissions have been reported as total emissions for their phase. The operations phase is ongoing and so emissions are shown in tonnes per year of operation. The total carbon dioxide equivalent emissions for the construction, commissioning, and operational phases are shown below.

Table ES-1: Carbon Dioxide Equivalent Emissions for Construction, Commissioning, and Operational Phases

Emission Sources	Carbon Dioxide Equivalents CO₂-e	Units
Construction	4,500	t
Commissioning	53	t
Operations	31	t/y

The predicted greenhouse gas emissions for the construction, commissioning, and operations phases of the proposed BGP Project (including the relevant loss of greenhouse sink as a result of vegetation clearing) are, on a Northern Territory and National scale, very low. Construction emissions represent the largest source of greenhouse gas emissions, with the dominant source being the use of diesel powered mobile equipment, and the associated loss of greenhouse sink material.

Greenhouse sinks

Through clearing, the Project is not directly contributing to Greenhouse Emissions, however it is recognised that removal of trees will contribute to a loss of Greenhouse Sink. The clearing of vegetation from the construction corridor and Project related facilities will result in the removal of approximately 600 hectares of existing woodland and forest. The majority (80%) of woodland and forest cleared by the Project will be allowed to grow back across the pipeline corridor resulting in a long term loss of 120ha, this equates to approximately 26,000 tonnes of Greenhouse Sink. Cleared vegetation will be allowed to decompose naturally, and will not be intentionally converted to CO₂, however natural fires may cause this over time.

Management

Emissions from the operations stage have been minimised through the use of solar / battery systems to provide power at the service sites, only relying on diesel generators for backup and external lighting where required.

Additionally the construction of the gas pipeline allows for the ongoing utilisation of natural gas as a fuel source, as well as offering a long term stable replacement option of other sources (such as fuel oil) to users along the BGP and ADP pipeline routes. The potential greenhouse benefits of this have not been captured in the estimations provided in the PER.

APT is currently actively engaged in discussions with the Australian Greenhouse Office about participation in the “Greenhouse Challenge Plus” program.

Overall emissions from clearing will be an issue only if cleared vegetation is burnt. It is not APT practice to burn the cleared vegetation, but to respread it across the construction corridor after the pipeline has been laid to assist in its stabilisation and revegetation. Potential emissions will be offset significantly by vegetation regrowth.

1.4.9. Land use

Baseline:

The breakdown of land tenure along the proposed BGP route generally reflects the Northern Territory distribution which is set out in Table ES-2.

Table ES-2: Land Tenure Type

Tenure Type	% of Total NT Area
Pastoral leases (under the Pastoral Land Act1992)	46.4
Aboriginal freehold land – granted as Commonwealth or NT title	43.9
Rural and urban vacant Crown land	4.8
Perpetual and term Crown leases	3.1
Freehold	0.4
Special purpose leases, for example mining leases	0.1
Crown stock routes and reserves, roads and river esplanades	1.2
Government usage and fishing farming/pearl culture leases	0.1

The BGP pipeline traverses three different land use zones:

- KP0 - KP135 Aboriginal Freehold;
- KP135 - KP170 Grazing/Pastoral (modified pastures); and
- KP170 - KP285 Grazing/Pastoral (natural vegetation).

A number of settlements occur within 10km of the proposed pipeline route, namely Wadeye, Palumpa, Peppimenarti, Daly River, Tipperary, Hayes Creek and Ban Ban Springs. The only large residential area in the immediate vicinity of the proposed BGP corridor is Wadeye.

There are several Mining Tenement Applications at the north-eastern end of the proposed construction corridor. Mining Exploration Licenses and areas under application for Mining Exploration Licenses cover almost the entire length of the route, and the majority of the north-

western part of the Northern Territory. A Petroleum Exploration License Application covers the western most section of the Daly River/Port Keats Aboriginal Land Trust (from KP125 - KP0).

Potential Impacts

Most of the impact of the proposed BGP on land use will be during the construction phase. Vehicles and machinery movements will flatten grasses and vegetation, compact soils, and, potentially create erosion problems. There is potential for construction activities to disturb stock and to impinge on general pastoralist activities such as fencing, planting and burning. Where fence lines need to be crossed by construction activities, there is the potential for stock and weed transfer across property boundaries. Weed spread is highly likely if mitigation measures are not implemented.

Works associated with pipeline construction will be a visual impact during the construction phase. The cleared corridor and construction camp sites will revegetate and stabilise quickly but, due to the absence of trees in the early years, may remain visible.

Construction at watercourse crossings has the potential to cause erosion and sedimentation.

The pipeline will be designed to enable existing and known future land uses to continue after construction. However any future developments will need to ensure no excavations or constructions occur over the pipeline.

Management

Management measures to reduce impacts on land use include:

- Restricting APT vehicle movements to approved access tracks and to the 30m proposed construction corridor;
- Provision of notice to landowners of construction activities in accordance with Land Access Agreements;
- Installation, where necessary, of temporary gates and fences;
- Documentation of all weed infestations identified during field surveys and implementation of a weed management plan (refer to Draft CEMP);
- Regrowth of vegetation, which in the tropical climate of the Northern Territory naturally regenerates quickly, to minimise visual impacts;
- Dial-Before-You-Dig program; and
- Ongoing landowner liaison during the operations phase will maintain a healthy level of pipeline awareness.

1.4.10. Historic and Cultural Heritage Values

Baseline

Aboriginal Heritage

The country traversed by the BGP is rich in Aboriginal Sacred Sites and areas. The Aboriginal Areas Protection Authority (AAPA) have identified numerous Registered and Recorded sites in the area. AAPA provided locations of all recorded Aboriginal Sacred Sites prior to the field surveys.

An Authority Certificate is required from AAPA for the Project. As part of this process, the NLC have held meetings with all the Traditional Owners along the route, including Native

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title claimants, to agree on the findings of the field survey work, and give approval for the pipeline route. The agreed route and the consultations with Traditional Owners, documented by anthropologists contracted to the Project, will be presented to the AAPA in order to enable an Authority Certificate to be prepared for the Project.

The Daly River Catchment is of great social, cultural and economic importance to Indigenous and non Indigenous Australians. Approximately 12 language groups retain strong cultural links with the Daly and its environs.

Archaeology and History

A preliminary desktop study of archaeological and historic places and objects was carried out. Known archaeological sites have been mapped. According to this information, there are no known historical or archaeological sites protected under Commonwealth Legislation recorded within a 100km corridor centred on the proposed pipeline alignment. Ten archaeological sites were recorded from desktop studies of existing databases, and five historic places were recorded within 10km of the pipeline route. There are 8 recorded Aboriginal archaeological sites located within the study corridor that are not listed on any registers. None of these sites are located on or adjacent to the proposed 30m wide construction corridor.

Eleven Aboriginal archaeological sites, 13 historic sites and 43 areas that contained isolated stone artefacts were located during the field survey.

Eleven historic sites located within 15km of the pipeline route are on the Register of the National Estate. Seven historic sites located within 15km of the pipeline route are listed on the Northern Territory Heritage Register. Only one of these protected sites, Fenton Airfield may be disturbed by a proposed access track leading to the 30m wide construction corridor.

Thirty three un-listed historic sites have been identified within 15km of the pipeline route. The majority are located in the north-eastern section of the BGP corridor and are associated with pastoral, mining or WW II activities. Two historic sites are located adjacent to the 30m wide construction corridor. The pipeline route also passes within 40m of sections of the Fenton Camp and Group Headquarters.

The historic research shows that Fenton Airfield was bombed several times in 1943. Therefore there is a low potential for the presence of unexploded bombs in the area.

There is the potential for disturbance to subsurface cultural material through accidental discovery during the construction of the pipeline.

Potential Impacts

The pipeline route has avoided all Sacred Sites, so no impact is expected from the construction and operation of the pipeline.

Several of the archaeological sites are located 20 metres or more from the edge of the alignment and they are close enough to cause concern about accidental disturbance during the construction of the pipeline. One stone artefact scatter and two historic sites will be destroyed by the proposed development. An additional stone artefact scatter and two historic sites may be disturbed during the construction phase. Forty three of the background scatters of isolated stone artefacts will be either disturbed or destroyed by the construction of the pipeline.

The most frequent features of the historic World War II sites are concrete slab floors or piles and /or scatters of bottles, tins and 44-gallon drums. These objects, unlike the majority of archaeological material are readily identifiable to non-professionals and are more visible than the smaller contents of Aboriginal sites. The proposed alignment is approximately 200m north

of the northeast corner of the defined area of the Fenton Airfield and is therefore unlikely to be affected.

Management

To avoid heavy machinery or vehicles accidentally disturbing the site temporary fences will, where required, be constructed along the edge of the 30m construction corridor nearest to each site for a distance of 100 metres. The construction of all fences will be monitored, where required, by an archaeologist to ensure there is no disturbance to the sites.

Applications to disturb or destroy those sites which will be disturbed or destroyed by the construction activities will be made under the *Heritage Conservation Act*.

Temporary fences in the area of historic sites is not considered warranted rather brightly coloured flagging tape will be placed where required around the historic features at risk of disturbance.

A response mechanism will be set up to ensure there is minimal loss of archaeological or cultural values in the event of accidental discovery of a site during construction. The response will include the immediate cessation of work around the cultural material and obtaining advice from Heritage Conservation Services to ensure that the conditions of the *Heritage Conservation Act 1991* are not contravened.

1.4.11. Social Environment

Baseline

The towns and communities in the region traversed by the BGP are all small and quite remote. The nearest large town is Katherine, approximately 150km south of the Ban Ban Springs end of the proposed BGP route.

The availability of skilled workers with experience in pipeline construction is very limited, and these workers will need to be brought in from elsewhere for pipeline construction.

Medical services in the region are provided through the Katherine Hospital which is the district hospital for the surrounding regions, including Wadeye, Peppimenarti and Daly River. To augment the services provided by Katherine Hospital, community centres also act as health clinics and a base for doctors and nurses who visit from Katherine. These health services are not equipped to service more than the local population.

Katherine is also the base for educational centres, with the bulk of educational needs in the region serviced through the education centres or carried out via correspondence.

The BGP construction crew, which may reach a peak of around 250, will be housed in fully self-contained construction camps providing single persons accommodation. A paramedic and an ambulance will support the construction crew at all times. They will be operating on a fly-in, fly-out single status basis.

Potential Impacts

In general, the impact of the pipeline after its installation will be negligible; the construction phase is recognised as the period with the greatest potential to impact on the social environment with the key impacts being associated with the influx of a large workforce predominantly sourced from outside of the local community.

It is anticipated that direct impact on nearby communities in regards to housing, food, social and medical facilities will be minimal.

Strategies have been implemented to assist Indigenous employment opportunities and provide positive impacts by providing work opportunities and encouraging cooperation between management and Indigenous people.

Management

Management measures will focus on promoting understanding of Indigenous culture, minimising the need for a high level of interaction between remote communities and the workforce and reducing potential impacts on community infrastructure. A Cultural Heritage Management Plan (CHMP) will be developed in conjunction with, and requiring the approval of, the NLC.

APT will require the appointed construction contractor to have a Fit for Work Program in place that will include random breath-testing of workers. Machinery operators (a large proportion of the workforce) will be under a zero tolerance limit, and other workers must all be deemed fit for work. Consequences will apply to personnel that fail the breath-test, and may lead to dismissal.

1.4.12. Economics

Baseline

The Northern Territory economy accounts for 1.2% of Australia's Gross Domestic Product (GDP) and 1% of nation-wide employment. The structure of the economy is distinctive, with a high reliance on export markets and a large percentage of the workforce employed in the Defence and other Government sectors. The size and scale of the BGP, which aims at providing a replacement gas supply rather than a new supply, is unlikely to have major flow on effects within the economy.

Locally there may be economic opportunities for Indigenous people through the supply of materials and services such as: gravel; trucks, machinery and labour for clear and grade and road maintenance, and weed and erosion management of the construction corridor.

Potential Impacts

While the Project ensures that the main electricity producers in the Northern Territory continue to use gas as opposed to other more expensive and polluting fuels such as fuel oil, it also has the potential to provide long term access to increased gas supplies to existing and potential customers. This aspect is crucial to the ongoing operations of the Northern Territory and for driving further development by expanding economic activity, employment, income and expenditure.

Once operational, all of the pipeline facilities will be un-staffed, therefore direct long-term employment opportunities are not a benefit that most communities should expect.

Management

APT wishes to maximise local and Northern Territory participation in the whole of the Project and will strongly encourage its contractors to utilise local service providers if they have the required skills and are cost effective.

APT has entered into an agreement with the Northern Territory Industry Capability Network (NTICN) to assist with resourcing local businesses and labour during the construction period. The local community will be advised of opportunities in association with the Project through industry briefings, advertisements in the local media and through the agreement between APT and NTICN.

1.4.13. Infrastructure and Transport

Baseline

During construction, most transport vehicles will enter the proposed BGP construction corridor from Katherine or Darwin via the Stuart Highway. Mostly the BGP proposed construction corridor closely follows existing roads or tracks. The furthest any point along the proposed construction corridor deviates from any road or track is 11km.

There are three commercial airports in the region of the BGP, namely Wadeye, Darwin Airport and Katherine/Tindal Airport.

Potential Impacts

Large numbers of heavy machinery and large trucks delivering plant, equipment, pipe and camp facilities, will have an impact on local roads during the construction phase. These impacts will occur intermittently over several months with the pipe deliveries being the most consistent movement.

Darwin and Katherine/Tindal Airports will experience an increase in demand over the construction phase to accommodate construction workers flying in and out to their home states. This demand will be temporary only and will be coordinated by the Construction Contractor.

Once the pipeline is installed the transport impacts will return to almost normal levels. The only foreseeable air and road traffic necessitated by the proposed pipeline will be that associated with pipeline maintenance and rehabilitation or management activities.

Management

The timing and management of impacts of the construction phase of the BGP on the road network and the timing of the proposed Northern Territory Government upgrade of the Port Keats Road are being negotiated with the relevant department. A Draft Road Use Management Plan detailing traffic control measures and agreements with respect to road maintenance has been prepared. Traffic control measures include restricting access to the most suitable route, employment of road maintenance resources for unsealed local and private roads, and implementation of safety measures such as appropriate signage.

1.5. Project Environmental Management

A Draft Construction EMP compliant with the *Australian Pipeline Industry Association (APIA) Code of Environmental Practice*, and incorporating the findings of this PER, has been prepared and will be finalized prior to construction commencing. This CEMP will be the principal guiding document in relation to environmental management for the Project.

1.6. Health and Safety Program

APT is fully committed to ensuring the safety of all people who may be affected by the development, construction and operation of the Pipeline and to attaining best practice results wherever possible.

A Field Safety Management Plan (FSMP) has been developed to meet the ongoing occupational health and safety (OHS) requirements of the Project. Additional procedures and plans have been, and will be, developed to complement the FSMP.

During the construction phase of the Project, additional safety procedures will be developed. Measures are in place to greatly reduce the likelihood of third party interference causing

rupture to the pipeline. APT is developing emergency response plans for the construction phases of the Project.

Operations for BGP will be carried out in accordance with the Northern Territory Gas plans and procedures in place for the ADP.

1.7. Risk Assessment and Emergency Management Plans

Pipelines are recognised as a safe and efficient means of transporting natural gas. However, all developments present some level of risk.

A preliminary risk assessment, focussing on location analysis and threat analysis, has been completed in accordance with the existing *AS2885 Pipelines - Gas and Liquid Petroleum* and the proposed amendment under consideration for the standard. The route traverses rural land and preliminary studies have shown that the pipeline is located at a safe distance from populated areas.

A combination of physical and procedural measures will be applied to the entire pipeline to either eliminate threats or to reduce and manage them in order to ensure that appropriate safety standards are maintained.

A detailed risk assessment will be carried out prior to construction, in accordance with the most current version of *AS2885*.

1.8. Public Involvement and Consultation

APT has taken a strategic approach to community consultation which is seen as an essential element of the Project and of the PER process. Consultation with landowners and the NLC has been carried out since June 2006 in conjunction with PWC who, under contractual arrangements between APT and PWC, has the lead role in this element of the Project.

The key issues for most stakeholders have been:

- Potential impacts to the Daly River;
- Construction corridor access and weed and fire management within the region;
- Erosion management;
- Traffic impacts to local population centres and the tourist industry; and
- Local employment opportunities and economic advantages.

Impacts to the Daly River were based around concerns with construction across the river and the potential for the Project to extract water for construction purposes. Management of the construction of the crossing has been addressed through the intention to HDD this river crossing. At the time of consultation APT had not planned to source water from the Daly River. This decision was based on the political sensitivity of the region and its water resource, and the thought that groundwater resources could be accessed. Further investigations have revealed that extraction of groundwater would actually be utilising the aquifers that feed the Daly River and sustain its dry season flow. In addition the almost 40 year river flow monitoring record of the Daly shows that under normal dry season flow regimes and the highest construction extraction rates the Project would require only 0.1% (1/1000th) of the river flow for a maximum period of 1.4 days at a time (refer to Section 4.3.2 for complete details).

APT is highly conscious of the weed management issues. A Construction Weed Management Plan will be implemented prior to the commencement of construction.

Erosion management will be an ongoing issue throughout the life of the Project. Management measures are detailed in the Draft Construction EMP.

Traffic impacts are important both from the safety of all road users, including the Project construction workers and the impact on the road pavement. A Draft Road Use Management Plan has been prepared.

APT has entered into an agreement with the NTICN to assist with resourcing local businesses and labour during the construction period.

1.9. Conclusions

The proposed BGP traverses about 280km of the Northern Territory through mostly natural and modified environments. Thorough investigations of the proposed route have been undertaken by experts qualified to assess the impacts on the environment, and associated impacts from the Project.

The proposed pipeline route has been selected, wherever possible, to avoid or minimise impacts on significant ecological species and areas of cultural significance.

Potential impacts associated with the construction and operation of the Project will be further minimised through the application of environmental management techniques applied through a Construction EMP, and after commissioning, an Operations EMP.

The medium term impacts on the environment after the pipeline has been constructed will be low, as the constructed pipeline corridor will gradually grow back to its natural condition except for a narrow corridor over the pipeline which will remain free of trees.

APT believes that the total impact of the proposed pipeline has been shown to not be significant when assessed in a regional context and that the Project will not result in any long-term adverse effects on the physical, built or social environment

Commitments to management of all aspects of the Project have been documented throughout the PER and are summarised in Table ES-3.