

ASSESSMENT REPORT 59

**BONAPARTE GAS PIPELINE - WADEYE TO
BAN BAN SPRINGS STATION**

AUSTRALIAN PIPELINE TRUST

**ENVIRONMENTAL ASSESSMENT REPORT
AND
RECOMMENDATIONS**

by the

ENVIRONMENT PROTECTION AGENCY PROGRAM

**DEPARTMENT OF NATURAL RESOURCES,
ENVIRONMENT AND THE ARTS**

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Table of Contents

Executive Summary.....	5
1 Introduction and Background.....	7
1.1 Environmental Impact Assessment Process.....	7
1.2 Environmental Impact Assessment History.....	8
1.3 Regulatory Framework.....	8
2 The Proposal.....	12
2.1 Project Components.....	12
2.2 Construction methods and timing.....	14
3 Regional Setting.....	17
3.1 Physical.....	17
3.1.1 Landform features.....	17
3.1.2 Surface and Groundwater.....	17
3.2 Biological.....	17
3.3 Cultural / Historical.....	20
3.4 Socio-economic.....	20
4 Environmental Impact Assessment.....	22
4.1 Introduction.....	22
4.2 Summary of issues.....	23
4.3 Ancillary activities and works not yet finalised.....	24
4.3.1 Access tracks.....	24
4.3.2 Water extraction.....	25
4.3.3 Above-ground infrastructure.....	25
4.4 Watercourse Crossings.....	26
4.5 Erosion and sediment control.....	28
4.6 Hydrostatic Testing.....	30
4.6.1 Water supply.....	30
4.6.2 Water disposal.....	31
4.7 Ecology.....	33
4.7.1 EPBC Act Triggers.....	33
4.7.2 Open trench.....	34
4.7.3 Outstanding survey information.....	36
4.7.4 Exotic species.....	37
4.7.5 Ecologically sensitive habitats.....	38
4.8 Greenhouse Gas Emissions.....	39
4.9 Waste Management.....	39

4.10	Roads and Transport	41
4.11	Historic and Aboriginal Cultural Heritage	42
4.12	Social Impact.....	43
4.13	Unauthorised Access to Pipeline Corridor	44
4.14	Environmental Management	44
5	References	47
	Appendix 1	48
	Appendix 2	58

Glossary of acronyms

AAPA	Aboriginal Areas Protection Authority
AFANT	Amateur Fisherman's Association of the Northern Territory
APIA	Australian Industry Pipeline Association
APT	Australian Pipeline Trust
BGP	Bonaparte Gas Pipeline
CEMP	construction Environmental Management Plan
COAG	Council of Australian Governments
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEW	Department of the Environment and Water Resources
DPIFM	NT Department of Primary Industry, Fisheries and Mines
ECNT	Environment Centre of the Northern Territory
EIS	Environmental Impact Statement
EPA	Environment Protection Agency
EPBC	Environment Protection and Biodiversity Conservation Act
HDD	Horizontal Directional Drilling
KP	Kilometre Point
NLC	Northern Land Council
NRETA	Department of Natural Resources Environment and the Arts
NTICN	Northern Territory Industry Capability Network
OEMP	Operational Environmental Management Plan
PER	Public Environmental Report
PIG	Pipeline Inspection Gauging
PWC	Power and Water Corporation
TTP	Trans Territory Pipeline

Executive Summary

This report assesses the environmental impacts of the proposal by Australian Pipeline Trust (APT) (the proponent), for the construction and operation of a 280km underground pipeline and ancillary infrastructure from Wadeye on the west coast of the Northern Territory to Ban Ban Springs near Pine Creek. The pipeline would convey gas from the gas facility associated with the Blacktip Gas reserve in the Joseph Bonaparte Gulf to connect with the existing Amadeus Basin to Darwin Gas Pipeline.

The Assessment Report reviews the Public Environmental Report (PER), public comments and the proponent's Supplement to the PER. Information, comments and advice provided by Northern Territory Government agencies have also been used in the preparation of this report.

Environmental Assessment is the process of defining those elements of the environment that may be affected by a development proposal and of determining the significance, risk and consequences of the potential impacts of the proposal. Recommendations arising from the assessment address methods to mitigate these impacts.

Major Issues

The major issue associated with the proposal is that the PER and the Supplement failed to provide information on a number of issues. The PER and Supplement were relatively conceptual due to the proponent's requirement to devolve much of the detailed decision-making for pipeline construction and logistics to a Construction Contractor. Consequently, many of the project details remain undetermined until the Contractor becomes more involved in the proposal.

Of most significance is the information gap on matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. While the Australian Government's Department of Environment and Water Resources (DEW) requested that the proponent provide the required information the proponent did not include this in their Supplement.

The environmental issues associated with the proposed pipeline are:

- Sources of water for pipeline hydrostatic testing, dust suppression, weed washdown stations, and construction camp consumption, and the disposal of hydro-test water;
- The impacts of pipeline trench construction on flora, fauna and habitat;
- The impacts of pipeline construction on water quality, ecology and landform stability at watercourse crossings;
- Disturbance of matters of National Environmental Significance under the EPBC Act;
- Erosion associated with vegetation clearing, and soil and landform disturbance;
- Spread of weeds and pest fauna along the pipeline route; and
- Traffic management associated with use of the Wadeye to Daly River Road.

Conclusions

The Environment Protection Agency (EPA) Program considers that based on the information provided and the assumptions made by the proponent, the environmental issues associated with

the proposed project have been adequately identified. The lack of information has not prevented the overall assessment of the proposal. However, in order for the project to proceed in an environmentally acceptable manner, the proponent needs to address all information gaps identified by this Assessment Report prior to commencement of works. It is acknowledged that there is potential that when undertaking the outstanding surveys and studies the proponent may identify a potential 'show-stopper' for the proposal, however this is considered unlikely. Any issue that is identified should be able to be managed or resolved through appropriate mitigation measures or re-engineering and design of the project.

The outstanding matters and information must be addressed in an amended Construction Environmental Management Plan to be submitted to the EPA Program for review and included in the Pipeline Management Plan. The final EMPs for construction and operational phases of the expansion will be subject to review and approval by relevant Northern Territory agencies prior to their incorporation into the Pipeline Management Plan. They will be working documents for the life of the pipeline and will require continual review in the light of operational experience and changed circumstances. The EMP must form part of the Construction Contractor's service contract. APT is ultimately responsible for the implementation of the EMP and will monitor the Construction Contractor's performance against the stated objectives and commitments under the EMP.

Provided there are no 'show-stoppers' in the outstanding information, the EPA Program considers that the Bonaparte Gas Pipeline project can be managed in a manner that avoids unacceptable environmental impacts, provided that the environmental commitments, safeguards and recommendations detailed in this Assessment Report and in the final EMPs are implemented, with regular reporting, compliance auditing, monitoring and evaluation, and appropriate responses and adaptations to any issues identified through monitoring.

1 Introduction and Background

The Power and Water Corporation (PWC) has negotiated an agreement with Eni Australia Pty Ltd (Eni) to source 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. The Amadeus Basin gas supply is depleted and replacement gas will be 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 1).

This Report assesses the environmental impact/risk of the BGP, which will consist of a buried high-tensile steel pipe located within an approved 30 m wide construction corridor, in-turn developed within a 100 m wide temporary pipeline corridor.

This Environmental Assessment Report is based on a review of the Public Environmental Report (PER); comments from the public and Northern Territory Government agencies on the PER; and the Supplement to the PER in response to these comments (the PER and the Supplement constitutes the PER).

1.1 Environmental Impact Assessment Process

One of the major objectives of environmental impact assessment is to fully define those elements of the environment that may be affected by a proposed development and to determine the significance, risks and consequences of the potential impacts of the proposal. The potential impacts are considered at both local and regional levels.

This report evaluates the adequacy of undertakings and environmental safeguards proposed by the proponent to avoid or mitigate the risks of potential impacts identified in the assessment process. The safeguards may be implemented at various levels within the planning framework of a project and include (among other approaches):

- Design and layout of buildings and other infrastructure on the route;
- Management of construction activities; and
- Management of processes used in operations of the facility (e.g. inputs and outputs).

A list of commitments made by the proponent in the PER and in the Supplement in response to submissions from the public and NT Government is provided in Appendix 1. Additional safeguards are recommended in this Assessment Report where appropriate.

The contents of this Assessment Report form the basis of advice to the NT Minister for Natural Resources, Environment and Heritage, and the Australian Government Minister for the Environment and Water Resources, on the environmental issues associated with the project.

1.2 Environmental Impact Assessment History

In July 2006, a Notice of Intent (NOI) was submitted by the proponent, Australian Pipeline Trust, to the Environment Protection Agency (EPA) Program, NT Department of Natural Resources, Environment and the Arts for the BGP proposal. The proposal was also referred to the Australian Government Department of the Environment and Water Resources for a determination under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In September 2006, the NT Minister for Natural Resources, Environment and Heritage determined that the proposal would be assessed at the level of a Public Environmental Report and, as the proposal had been determined by the Australian Government to be a controlled action under the EPBC Act, it would be assessed in accordance with Schedule 1 of the “Commonwealth of Australia and the Northern Territory under Section 45 of the EPBC Act Relating to Environmental Impact Assessment” (the Bilateral Agreement).

Draft guidelines covering issues to be addressed in the PER were subject to a 14-day public review period which concluded on 4 October 2006. The NT Minister for Natural Resources, Environment and Heritage then directed the proponent to prepare the PER addressing the matters set out in the final guidelines.

The PER was submitted on 19 March 2007 and placed on public review for six weeks. It was also circulated to NT Government advisory bodies for review and comment. One local Government and two public submissions were received within the review period as well as comments from NT Government agencies and the Australian Government. All submissions were forwarded individually to the proponent at the close of the public review period. The proponent prepared a Supplement to the PER as required under the Bilateral Agreement to address the issues raised by the public and Government agencies.

The Supplement was submitted to the EPA Program on 28 May 2007. The EPA Program circulated the Supplement to NT Government advisory bodies for review and comment. The PER, the Supplement, the public comments and comments from NT Government agencies have been taken into account in the preparation of this Assessment Report.

1.3 Regulatory Framework

The proposed BGP project is a ‘controlled action’ under section 75 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Assessment is in accordance with the Bilateral Agreement and an approval is required under the EPBC Act.

The controlling provisions under the EPBC Act are:

- Sections 18 and 18A (Listed Threatened Species and Communities); and
- Sections 20 and 20A (Listed Migratory Species).

Other legislation administered by the Australian Government includes:

- *Aboriginal Land Rights (Northern Territory) Act 1976*; and
- *Native Title Act 1993*.

The BGP project is also subject to relevant Northern Territory legislation. In particular, Northern Territory pipeline projects are regulated by the *Energy Pipelines Act*, administered by the Department of Primary Industry, Fisheries and Mines (DPIFM). Under this Act, discrete licences, permits and plans are required for the construction and operation of a pipeline. The proponent must submit a Pipeline Management Plan (PMP), which is the principal administrative document for the pipeline and can incorporate environmental conditions created through the environmental approval process. The Construction and Operational Environmental Management Plans (CEMP and OEMP) prepared by the proponent will be attached to the PMP.

Other Northern Territory statutory documents associated with the BGP pipeline include:

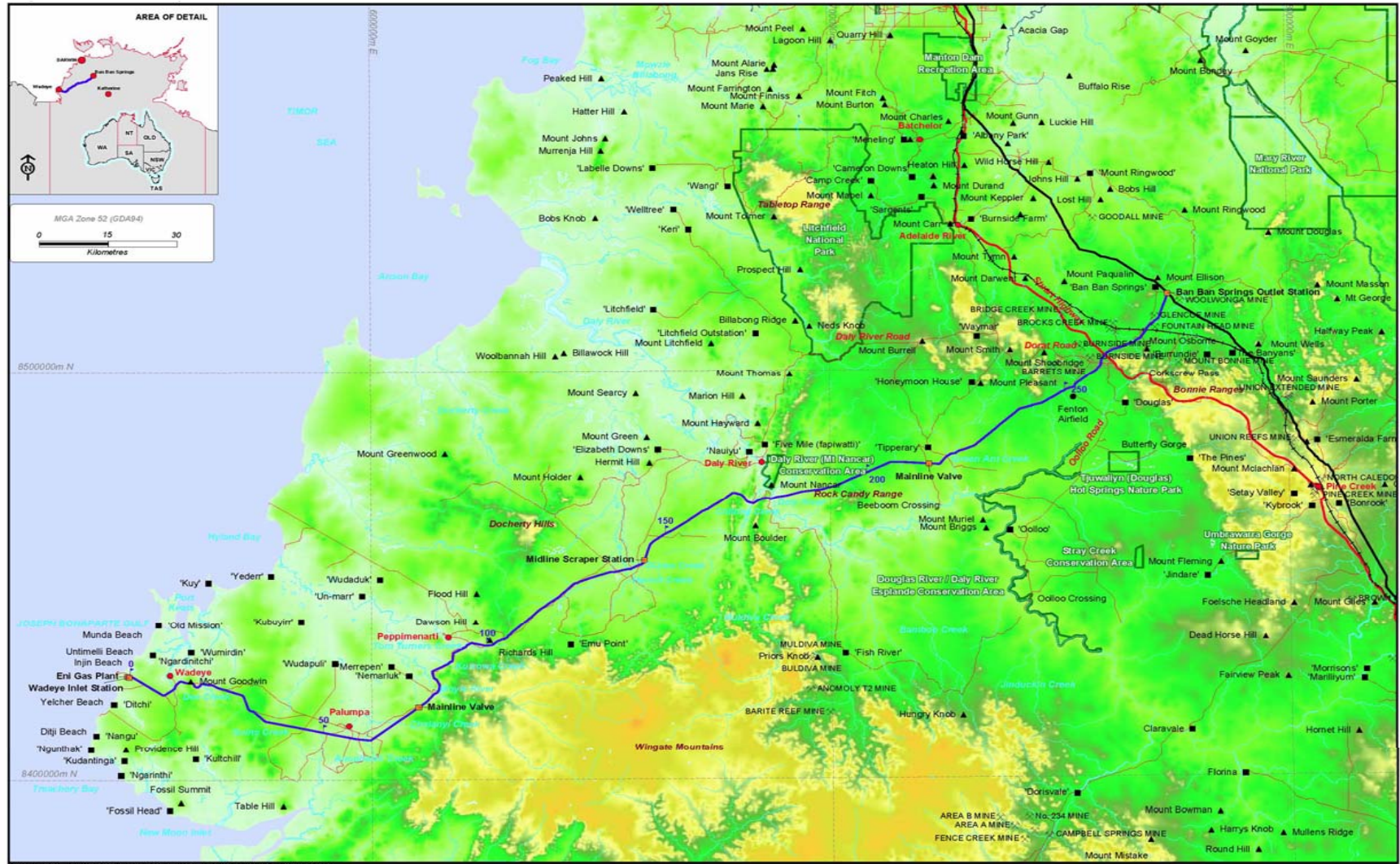
- *Aboriginal Land Act 1978*: Controls entry onto Aboriginal land. Entry permits for approximately 50% of the proposed route are required pursuant to this Act;
- *Bushfires Act 1980*: This Act provides for protection from bushfires outside urban areas;
- *Control of Roads Act 2001*: Deals with the management and maintenance of roads;
- *Dangerous Goods Act 1998*: Provides for the safe storage, handling and transport of certain dangerous goods, of which petroleum gas is classified as a dangerous good;
- *Environmental Assessment Act 1982*: This Act provides for the assessment of the environmental effects of development proposals and for the protection of the environment;
- *Food Act 2005*: All food preparation at construction camps will be required to conform to this Act, and food safety standards (refer Technical Standards and Codes of Practice);
- *Lands Acquisition Act 1978*: This Act relates to the acquisition of land by the Northern Territory Government;
- *Motor Vehicles Act (MVA) 1959* and *Motor Vehicles (Standards) Regulations*: This Act and regulations provide the legislative requirements relating to vehicle standards and dimensional and loading limits;
- *Northern Territory Aboriginal Sacred Sites Act 1989*: Provides protection to Aboriginal Sacred Sites and Objects. The Act requires development proponents to comply with a process for consulting with site custodians, and an Authority Certificate needs to be obtained from the Aboriginal Areas Protection Authority prior to development;
- *Northern Territory Heritage Conservation Act 1991*: The Act provides a system for the identification, assessment, recording, conservation and protection of places and objects of prehistoric, protohistoric, historic, social, aesthetic or scientific value. The Heritage Conservation Branch maintains an Archaeological Sites Register and Heritage Register, which lists sites of Heritage value prescribed under the *Heritage Conservation Act*;
- *Ozone Protection Act 1996*: The purpose of this Act is to make provision for a system of controls on substances which, when released into or dispersed in the atmosphere, act as atmospheric pollutants that contribute to depletion of ozone in the stratospheric ozone layer;
- *Pastoral Lands Act 1992*: Where additional developments for non pastoral uses are proposed outside of the pipeline easement, approval may be required. In the case of freehold, Crown or Aboriginal land, any proposed works, outside the area approved under the *Energy Pipelines Act* which require the clearing of native vegetation and where that clearing would result in the aggregate area cleared on the property exceeding 1ha, consent would be required;
- *Planning Act 2005*: Native vegetation clearing on freehold, crown and Aboriginal land tenures, outside the area approved under the *Energy Pipelines Act*, is controlled under this

Act. The Act provides for appropriate and orderly planning and control of the use and development of land. It establishes the Northern Territory Planning Scheme and provides for a development approval process. It also provides for interim development control and an appeals regime and enforcement;

- *Public Health Act 1997*: This Act and associated regulations applies to the health of the public. Particular regulations prescribe to matters which include prevention of disease, maintenance of health, sanitation, the designation of diseases and measures for the control of diseases;
- *Soil Conservation and Land Utilization Act 1969*: Makes provision for the prevention of soil erosion, and for the conservation and reclamation of soil;
- *Territory Parks and Wildlife Conservation Act 1976 (TPWC Act)*: Applies statutory obligations in relation to the protection of flora and fauna. The Act allows the listing of threatened species with special conservation status, and requires a permit to be obtained prior to interference with these species;
- *Traffic Act 1987*: Provides regulations for drivers, vehicles and pedestrians on public streets and in public places;
- *Waste Management and Pollution Control Act 1998*: Provides for the protection of the environment through encouragement of effective waste management and pollution prevention measures. The Act does not apply to wastes that are confined to the site on which they are generated, but requires licensing and registration for wastes that are discharged offsite;
- *Water Act 1992*: Provides for the protection of waterways, groundwater and tidal water from pollution. The Act also controls the drilling and abstraction of water from bores, extraction from surface water sources, and the construction of dams or water storage facilities;
- *Water Supply and Sewerage Act 1983*: Provides for the protection of the Northern Territory's water supply system or any water source from which water is drawn for human consumption. Any abstraction or diversion of water from the Territory's supply system must not be undertaken unless authorized by the appropriate authorities. Penalties are in place for pollution of any water supply or source;
- *Weeds Management Act 2001*: The Act has been developed to protect the Territory's economy, community, industry and environment from the adverse impact of weeds. Under Section 32 of the Act a person must not move or drive an animal or vehicle that contains a declared weed on a public road or from the person's land to another person's land unless the animal or vehicle has been cleaned in accordance with a declared weed management plan or in compliance with the direction of a gazetted Weed Management Officer; and
- *Work Health Act and Regulations 2004*: An Act to promote occupational health and safety in the Territory to prevent workplace injuries and diseases, to protect the health and safety of the public in relation to work activities, to promote the reinstatement and maximum recovery from incapacity of injured workers, to provide financial compensation to workers incapacitated from workplace injuries or diseases and to the dependants of workers who die as the results of such injuries or diseases, to establish certain bodies and a fund for the proper administration of the Act, and for related purposes.

The BGP project area traverses three land use zones: the Daly River/Port Keats Land Trust, pastoral leases (modified pastures) and pastoral lease (natural vegetation) areas. Mining Exploration Licences and areas under application cover almost the entire length of the pipeline route.

Figure 1: Bonaparte Gas Pipeline route – Northern Territory (EcOz 2007).



2 The Proposal

A detailed description of the proposal is presented in Section 5 of the Draft EIS. The following section provides an overview of the components that comprise the proposed development. Figure 1 shows the route of the proposed pipeline.

2.1 Project Components

Pipeline

The BGP will extend inland approximately 280 km from the Eni Blacktip gas plant near Wadeye to a point on the Amadeus to Darwin gas pipeline (ADP) at Ban Ban Springs north of Katherine.

It will initially be capable of delivering 30PJ/year, will consist of a buried 300mm (12"), class 900, high tensile steel pipe operated to a maximum allowable operating pressure of 15.3 Mpa and located in an approved 30m wide construction corridor. The pipeline will have an initial design life of 50 years. Individual pipe lengths will be welded together onsite, field coated and buried with a minimum depth of cover of 750 mm. Depth of cover will vary depending on the conditions of the terrain and the surrounding land use.

At the end of pipeline life, it is proposed to leave the pipe in situ and cement the ends. Where required, the pipeline could be grouted to prevent collapse, for example, under roads and watercourses.

Inlet Station

The Inlet Station of the pipeline will be a scraper launcher, to be used for the insertion of pipeline inspection gauging (PIG) tools for cleaning and internal pipeline inspection and an emergency shutdown valve. To support ongoing operations the BGP pipeline will also require some operations and maintenance infrastructure in the Wadeye area.

The exact location of this support infrastructure is not yet determined, as the location is the subject of negotiations involving APT, Eni, and representatives of the local traditional owners.

Vent Stacks

There will be five vent stacks on the pipeline, one each at the inlet, outlet, mid-line, and two intermediate mainline valves (MLVs). Each vent compound will be separated from the main facility by about 100m, and will comprise a fenced area of about 100m². The vent pipe inside the fenced area will extend vertically above ground about 2m.

Vents will be used during commissioning to allow air to be purged out of the pipeline during the introduction of gas. In normal operations vent stacks are not used at all. Only when repairs are occasionally required on the buried pipeline are the vents used to depressurise the pipeline to atmosphere.

Mainline Valves

The principal purpose of MLVs is to enable sections of the pipeline to be isolated in the event of damage or for programmed maintenance. MLVs typically occupy a fenced and gravelled area of 100m² and will be located on the pipeline easement. Shutdown valves will be located at the inlet to the pipeline at Wadeye and at the ADP interconnection. It is anticipated that 2

mid-line MLVs will be installed along the pipeline in addition to the valves at the Wadeye inlet and ADP interconnection.

Scraper Stations

Scraper stations are permanent above ground facilities that allow the insertion and/or retrieval of PIGs to clean the internal sections of the pipe or to detect damage or metal loss within the pipe. At these locations the pipeline is brought above ground for approximately 15m and a by-pass section of pipe is installed. This enables the gas flow to be diverted to allow for the insertion or retrieval of the PIGs. Scraper stations are located within a fenced compound of approximately 1500m².

Meter Stations

The interconnection with the ADP will consist of a meter and regulator station and a scraper launcher. The station will include equipment to measure the volume of gas and equipment to adjust temperature and pressure. It is anticipated that the facilities will occupy an area of approximately 6,000m² on already cleared land associated with the existing Northern Territory Gas facilities.

Communications Towers

Northern Territory Gas will operate the BGP through an extension of their existing communications system. Data and voice communications will be via satellite. Temporary towers for radio communications during construction will be required and will be removed on completion of construction.

Cathodic Protection Facilities

Requirements for protecting the pipeline from corrosion will be met by a cathodic protection system. The pipeline coating will provide the primary corrosion protection and a cathodic protection system will be installed on the pipeline to provide a secondary form of corrosion protection. The secondary system will consist of small power rectifiers and anode beds that will maintain the pipe at a negative potential using an impressed current system. This system places a negative voltage potential onto the pipe with the positive from the controller connected to an anode bed that consists of a number of buried silicon/cast iron anodes placed in a petroleum coke backfill. This will mitigate against corrosion should the coating become damaged. The anode beds are likely to be located at each end of the pipeline and at the scraper station and would consist of an 3m-deep, 600mm-wide and 25m-long excavated trench, backfilled around the anodes with petroleum coke. These beds may be situated up to 300 m perpendicular from the pipeline, depending on the soil resistivity, and will be connected to the pipeline via a buried cable.

Test points will be located at approximately 3km - 5km intervals along the pipeline to allow monitoring of the system.

Construction Camps

The towns and communities in the region traversed by the BGP are all small and quite remote. Dedicated campsites will be required to accommodate construction teams. A number of appropriate site locations have been identified at approximately KP74, KP142, KP214, and KP256 along the pipeline route. These locations have been selected based on limiting the travel distance for workers to reach the construction corridor (i.e. fatigue management), and a consideration of the major physical constraints present in the Project area (e.g. Daly River). It is anticipated that there will be no more than two camps operational at any one time.

Camps will be used to accommodate the construction workforce and will consist of air-conditioned, demountable style units including:

- Accommodation blocks containing multiple rooms with shared ensuite (toilet and shower with hand basins being provided in each room) and associated waste water treatment facilities;
- Central ablution unit containing toilets and laundry facilities for use by camp occupants;
- Messing units which include cooking and eating facilities and a wet mess with recreation lounge;
- Offices;
- Training / meeting room;
- Equipped recreational room;
- First Aid room; and
- Workshop for maintenance of vehicles and equipment.

Workforce

Construction activities within the Northern Territory would be expected to directly utilize approximately 150 - 250 personnel at peak construction, including construction workers and support services (e.g. food supply and cleaning). The construction workforce is expected to comprise:

- Trades assistants and labourers;
- Trades people;
- Administration staff;
- Managers; and
- Engineers and surveyors.

Local contractors and service companies would be involved with the construction phase of the pipeline and associated facilities where possible.

The proponent has entered into a Framework Agreement with the Northern Territory Industry Capability Network (NTICN) who will use local knowledge, resources and databases to assist in identifying suitable resources. All major contracts will contain appropriate clauses requiring similar use of the NTICN process. The proponent will also work with any interested Indigenous contractors qualified for the work.

2.2 Construction methods and timing

Survey

At the start of the construction phase surveyors are sent into the field to mark the pipe centreline and the width of the construction corridor.

Fencing crews are also mobilized, where necessary, to set up temporary gates and fences at points where any fence lines will be breached for pipe construction. This allows for construction crew movement and protection of livestock.

Preparation of supporting facilities

A range of temporary facilities will be required during pipeline construction. These include work areas for equipment, pipe delivery, storage and campsites.

The location of the temporary facilities will be based on logistical requirements, the objectives for the pipeline route selection and the *APIA Code of Environmental Practice*.

Occasionally additional fill material may be required to provide rock free material immediately around the pipeline, which could require use of locally available resources (e.g. existing borrow pits) or a Project specific borrow pit. Prospective borrow pit sites have been identified in proximity to the proposed route. The Project may from time to time use soils within the 100m survey area where smaller amounts of material are required. These small borrow pits would typically be no more than 1 hectare in total area and no more than 1.5m deep.

Preparation of construction corridor

Clear and grade is carried out to provide a safe construction corridor for vehicular movement, trenching and other construction activities. An impact width of approximately 30m is generally required to enable construction operations to be safely and efficiently carried out. This width is typically increased adjacent to watercourses to provide additional room for stockpiling brush and soil outside of the watercourse. The construction corridor is cleared of heavy vegetation and in scrubby areas the vegetation is stockpiled for respreading as part of the restoration process. The construction corridor is levelled to the required gradient using graders, backhoes and bulldozers.

Trenching

A wheel trencher, rock saw or excavator is used to dig the trench in which the pipe will lie. In hard rock terrain where the use of this equipment is not feasible, controlled blasting may be used. The distance covered per day by trenching is dependent on terrain, equipment availability and weather conditions but is expected to achieve a production rate of 3 - 4km/day. Watercourses may be crossed either using 'open cut' trenching methods with flow diversion if flows are present, or by horizontal directional drilling (HDD) techniques, which creates a hole under the watercourse through which the pipe is pulled.

Pipe preparation and laying

Stringing and Bending

Stringing is the term used to describe the laying out of the pipe lengths in preparation for welding. Pipe is generally transported to site on trucks in 18m lengths. The pipe is laid out adjacent to the trench and held off the ground on skids (i.e. timber blocks, sand bags or sawdust bags) that protect the pipe coating from damage. Prior to welding the pipes are bent to match the required vertical or horizontal profile.

Welding, Inspection and Joint Coating

Once the pipe is strung a line-up crew positions the pipe using side boom tractors and internal line-up clamps. Specialist construction crews undertake the welding phase of the Project. Pipes are typically welded into strings of up to 1.5km in length.

Each weld is subjected to a 100% non-destructive test (NDT) inspection to check for compliance to specification, thus ensuring the integrity of each weld. This is typically carried out immediately after welding so that any defects in the weld can be repaired whilst the welding crews are still in the general vicinity. Following welding the joints are cleaned by grit blasting and an external coating, compatible with the factory-applied coating, is applied.

Lowering In and Backfilling

The trench is prepared as necessary to protect the pipe. This may include placing padding or supports in the bottom of the trench to protect the pipe coating; padding is typically sourced

by sifting subsoil using a padding machine. In very rocky areas where insufficient padding can be obtained by this method it may be necessary to obtain sand or other padding material from borrow pits.

The pipe coating is inspected and tested for defects and then the pipe is lifted off the skids and lowered into the trench using side-boom tractors.

Impermeable trench blocks (known as trench breakers) may be installed prior to backfilling of the trench to control water movement along the backfilled trench in areas with slope. Trench breakers are commonly installed in a number of environmental conditions, such as adjacent to watercourses, on steep slopes or where drainage patterns change.

Testing

Once in place the pipe sections are subjected to a hydrostatic test. Testing is done in strict accordance with the applicable design and construction standard *AS 2885-5: Field Pressure Testing*. This includes sections of the pipe being capped with test manifolds, filled with water, pressurised and held at pressure for a minimum of four hours. The pressure is then reduced and the water retained for a further 24 hours to test for the presence of any leaks. The methodology for hydrostatic testing depends upon the quality and quantity of water available, but may include transferring hydrotest water from one section of the pipeline to another to minimise the overall volume of water required. An oxygen scavenger is added to the hydrotest water to reduce the potential for corrosion. Depending upon the quality of the available water and the length of time the water is required to be held in the pipe, a biocide may also be added. These chemicals would be selected to minimise their potential to cause harm to the environment whilst adequately protecting against corrosion in the pipeline.

Clean up and reinstatement

Clean up and reinstatement measures are applied to the construction corridor, work areas, truck turning areas, access tracks, camp sites and any other temporary sites. Generally clean up and reinstatement involves removal of foreign material (e.g. construction material and waste), surface contouring, respreading topsoil and respreading vegetation. Plant matter is respread over the construction corridor. The respreading of plant matter assists in both stabilising the ground and re-establishing vegetation regrowth. Occasionally it is necessary to dispose of the plant matter (e.g. heavy weed infestation) and this is done through burning off under controlled conditions.

Timing

Each crew works at the rate of approximately 3 - 4km/day depending on the terrain (i.e. if there are more trees or the ground is very rocky progress may be slower). To enable the crews to work safely and efficiently there is often a delay between the arrival dates of each crew. Typically it will take about 12 weeks for all the crews to pass through an area and complete their tasks. During this time there will be interruptions to some land uses (e.g. no crop growing or grazing over the construction corridor) and this will be negotiated with the landowner.

The crossing of any roads or rail lines will be carried out by a specialist crew enabling the activity to be completed within one to two days. At no time would a road be permanently impassable.

3 Regional Setting

3.1 Physical

3.1.1 Landform features

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.

3.1.2 Surface and Groundwater

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

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.

3.2 Biological

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.

Weed distribution in the region is generally related to roads and tracks, cattle grazing and feral animals.

Terrestrial Fauna and Habitats

The BGP 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 nudicluniatu*s;
- 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*.

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 minimise 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 *Haliaeetus 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 an absence of their required habitat.

Feral and Invasive Species

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

The BGP construction corridor was aligned to avoid most of these patches; the proposed route crosses two minor patches with monsoon forest elements.

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 that 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 the BGP route, Indigenous Traditional Owners guided the survey team in order to ensure that impacts on significant species and habitats were kept to a minimum.

3.3 Cultural / Historical

The country traversed by the BGP is rich in Aboriginal cultural sites and European history, primarily associated with the pastoral and mining industries, and World War II activities.

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. These traditions are still strong as a result of social action and recounting of stories which convey the meaning and enduring significance of water (Jackson 2004). Land management practices, ceremonial activities, hunting, fishing and bush tucker collection provide the means by which people interact with the cultural landscape as well as provide for their economic needs.

The town of Wadeye is the main community in the western end of the BGP project area known as the Thamarrurr Region that was and continues to be the traditional country for 20 tribal groups whose traditional lands stretch from Cape Scott in the north to the Fitzmaurice River in the south. First contact with European society started with the explorations of Captain King in 1819 but the complex and sophisticated social, economic and cultural systems of the Indigenous inhabitants of the region remained relatively unaffected up until the establishment of contact with non-Aboriginal influences in 1935. It was at this time that these diverse peoples came together, following the establishment of a Roman Catholic Mission. From 1938 to 1975 the Mission ran a cattle station in the 5000 square mile Daly River Aboriginal Reserve.

In 1975 the Australian Government recognised Aboriginal claims to the Reserve and the land passed back to its traditional owners. The underlying land tenure of much of the western half of the pipeline route is therefore inalienable Aboriginal freehold (Commonwealth), vested in the Daly River/Port Keats Aboriginal Land Trust.

3.4 Socio-economic

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 Government sectors. The economy is extremely sensitive to economic impacts such as recent resource and infrastructure investment projects.

The towns and communities in the region traversed by the BGP are all small and quite remote, and mostly share the same postcode. The communities situated on Aboriginal Land (approximately half of the route) are comprised predominantly of people of Australian Aboriginal descent. The nearest large town is Katherine, approximately 150km south of the Ban Ban Springs end of the proposed BGP route.

The economy of the Katherine region is diverse and vibrant. The town has experienced a 60% increase in population since 1988. This is mainly attributed to the establishment of RAAF Base Tindal and the ongoing development of several industries such as tourism, mining and horticulture.

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.

Wadeye, the largest Aboriginal community in the NT, sits at the western end of the pipeline route. The economic circumstances of the Wadeye Township indicate that it is a relatively poor community. The employment opportunities are limited in the Thamarrurr Region to a fledgling construction industry being developed by the Thamarrurr Regional Council, a small-scale cattle industry based at Palumpa Station and the remotely operated tourism and fishing industries. There is an almost exclusive reliance on the Community Development Employment Projects Scheme for employment. There are no data on expenditure patterns at Wadeye, but a common pattern in similar communities is one of cash “feast and famine” against a background of high costs for essentials such as food and transport (Alcan 2004). A study undertaken in 2003 identified the following elements of the Wadeye profile (Taylor 2004):

- 100 people are aged over 50;
- 500 people are aged 25-50;
- 1500 people are aged less than 25;
- 700 people are of school age;
- 60-80 babies are born into the community each year;
- The population of the Thamarrurr region is likely to expand at a rate of 4% pa;
- There are 144 habitable homes with an occupancy rate of 16 persons per dwelling.
- Another 122 dwellings will be needed by 2023 just to maintain the present level of occupancy. If a rate of 7 persons per dwelling was to be achieved, an additional 465 dwellings will be required by 2023;
- The vast majority of school age children are not attending school;
- Less than one-fifth of all adults are currently employed; and
- 82% of Aboriginal income is attributable to welfare sources (90% if CDEP is included).

Wadeye is the site of a Council of Australian Governments (COAG) program to encourage community development by better co-ordinating government service delivery. To this end, Thamarrurr Regional Council has been created and increased resources have been put into education, training and other areas.

4 Environmental Impact Assessment

4.1 Introduction

The purpose of this Assessment Report is to evaluate the environmental protection measures of the project proposal and to determine whether the proposal can proceed without unacceptable environmental impacts. This is achieved by identifying any potential environmental impacts associated with the project and evaluating the corresponding safeguards or prevention measures suggested by the proponent. Where the proposed safeguards are considered insufficient, or where a safeguard is significantly important, recommendations are made in this Report to add to or emphasise those commitments made by the proponent.

The environmental acceptability of this project is based on consideration of the following from the PER:

- Adequacy of information outlining the proposal (particularly which structures or activities are likely to impact the environment);
- Adequacy of information on the existing environment (particularly environmental sensitivities);
- Adequacy and information on the range and extent of potential impacts; and
- Adequacy of the proposed safeguards to avoid or mitigate potential impacts.

The major issue associated with the assessment of this proposal is that the PER and Supplement were relatively conceptual due to the proponent's requirement to devolve much of the detailed decision-making for pipeline construction and logistics to a Construction Contractor. Consequently, many of the project details cannot be determined until the Contractor becomes more involved in the proposal. This directly impacted the information that was provided in the PER and Supplement.

However the lack of information has not prevented the overall assessment of the proposal and the Environment Protection Agency (EPA) Program considers that based on the information provided and the assumptions made by the proponent, the environmental issues associated with the proposed project have been adequately identified.

In order for the project to proceed in an environmentally acceptable manner, the proponent needs to address all information gaps identified in this Assessment Report prior to commencement of works. It is acknowledged that there is potential that when undertaking the outstanding surveys and studies the proponent may identify a potential 'show-stopper' for the proposal, however this is considered unlikely. Any issue that is identified should be able to be managed or resolved through appropriate mitigation measures or re-engineering and design of the project.

Provided there are no 'show-stoppers' in the outstanding information, the EPA Program considers that the Bonaparte Gas Pipeline project can be managed in a manner that avoids unacceptable environmental impacts, provided that the environmental commitments, safeguards and recommendations detailed in this Assessment Report and in the final EMPs are implemented, with regular reporting, compliance auditing, monitoring and evaluation, and appropriate responses and adaptations to any issues identified through monitoring.

Each recommendation (in **bold**) is preceded by text that identifies concerns, suggestions and undertakings associated with the project. For this reason, the recommendations should **not** be

considered in isolation. Subject to decisions that authorize / permit the project to proceed, the primary recommendations of this assessment are:

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:

- **Identified in the Bonaparte Gas Pipeline Public Environmental Report; and**
- **Recommended in this Assessment Report (No. 59)**

All safeguards and mitigation measures outlined in the Public Environmental Report are considered commitments by Australian Pipeline Trust.

Recommendation 2

The proponent shall advise the Minister of any changes to the proposal in accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act*, for determination of whether or not further assessment is required.

Recommendation 3

Access to, and use of, any resources or infrastructure required for the purposes of the project, must be negotiated appropriately with the relevant Traditional Owners and non-Indigenous land owners. All necessary approvals must be obtained prior to commencement of works.

For the purposes of this Assessment Report, ‘works’ is defined as any tasks which would require/cause any physical disturbance for the purposes of achieving an objective for the pipeline project and could include access track upgrade, bore water extraction, vegetation clearing, trenching, etc.

4.2 Summary of issues

The major issue associated with the proposal is that the PER and the Supplement failed to provide information on a number of issues. Of most significance is the information gap on matters of National Environmental Significance under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. While the Australian Government’s Department of Environment and Water Resources (DEW) requested that the proponent provide the required information the proponent did not include this in their Supplement. This is discussed in section 4.7.

The principal environmental issues associated with the proposed pipeline are:

- Sources of water for pipeline hydrostatic testing, dust suppression, weed washdown stations, and construction camp consumption, and the disposal of hydro-test water;
- The impacts of pipeline trench construction on flora, fauna and habitat;
- The impacts of pipeline construction on water quality, ecology and landform stability at watercourse crossings;
- Disturbance of matters of National Environmental Significance under the EPBC Act;
- Erosion associated with vegetation clearing, and soil and landform disturbance;
- Spread of weeds and pest fauna along the pipeline route; and
- Traffic management associated with use of the Wadeye to Daly River Road.

The remainder of Section 4 deals with issues raised in the public and government submissions to the PER and the proponent’s commitments to environmental management provided within

the PER and the Supplement. In addition, recommendations to complement or strengthen environmental management strategies and safeguards will be presented.

Some issues were adequately addressed in the Supplement and do not require further discussion. The outstanding environmental issues that remain are addressed through the remainder of the document.

4.3 Ancillary activities and works not yet finalised

The PER was relatively conceptual due to the proponent's requirement to devolve much of the detailed decision-making for pipeline construction and logistics to a Construction Contractor. Consequently, many of the project details remain undetermined until the Contractor becomes more involved in the proceedings. However, the proponent is ultimately responsible for management of the BGP project.

Generally, many of the more detailed studies and investigations such as the geotechnical aspects of watercourses, cultural heritage studies, road use and traffic management, dedicated fauna surveys, identification of water sources, borrow material sources, etc, have not been undertaken within the timeframes necessary to include in the impact assessment documentation. The EPA Program acknowledges that timelines and logistics make this difficult when approval processes are running concurrently; however, this has resulted in a number of deficiencies in the PER. Some of these deficiencies will be discussed later in this Report.

The outstanding matters and information must be addressed in an amended Construction Environmental Management Plan to be submitted to the EPA Program for approval and included in the Pipeline Management Plan.

Recommendation 4

An updated Construction Environmental Management Plan is to be provided to the Environment Protection Agency Program addressing outstanding matters and information as identified in this Assessment Report.

4.3.1 Access tracks

During construction, access to the pipeline construction corridor, work areas and campsites will be required. The proponent intends to use existing roads, tracks and disturbed areas where possible. It is likely that some of these will need to be upgraded to accommodate construction traffic and it is also expected that some new access tracks will need to be created. There may be other access points required once further details of the project become clear, for example, water extraction points for dust suppression, hydrostatic testing and drinking, and locations of suitable aggregate and borrow sites. The areas selected for access will need to be investigated for archaeological places and objects protected under the *Heritage Conservation Act* and for sacred sites under the *NT Aboriginal Sacred Sites Act*. The proponent and contractors will require clearance from Traditional Owners to proceed outside the 30m construction corridor for these works if on Aboriginal Land. Other approvals may also be required from non-Indigenous landowners to access private land outside the 30m corridor.

The proponent has committed to selecting access routes in consultation with all relevant landholders and regulatory authorities, and subject to the conditions of the CEMP. Environmentally sensitive areas will be avoided and works will be undertaken in accordance with a Cultural Heritage Management Plan.

4.3.2 *Water extraction*

The BGP project demands water for four main project components including construction camp consumption, construction track maintenance, weed washdown bays and for hydrostatic testing (pipeline pressure testing) purposes. The sources of water that would meet these component demands have not been fully determined but will include bores and/or surface water bodies such as freshwater rivers. Volumes of water required have been estimated for the project's needs; approximately 7.5ML for total camp consumption; an approximate total of 50ML for construction track maintenance purposes and an estimated maximum of 23ML for hydrotesting if no water were reused. Weed washdown bay water requirements were not discussed in the PER and have not yet been determined but the proponent expects that the volume required for this purpose will be 'moderate'.

Bore yields are likely to be variable along the pipeline route; however, determination of exact bore yields is constrained by the lack of bore testing and/or ongoing monitoring data. Only one bore, on Tipperary Station, has been found to yield at rates that would require a licence to extract under the *Water Act* (>15L/s) if it was to be used. The proponent has identified bores within close proximity to the pipeline route and indicates that site reconnaissance will be required to confirm that the bores can be accessed and used, and that water quality from some bores will be fit for purpose. The proponent stresses that the bore sources indicated in the PER are not a definitive selection and that final decisions will be made by the Construction Contractor for the project based on detailed analyses of water requirements and following negotiations with the owners of the water sources and any relevant licence/s issued.

Any extraction of surface water from sources in the Daly River Catchment will require a surface water extraction licence issued by the Water Resources Management Branch of the Department of Natural Resources, Environment and the Arts (NRETA) under the *Water Act*. This is not considered to be an issue but NRETA will require determination of any extraction source as well as the monthly maximum water requirements proposed to be extracted at these locations. Extraction of surface waters will not be permitted to exceed the capacity of any water body to sustain its ecosystem (not more than 20% by volume of flow), particularly in the Dry season when perennial water is critical for species survival. With respect to all sources of water within Land Trust land, the NLC indicates that the proponent will need to identify their water source requirements and schedule consultations and negotiations for access into the 2007 Dry season. Scheduling will need to include assessment of flow data for any creeks proposed for use where data is deficient. The proponent concurs that negotiations with Traditional Owners will be undertaken in accordance with the terms of the Land Access Agreement between the NLC and APT.

A respondent to the PER believes that the calculated water requirements for the project are underestimated because dust suppression requirements for the Wadeye-Daly River main road have not been accounted for. The proponent has indicated that there is no intention to water the main road during construction and therefore no water sources will be needed for this purpose. Any water requirements for dust suppression on access tracks and the construction corridor are included in the PER water supply estimates. Detailed discussion of dust suppression and safety on the Wadeye-Daly River Road is discussed in Section 4.10 of this Report.

4.3.3 *Above-ground infrastructure*

The BGP project will include above ground facilities such as:

- Inlet station;
- Vent stacks;

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- Mainline valves;
 - Scraper station;
 - Meter stations;
 - Communication towers;
 - Cathodic protection facilities; and
 - Marker posts.

These facilities are described in more detail in Section 2 of this Report. A compressor station is also planned for the pipeline at some stage in the future.

Some of the abovementioned facilities will require land external to the 30m construction corridor and in some cases the exact locations of the infrastructure have not yet been determined and will be finalized once a Construction Contractor has been appointed for the project. In all cases, appropriate studies will need to be undertaken to ensure the final selected location does not impact on culturally, historically or ecologically sensitive areas and that permissions are appropriately negotiated with landowners.

Detailed information for a future compressor station has not been provided in BGP project assessment documentation. The addition of a compressor station to the project significantly alters the magnitude of potential environmental risk with respect to sensitivities associated with the proposed land and surrounding environment in which it would be stationed, air emissions, including greenhouse emissions, and potential noise impacts to any sensitive receptors. Any proposal to include a compressor station for this project in the future should be referred under the Environmental Assessment Act in accordance with Recommendation 2 of this Assessment Report.

4.4 Watercourse Crossings

The BGP is proposed to cross 38 watercourses; four of these are to be horizontally directionally drilled (HDD) and the remaining 34 are proposed to be “open cut”. In declaring which surface water systems to HDD, the proponent assessed the following environmental values:

- Type and integrity of riparian vegetation;
- Susceptibility to erosion and potential to cause downstream sedimentation impacts;
- Ability to stabilize and rehabilitate in short time frame between construction and the following wet season;
- Type and integrity of in-stream habitat;
- Declared beneficial uses of water;
- Timing (season); and
- Threatened flora and fauna.

Additional selection criteria included potential impacts to archaeological and heritage sites, social and cultural values, and engineering feasibility. Economically, open cut crossings also cost considerably less than HDD crossings.

The feasibility of using HDD is limited by site conditions such as soil stability, slope, access, available workspace and nature of subsurface rock. Directional drilling also introduces additional environmental considerations including drill site sediment control, potential for

seepage of drill muds through alluvial materials, disposal of drill muds and other wastes, and a larger working area required on both sides of the watercourse. Despite these constraints and management issues, the use of HDD would avoid unnecessary impact to the bed and banks of watercourses and also largely avoid the need to clear riparian vegetation.

The proponent is confident that HDD at the crossings selected is feasible but final geotechnical investigations of these sites are still required to verify the geology. The commitment to HDD these rivers is therefore a qualified one. Should technical constraints render HDD of some of the nominated sites unfeasible, an alternative crossing methodology would need to be employed that appropriately treats the specific issue. Social attitudes, too, will need to be considered. For example, it has been suggested that trenching the Daly River would be socially unacceptable. In the unlikely event that the Daly was to be trenched, the proponent could face some challenging community engagement, with possible consequences to project timelines.

If the geotechnical studies indicate that there is any potential for HDD to be unsuitable at any of the selected sites, the proponent has committed to immediately notifying NRETA to negotiate an alternative crossing technique and, particularly in the case of the Daly River, to undertake consultation with all key stakeholders including the relevant government agencies as identified by the EPA Program, the NLC, Daly River Community, AFANT, and ECNT as part of the development process.

Recommendation 5

Geotechnical Reports are to be provided to NRETA (in accordance with Recommendation 4) to determine the feasibility or not, at all four proposed HDD sites. In the event that HDD is not feasible, the proponent is required to negotiate an alternative crossing technique.

The proponent will consult with all key stakeholders until an appropriate alternative crossing is agreed.

As well as the uncertainty regarding HDD of the four selected rivers, there are also concerns that other water courses with values significant enough to merit HDD have not been proposed; for example, Dee Creek and Moyle River. The PER provides reasons for open cutting rather than drilling these two rivers. Dee Creek has existing extensive erosion problems and steep banks that could be difficult to stabilise, and the Moyle River has year-round water flows and its floodplain is a 'Wetland of National Significance' under the *Ramsar Convention 1971*. The proposed pipeline route lies within the upper extremities of the nominated boundary of this wetland system. This issue is discussed in Section 4.7.5 of this Report.

The Supplement further justifies trenching as opposed to HDD for some water courses: "Large volumes of flowing water which would require significant effort to divert, and steep banks with dense mature vegetation which would be difficult for construction and difficult to rehabilitate are all indicators for an HDD crossing preference. Watercourses that carry little or no flowing water and have gradual bank slopes without dense vegetation can be crossed by open cut methods without significant disturbance and siltation of the water, and can be rehabilitated back to their normal state with success".

The Moyle River and Dee Creek appear to exhibit characteristics that could justify use of either crossing method. Cross-sectional diagrams in the Supplement do demonstrate gradual bank slopes and a low dry-season flow of 300mm (0.3m) in the Moyle River. The Supplement states that field studies identified that the Moyle River could potentially be open cut with

minimal environmental damage. The crossing point was also selected to minimise the removal of trees and is adjacent to an existing trenched optic fibre cable.

The Dee Creek crossing is adjacent to the road and was dry at the time the photographs contained in the PER were taken. The evidence suggests that this creek is seasonally dry and the bank vegetation is represented widely across the region. Dee Creek does, however, have high erosion potential associated with a steep bank, which could confound efforts to rehabilitate and lead to significant sedimentation of the watercourse. Erosion and sediment control at watercourse crossings is discussed further in Section 4.5 of this Report.

The proponent has prepared draft Special Area Plans for Dee Creek to mitigate erosion and sedimentation issues, and for the Moyle River, which will require flow diversion if it is trenched. These plans include rehabilitation strategies for the respective watercourses.

Concerns were raised about the impact of flow diversion techniques on aquatic systems in the Moyle River. The proponent has indicated that the duration of works would be a matter of days and given the ephemeral nature of the watercourse, the existing aquatic fauna is likely to be adapted to variable flow regimes during the Dry season. Consequently, the impacts are considered unlikely to be significant. Nevertheless, the proponent has retained the option to use HDD and will consider this closer to the time of actual construction based on prevailing conditions.

Irrespective of the geotechnical and biophysical constraints or otherwise that might dictate crossing techniques at these watercourses, other factors still have to be considered in selecting the most appropriate crossing method. The Northern Land Council (NLC) has advised that Traditional Owners wish to see the HDD method used for the Moyle River crossing to ensure minimal lasting disturbance to their country. The NLC has also indicated that some other watercourses may also require HDD, including Dee Creek and Anopheles Creek. These decisions are ultimately a matter for negotiation between the proponents and the Traditional Owners of the respective country. The proponent has committed to continuing consultation with the NLC and Traditional Owners in accordance with the Land Access Agreement. Provided the negotiated crossing techniques are acceptable to all landowners and Government agencies and no other constraints are identified to effect those negotiations, the EPA Program is satisfied that the environmental risks will be minimal if works are undertaken in accordance with the approved CEMP. Issues associated with erosion and sediment control at watercourse crossings will need to be resolved in the CEMP to satisfy NRETA requirements if open cut techniques are employed as discussed in Section 4.5 below.

Recommendation 6

The proponent will ensure that construction activities at watercourse crossings are conducted as agreed by respective landowners and Government agencies, and in accordance with the management measures described in the approved Construction Environmental Management Plans and Special Area Plans.

4.5 Erosion and sediment control

Any soil disturbance has the potential to lead to erosion and sedimentation. Vegetation clearing, vehicle movements and trenching activities, particularly near watercourses, are potential erosion sources associated with the BGP project. High, intense rainfall in the region significantly increases erosion potential. The consequences of this include increased sedimentation in an already turbid system potentially impacting sensitive down-stream environments and in-stream habitat.

The greatest risks of erosion are acknowledged in the PER to be scouring of creek beds and banks during the initial wet season flows prior to successful reinstatement, and gully erosion associated with the pipeline trench before revegetation, particularly at stream approaches. NRETA expressed concerns that the proposed erosion and sediment control works were minimal. This minimalist approach at these high-risk sites, particularly where re-establishment fails before the onset of the wet season, may be insufficient or ineffective. Concern was also raised by the proponent's determination to revegetate merely by respreading vegetation, topsoil and rock following completion of the pipeline works. NRETA requested that the proponent develop and provide detailed plans of all riparian crossing construction erosion control principles and works, initially in the Supplement, to give more assurance that the cleared corridor would not lead to significant damage to riparian environments along the pipeline easement. Consideration of monitoring, maintenance and remedial actions for observed erosion was also requested.

The requested plans were not provided in the Supplement. Instead, the Supplement contains some of the relevant information in amended Erosion Management, Watercourse Management, Flora and Fauna Protection, and Clean Up and Restabilisation sub-plans within the draft CEMP. The proponent provides an assurance in keeping with a commitment in the PER that reinstatement will be conducted progressively along the pipeline corridor and will be completed prior to the first storms of the wet season. Further assurances have been provided in the amended text and CEMP and include:

- Long-term erosion control structures, maintained for 2 years;
- Ongoing erosion monitoring and remedial action performed according to the OEMP;
- Drainage line restoration will include replacement or, in some cases, importation of a surface layer of coarse gravels, generally extending 2m up the bank from the toe and across the creek bed to prevent scouring;
- Contour banks and possibly sediment fences will be installed to prevent possible erosion from surface flow down the pipeline alignment and into the stream;
- Where natural revegetation does not meet expected rates (as outlined) in the first season, active measures such as reseeding will be implemented. Sterile grass may be utilised to stabilise banks at watercourses where deemed necessary;
- Where revegetation of the construction corridor has not commenced by the end of construction, stabilisation of erosion-prone areas will be carried out (eg. placement of rock, timber or jute matting); and
- All watercourse crossings are to be reinspected at the commencement of the Dry season 2009 and rectification works to be implemented where any failure of the banks or beds has occurred.

Further detailed measures are described in the draft CEMP to reflect the proponent's renewed commitments to managing erosion across the construction site. The EPA Program is satisfied that the respondents concerns have been adequately addressed in the PER. If the proponent undertakes works in accordance with the commitments in the PER and the approved CEMP and OEMP, the environmental risks can be appropriately managed.

Recommendation 7

The proponent will ensure, through the Construction Contractor for the project, that best-practice erosion and sediment control measures are fully implemented for all disturbed areas prior to the onset of the 2008/2009 wet season.

Erosion and sediment control measures, including monitoring and maintenance, should be implemented in accordance with the commitments made in the PER, and in the

approved Construction and Operational Environmental Management Plans for the project.

Following the first wet season, a monitoring or audit report is to be prepared and provided to Natural Resource Management Division, NRETA, before June 2009. This report should include details on the effectiveness of erosion and sediment control measures and any rectification works undertaken or proposed.

4.6 Hydrostatic Testing

4.6.1 Water supply

Hydrostatic testing of pipeline sections will be conducted to determine the presence of leaks once the pipeline is in place. This will require large, single volumes of water to be pumped into five sections of completed pipeline. Discussions with the proponent regarding the proposed sources of water for hydrotesting suggest that much of the water could be sourced from the Daly River, as the Daly is close to the mid-point of the pipeline. The water would be pumped into the completed section of pipe adjacent to the Daly for pressure testing. On completion of the test, that same slug of water could be transferred progressively to the neighbouring completed sections until all sections were tested.

It is estimated that each section would require a volume of 4292m³ (4.3ML) of water. Based on assumptions of minimum daily average flow rates for a 40-year period, it is estimated that the hydrotest component would result in approximately 0.1% of the flow of the Daly River being extracted for around 1.4 days for each test section. If the water were to be reused, then it is likely that this volume would be pumped only twice (one slug towards Wadeye and one towards Ban Ban Springs); however if reuse was not an option, then five extractions would be required, possibly from other sources. If two slugs were successfully reused for the entire pipeline, allowing for a 5% 'top up' for each section to allow for flushing, the minimum water requirement would be 9700m³ (9.7ML). The maximum volume required allowing for five extractions and top up would approximate 22,520m³ (22.5ML), which the proponent indicates is an unlikely scenario.

Other water sources along the route could be used to top up the respective pipeline sections. The PER includes the other creeks and rivers crossed by the pipeline, mine pits in the eastern area of the pipeline route, and bores along the route, as possible sources for hydrotest water. As discussed in Section 4.3.2 of this Report, permission from landowners is likely to be required to access and/or use these sources and an extraction licence may be required from the NT Controller of Waters under the *Water Act* for surface water sources. The use of mine pit sources would be dependent on appropriateness of water quality.

The proponent should employ measures to avoid or minimise disturbance to riparian vegetation when extracting water from watercourses. Pump suction intakes should be suspended above the watercourse bed to prevent suction of river substrate and should incorporate a fish screen to minimise impact to aquatic fauna.

The EPA Program supports the preferable use of the Daly River as a hydrotest source. It provides the highest volume of flow of any of the possible water sources along the route and is the most capable of supplying the volumes with the least impact. Regardless of the source, the proponent should ensure that all necessary precautions are taken to minimise the impacts of water extraction. Appropriate approvals for use of all sources must be obtained in accordance with Recommendation 3 of this Report.

Recommendation 8

The proponent will ensure that disturbance to riparian and aquatic environments is minimised to the greatest extent possible during water extraction activities. Proposed management measures are to be described in the CEMP. Any disturbance as a result of water extraction will be restored prior to the onset of the 2008/2009 wet season.

Recommendation 9

If mine pit water is considered for use, the proponent must obtain an analysis of the water to determine suitability for purpose and discharge into the environment. Analysis results must be provided to the EPA Program and DPIFM for review prior to use.

4.6.2 Water disposal

The primary issues identified in the BGP assessment associated with pressure testing the pipeline relate to the disposal of pipe flush water and the large volumes of hydrotest disposal water. Potential environmental impacts from disposal of hydrotest water arise from the composition of the flush water and the chemical properties of the hydrotest disposal water if oxygen scavengers and biocides are added to it.

Flush Water

The PER states that the limited volumes of flush water (an estimated 215m³ per pipe test section) used to clean the pipe prior to testing are likely to be more polluted than the test water due to a “range of residues and minor construction debris” washed from the pipe. These might include weld slag, oxidised metallic compounds from the pipe walls, soil contaminants and possibly solid waste contaminants.

The proponent has committed to managing the flush water by spray aeration through geofabric to capture any macro contaminants and discharging to land away from any water bodies. Erosion potential will need to be managed through appropriate control measures at the discharge point.

The EPA Program considers this to be an appropriate treatment and is satisfied that flush water can be adequately managed. Impacts will be limited to short-term elevated concentrations of elements and salts derived from the source water and pipe residues. Any localised impacts at the discharge point will dissipate over time by soil filtration and rainfall dilution.

Disposal water

Following flushing of the pipeline, the hydrotest disposal water would normally be of similar quality to the source from which it is extracted. According to a study of hydrostatic test water conducted by CSIRO Manufacturing and Infrastructure Technology, any changes to the properties of the water could only occur if substances were introduced into the pipe via the fill water and its additives (oxygen scavengers and/or biocides). Breakdown of residues on the pipe walls or the subsequent reactions that occur following introduction of additives, also contribute to these changes (Tjandraatmadja *et al.* 2005). An oxygen scavenger will be added to the BGP hydrotest water to reduce the potential for corrosion by depleting dissolved oxygen in the water. Any excess concentrations of the oxygen scavenger may still be reactive on conclusion of the test, and by-products of the oxygen depletion reaction may also be

present in the disposal water. As a result, the proponent proposes to aerate the water to neutralise these substances upon discharge.

The possible addition of a biocide to the fill water to limit biological corrosion caused by bacterial action is of concern due to the toxicity of such additives and, in particular, the persistence of some in the environment. In general the effectiveness of a biocide is correlated to its toxicity to the environment, and so often requires treatment before disposal (Tjandraatmadja *et al.* 2005). Combinations of certain biocides with oxygen scavengers can enhance or reduce the toxicity compared to the use of either additive alone (Tjandraatmadja *et al.* 2005). Consequently, the selection of additives to be used is paramount to ensuring that environmental impact can be minimised. Biocide use can be eliminated by using clean water to reduce the risk of the presence of harmful bacteria, and limiting the residence time of water in the pipe.

The proponent undertakes to avoid the use of biocides in this project; however, decisions made on hydrotest water reuse and treatment will not be finalised until the detailed design and construction phase so no express commitment has been made to avoid biocide use.

The uncertainty surrounding hydrotest disposal water characteristics has led to a concern that possible damage to native vegetation could occur from residues in hydrotest disposal water with consequent impacts to indigenous food sources (bush tucker). The CSIRO studies considered the effects of hydrotest water on plant growth. The study considered the potential impacts of micro-nutrients in toxic concentrations as well as potential biomagnification through the food chain. Based on guideline values for agricultural irrigation waters, the physico-chemical parameters and metals concentrations of hydrotest waters were shown not to restrict their application to land if Fe (iron) content was reduced. Some issues with sodicity were found with particular additives (Tjandraatmadja *et al.* 2005).

These results were based on values that assume frequent irrigation over a number of years; the hydrotest water from this project would be applied as a single load over a short time period. The risks of localised impacts to soils, vegetation and groundwater could be further reduced by widening the land area to be irrigated, ensuring that the receiving surface is robust and the discharge is appropriately treated. The EPA Program is confident that the risks to vegetation and hence, food sources, is low if treatment of disposal water is in accordance with the approved CEMP.

As with the flush water, treatment of the discharge will also require additional measures to control erosion at the discharge point. The PER describes the options available to the proponent to treat disposal water during discharge. Measures to minimise the impacts of hydrotest water disposal are also outlined in the CEMP. The CEMP will need to be amended to include the details of hydrotest practices once the proponent and the Construction Contractor finalise this information.

The EPA Program is satisfied with the relevant amendments to the commitments contained in the Supplement to include an assurance that, should biocides be necessary, APT will submit a detailed proposal on the use and disposal of waters containing biocides. Any such proposal should be reflected by a detailed amendment of the CEMP to ensure that potential impacts to the receiving environment are minimised. The amendment should be submitted to DPIFM and the EPA Program for review and comment prior to any use of biocides.

Recommendation 10

All pipe washing or pressure test water should be:

- Irrigated onto a stable soil surface using appropriate wastewater reuse guidelines; and
- Discharged away from watercourses.

Recommendation 11

Should biocides be shown to be necessary for hydrotesting, APT will submit a detailed proposal on the intended use and disposal of waters containing biocides. The CEMP should be amended to include a biocide sub-plan for management of this disposal water. Any such proposal, including the biocide sub-plan, shall be submitted to DPIFM and the EPA Program for approval prior to the use of biocides.

The CEMP is to provide full details of chemical usage and information relevant to hydrotest water management strategies including ecological consequence of discharge.

4.7 Ecology

4.7.1 EPBC Act Triggers

The BGP has been declared a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The controlling provisions are listed threatened species and communities (Sections 18 and 18A) and listed migratory species (Sections 20 and 20A). Specific species listed under the EPBC Act are included in Section 4.4 of the PER.

The Australian Government Department of the Environment and Water Resources (DEW) requested information from the proponent on which EPBC Act listed species are likely to occur on the pipeline route, what the potential impacts to these species might be, how the impacts would be mitigated and whether the expected impact following mitigation would be considered acceptable. Additionally, DEW requested that reasons be provided for the selection of targeted fauna survey sites and asked for the timing of surveys to be discussed. The intent of the latter query was to establish if survey timing would correspond with the optimum time to survey for EPBC Act listed species. Of primary concern are the potential impacts of the project on listed species during breeding seasons (in particular the Gouldian Finch and Northern Quoll). These requests were not addressed to the satisfaction of DEW and the dedicated survey reports will need to give more certainty in respect of the issues discussed. The project can not be considered for an approval under the EPBC Act until all of the requested information is provided to DEW.

At the time of writing, only one of the five proposed surveys had been completed. The survey was conducted in the vicinity of KP250 on the pipeline route to investigate possible suitable habitat for the Gouldian Finch. This area was targeted due to the presence of mature *Eucalyptus tintinnans* (Salmon Gum), regarded as critical nesting habitat for the finch. The field survey was conducted over several days and nights employing various trapping and observation techniques. A total of 53 fauna species were recorded, none of which were found to be species of conservation significance under the EPBC Act or the *Northern Territory Parks and Wildlife Conservation Act 2000*. In particular, there were no sightings of the

Gouldian Finch and no specific evidence of Gouldian Finches using the area for breeding purposes, despite the presence of Salmon Gums and suitable grass food species. A further four surveys of other locations are planned and the results of these could influence the assessment outcomes under the EPBC Act. The surveys will need to be completed and the interpreted results provided to DEW before an approval to commence works can be considered. This survey issue is discussed further in Section 4.7.3 of this Report.

Recommendation 12

All dedicated fauna surveys will be completed and the results provided to the Australian Government Department of the Environment and Water Resources for consideration of an approval prior to commencement of any works in these locations.

Specific management and monitoring strategies for issues arising from these surveys should be included in the relevant sub-plans in the CEMP.

Further information was requested by DEW on the possible impacts to listed threatened species of blasting associated with trenching along the route. The proponent responded by informing DEW that “*modern blasting techniques for rock excavation of pipeline trench should not be associated with traditional movie-style vision of a tremendous explosion of rock and dust*”. DEW has expressed disappointment at the response.

The EPA Program is also not satisfied that the information request was adequately addressed. The blasting itself will generate noise and vibration, as will the ‘airtracks’ used to drill holes for the explosive placement (Alcan 2004). Should blasting be required during pipeline construction, the proponent is to prepare a blasting sub-plan as part of the CEMP. Details should be provided on where and when blasting will occur in the context of potential impacts on EPBC Act listed species, habitats and breeding cycles. The Northern Quoll and Gouldian Finch are of particular concern in this respect. Where there is any risk of impacts to listed species, management measures should be provided. These measures could include increasing the depth of material cover, increased spacings between charges and reducing the size of charge detonated per event.

Recommendation 13

A Blasting Sub-Plan is to be prepared as part of the CEMP in the event that blasting is required and submitted for approval by the Australian Government Department of the Environment and Water Resources. The plan should outline management measures that will be employed in the context of risks to species listed under the EPBC Act.

4.7.2 Open trench

Excavation of a 1.2m-deep trench in which the pipe will be laid has the potential to act as a pitfall trap. The proponent indicates that the maximum length of trench that would be open at any one time would be 70km. This is because different parts of any spread require advanced construction before the main part of spread machinery reaches advanced open trench areas, particularly in rocky terrain. Issues have arisen with previous pipeline construction projects such as the Port Hedland to Telfer gas pipeline where significant fauna mortality occurred in the open trench. The main causes of this mortality were attributed to a mix of very hot conditions, rainfall events flooding the trench and failure of fauna teams to clear the trenches regularly. Resultant control measures applied to future pipeline projects in Western Australia included:

-
- Allowable open trench lengths were significantly restricted to 20km, with a further 10km allowed for rocky terrain;
 - No part of the trench was to remain open for longer than 7 days except in rocky terrain where 15 days was allowed;
 - At least six fauna handlers were required to be employed and a minimum of one person for every five kilometres of open trench;
 - The full length of the open trench was to be cleared by ‘fauna clearing persons’ at least once each day before 10am;
 - ‘Shade shelters’ to be installed at intervals not exceeding 100m;
 - ‘Trench plugs’ to be installed not exceeding 1000m to allow fauna to exit; and
 - Water (with the exception of groundwater) to be pumped out of the trench on a daily basis.

The proponent acknowledges that prevention of wildlife falling into the trench is unrealistic but argues that, historically, pipeline projects that have had restricted open trench requirements imposed, have been plagued with logistical and safety concerns. The EPA Program is of the opinion that these concerns have not been adequately demonstrated. It is acknowledged that logistical issues are important and that a 20km open trench allowance could be very restrictive. Nevertheless, the EPA Program is of the opinion that 70km of open trench is excessive and that the proposed maximum open trench distance has high risk for fauna mortality. The proponent intends to manage an unrestricted open trench by having appropriate numbers of competent wildlife handlers. The EPA Program considers that this would be more effectively managed by reducing the maximum length of open trench and 60km is considered to be a generous maximum. This could reduce the incidence of fauna falling into the trench and being injured or killed. An open trench of 60km is in keeping with that identified for the Trans Territory Pipeline proposal.

Regardless of the distance, the EPA Program considers that the number of qualified wildlife handlers engaged on the site will need be proportional to the amount of trench that is open at any particular time. The proponent provides assurances that there will be sufficient numbers of wildlife handlers to cover the length of open trench and remove any trapped fauna daily. The EPA Program recommends more frequent trench clearances per day in accordance with Animal Ethics Operating Procedures (CDU 2003).

A protocol for the handling of trench fauna has been developed and is included in Appendix 2 of the PER Supplement. The following measures are proposed by the proponent for the BGP pipeline:

- Construction activities will be confined to the Dry season when activity levels of reptiles are lower due to cooler weather;
- Inspection of the entire open trench each day, current work areas being the priority, by specialist fauna handlers;
- Installation of ramps at 500m intervals;
- Placement of moistened hessian sacks as wildlife havens in each section between ramps and/or trench plugs; and
- Additional measures in areas of high faunal density (more sacks, ramps and branches as ladders).

Recommendation 14

- **Maximum length of open trench is to be limited to 60km;**
- **The proponent will ensure the pipeline contractor adheres to all management measures outlined in the EMP;**
- **Audits of the pipeline construction work will be conducted by DPIFM;**
- **If the recommended management strategies are not effective in managing fauna mortality, further measures may be required of the proponent and their principal contractor to ensure this is rectified (reduce allowable length of open trench, reduce allowable time that trench can remain open in more ecologically rich areas); and**
- **Appropriately trained fauna handlers will be employed in sufficient numbers to enable the open trench to be cleared at least once daily.**

4.7.3 Outstanding survey information

Regional fauna experts from the Parks and Wildlife Service of the Northern Territory were consulted to determine specific sites along the pipeline route for targeted surveys. Five locations were identified during field investigations as being habitats of interest and/or areas where little knowledge of fauna existed. At the time of writing, only one of the sites had been surveyed as described in Section 4.7.1 of this Report. The remaining four sites to be surveyed include:

- An area of limestone-influenced soils that displayed vegetation characteristics distinctly different to anywhere else on the route, and also showed signs of faunal activity;
- The riparian zone on the eastern side of the pipeline crossing of the Daly River;
- The rocky range on the western side of the pipeline crossing of the Daly River (possible pebble mound mouse habitat); and
- An area of tall forest on red soils near Wadeye.

Several NT Government agencies requested this information for the Supplement. DEW also requested that the information be provided to aid in consideration of an EPBC approval decision as discussed in Section 4.7.1 of this Report. The proponent has indicated that the surveys will be completed by the end of June and the information will be presented in report form in July citing access limitations as the reason the surveys were not completed for the Supplement.

It is generally accepted that information used to inform decisions on large projects is provided during the assessment process and not after decision-making is completed.

This information must be provided in order to inform final decision-making with respect to the pipeline route. Therefore, it is recommended that pipeline construction works in the survey locations be delayed until the interpreted survey information, together with appropriate management strategies, is reviewed and recommendations made to the proponent by the Australian and Northern Territory Governments.

Recommendation 15

Fauna survey and management information is to be submitted to the EPA Program prior to the commencement of works in targeted locations in accordance with Recommendation 12 of this Report. Specific matters to be dealt with must include, but

not be limited to, EPBC listed species and species of significance under the *NT Parks and Wildlife Conservation Act*.

4.7.4 Exotic species

The spread of weed and pest fauna species along the BGP route is considered to be a major risk of the project. Weed propagules are likely to be picked up and transported through all stages of the project. As traffic movements along access tracks and the pipeline corridor will be most frequent during the construction phase, this is likely to be the period of highest risk. During the operational phase the opportunity for weed transfer will be less frequent; however, traffic may be less easily managed during this time if access to the pipeline corridor by non-project vehicles is not properly restricted. This will be a major challenge to the BGP project and is discussed in Section 4.13 of this report.

Pest species such as the Yellow Crazy Ant *Anoplolepis gracilipes* have the potential to be imported in machinery from infested areas such as Gove and Queensland. Cane Toads *Bufo marinus* could also be further spread during the project and will need to be managed. For example, Cane Toads removed from the open trench could be euthanized. These and other pests already exist in the region but the opportunities for further spread should in no way be enhanced by the project.

During field surveys of the BGP proposed construction corridor in December 2006, the major exotic species recorded were:

- *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 gayanus* (an introduced grass, known as Gamba Grass).

A further fifteen species identified in the project area are related to environmental disturbances from road construction, cattle grazing and feral animals, mostly on pastoral land. Fourteen weeds of potential concern were identified through published information. From the available data, the proponent has identified three priority areas for weed management along the route. As well as ensuring the priority areas are properly managed, the proponent will need to ensure that weed transfer into adjacent areas does not occur.

The proponent has prepared a Weed Management Sub-Plan as part of its CEMP, which will require further review by NTG once the Construction Contractor is selected.

To ensure preventative and management measures are effective, frequent and thorough inspections and treatment will need to be ongoing to ensure pest species are not given the opportunity to establish. The vehicle washdown facilities will need to be strategically placed and managed effectively for the life of the project. The proponent will be required to consult closely with the Weeds Branch of NRETA in finalising their management plan and is advised to consult with other weed management groups along the route including the Thamarrurr Regional Council, which has an established weed management program.

The EPA Program is satisfied that weed issues on the BGP route can be managed provided management measures documented by the proponent in the CEMP and OEMP are strictly adhered to. Monitoring in accordance with the CEMP commitments must be undertaken to assess the ongoing success of these measures. Compliance reports should be submitted to NRETA.

Recommendation 16

Monitoring and management of exotic species along the operating pipeline corridor must be ongoing. A revised Weed Management sub-plan is to be submitted to NRETA for approval following input from the Construction Contractor prior to commencement of works. Compliance reports for the monitoring program must also be submitted to NRETA.

The proponent should engage with the Thamarrurr Regional Council to discuss employment opportunities associated with ongoing exotic species management.

4.7.5 Ecologically sensitive habitats

The pipeline is proposed to traverse the upstream section of the Moyle Floodplain and Hyland Bay System within the nominated boundaries of a declared ‘Wetland of National Significance’ under the *Ramsar Convention 1971*. This area is most notable for its waterbird populations and is considered to be one of the most important areas for colonial breeding waterfowl in the Northern Territory. The wetland complex occurs across an area of approximately 20km by 30km. Studies showed the area has supported up to 14 significant waterbird sites and 6 significant breeding sites. The habitat through which the pipeline traverses the wetland catchment is dissected by seasonally inundated floodplains and riparian forests associated with Anopheles and Chalanyi Creeks. These creeks are the main surface water inflows to the southern part of the wetland system.

It is essential that pipeline construction activities be absolutely confined to within the 30m corridor in this area to ensure that the wetlands are not impacted. Although this philosophy applies to the entire pipeline route, it is particularly important here, as any failure of erosion and sediment control measures has the potential to impact on this significant area.

The proponent acknowledges the importance of this issue and the PER indicates that the pipeline corridor will follow country that is dominated by *Eucalyptus* woodland to open forest. This will ensure that permanent floodplain swamps are avoided. No specific monitoring program for the wetland has been planned as the proponent considers down-gradient impacts highly unlikely. This is because:

- all works will be conducted during the Dry season;
- the alignment was chosen to avoid permanent floodplain wetlands; and
- all precautions will be taken to minimise impact at Anopheles and Chalanyi Creeks, which are unlikely to be in flow at the time of construction.

The draft CEMP contains management measures for watercourse crossings as well as a program to monitor the success of reinstatement of the construction corridor. The EPA Program continues to emphasise the importance of maximising the stability of work areas following completion of construction prior to the wet season.

Ancillary infrastructure for this section of the pipeline should be avoided to the full extent possible, and the proponent should avoid the use of access tracks and creation of turn-around areas and borrow pits.

Recommendation 17

Within the nominated boundaries of the Moyle Floodplain and the Hyland Bay System, the proponent is to implement all possible measures to confine construction activities to the 30m corridor.

Access through the area is to occur on the main road or within the construction corridor and no ancillary infrastructure is to be built within this section of the pipeline unless absolutely necessary and following discussion with the NRETA.

4.8 Greenhouse Gas Emissions

As identified in the PER, greenhouse gas emissions from the proposal are expected to arise from three project phases: construction, commissioning and operations. The construction phase would generate the largest proportion of emissions.

Construction phase

The PER states that construction emissions would amount to 4500 tonnes carbon dioxide equivalent (tCO₂-e), generated primarily from diesel fuelled mobile equipment. The PER separately identifies emissions associated with vegetation clearing as a result of construction. The emissions associated with land clearing, due to a loss of sequestration capacity, will initially be much greater than that estimated in the PER. However, it is recognised that the proponent intends to revegetate the majority of land cleared, and that *permanent* emissions as a result of land clearing will be approximately 26,000tCO₂-e. Consequently, total emissions resulting from the construction phase will be approximately 30,500tCO₂-e.

The proponent has committed to a number of measures to minimise emissions from the construction phase including revegetating land, avoiding the burning of cleared vegetation, and in the context of air emissions generally, vehicle maintenance. The EPA Program supports these measures.

Commissioning and operations

Projected greenhouse gas emissions from commissioning (53tCO₂-e as a one-off) and operations (31tCO₂-e per year) are minor; however, fugitive emissions have not been considered in the PER as requested. The significance of these emissions cannot therefore be determined for this project, which is a concern given the significance of fugitive emissions that were estimated for the Trans Territory Pipeline (TTP) proposal. It may be that much of the fugitive emission sources for the TTP could be attributed to the proposed compressor station, a component that is not included in the initial phase of the BGP project. The emissions from a compressor station may in the future require reporting under a national mandatory reporting scheme and/or be captured through an emissions trading scheme. Any proposal to include a compressor station for this project in the future should be referred under the Environmental Assessment Act in accordance with Recommendation 2 of this Assessment Report.

The PER states that the proponent is in discussion with the Australian Greenhouse Office about participation in the Greenhouse Challenge Plus program to offset its emissions. Offsetting emissions from all phases of the proposal is strongly supported, and provides an opportunity for the proponent, particularly in relation to the operations phase, to promote the operation of the pipeline as 'carbon neutral'.

4.9 Waste Management

Two main sources of waste are expected from the BGP project – wastes from construction activities and wastes from the construction camps. The PER provided a very broad estimate of

the types of wastes expected and the quantities of packaging and some campsite wastes. This was not a comprehensive description.

The EPA Program requested further information regarding quantities of wastes citing the proponent's experience with other pipeline projects as a basis for this information. The proponent did not expand on what was originally provided in the PER. The EPA Program considers that procurement for these projects should aim to minimise waste generation, and waste types and volumes should be tracked to inform improvement mechanisms for this and future projects.

The proponent indicates that resolution of waste disposal issues will not be possible until the Construction Contractor is involved in the decision-making but will approach the Construction Contractor to consider minimising packaging where this is possible. Procured materials will normally come complete with packing materials and containers, and the proponent commits to dispose of those in a responsible manner.

Recycling

Recycling opportunities in the Northern Territory are limited to landfills in Darwin and Katherine, and to a number of commercial facilities with limited capacity. The BGP proponent commits to recycling wastes including waste oils, glass, metals, cardboard and paper, and tyres, where possible. The EPA Program suggested that recyclables could be segregated, for example, in the construction camps, and then 'opportunistically' transported to the major centres of Darwin or Katherine. The proponent asserts that segregation of wastes could be carried out if facilities existed for the disposal of the segregated wastes and the Construction Contractor would recycle where feasible and practical to do so.

The Supplement states that if recycling cannot be carried out locally, it would be wasteful to undertake additional trips (increase greenhouse gas emissions) to and from Darwin to recycle the quantity of recyclables that the Project is likely to produce. The Project has identified a number of companies that can receive and recycle certain types of wastes, but these are limited in the region. The EPA Program recognises these limitations but considers that logistical opportunities could arise with 'empty' transport vehicles moving from the project area to Katherine and Darwin. The proponent could improve waste disposal behaviours in camps and promote further recycling demand in the NT by encouraging this practice. The BGP project commits to managing waste in accordance with an approved CEMP.

Waste water

Effluent disposal systems for sewage waste must comply with the requirements of the *Code of Practice for Small On-site Sewage and Sullage Treatment Systems and the Disposal and Reuse of Sewage Effluent* and discharge will be to the satisfaction of the NT Department of Health and Community Services (DHCS) after consideration of an application for site specific design approval. The proponent should also liaise with the Environmental Operations Branch in the EPA Program to ensure all obligations under the *Water Act* are met.

Recommendation 18

A revised Waste Management sub-plan is to be submitted to the EPA Program for approval following input from the Construction Contractor. The sub-plan should include a detailed waste minimisation strategy. The Project should ensure a detailed waste inventory is recorded to inform future project management improvements.

4.10 Roads and Transport

The PER assessment process identified road safety as an issue associated with increased traffic movement from construction vehicles on the Wadeye-Daly River Road. The increased frequency of vehicles and their combined weight over time also has the potential to damage the local roads and road verges. The proponent considers that the main impact from BGP traffic will be to the pavement surface of unsealed roads. The PER does not discuss the safety implications and social impacts of construction traffic using public roads. The perception of significantly enhanced accident risk is considered by one respondent to be the major issue for service providers and residents in the Thamarrurr Region. This risk is potentially due to increased heavy vehicle movements combined with traffic speed differentials and dust on the main road to Wadeye from Daly River.

Traffic for the BGP project can be attributed to 5 elements:

- Pipe haulage;
- Mobilisation/demobilisation of plant and equipment;
- Relocation of construction camp sites;
- Construction vehicle movements; and
- Personnel vehicle movements.

The public roads that would be used for project-related traffic include the Stuart Highway, Fountain Head Road, Oolloo Road, Dorat South Road, Daly River Road and the Wadeye-Daly River Road. All roads are bituminised except for the latter, which is 178km of unsealed gravel road in poor condition. It is this section of road that is of most concern from a safety perspective.

Determining the number of project-related trips on the Wadeye-Daly River section of road is problematic. Until the Construction Contractor becomes involved in the detailed planning phase for the project, statistics presented in the assessment documentation are acknowledged to be conceptual. Detailed traffic and logistics studies, though intended, have not been undertaken. The BGP proponent has estimated from experience that no more than 500 construction vehicle trips will be required over the duration of the construction period, estimated to be 120 days. However, this represents only a relatively small portion of total traffic movements for the project, accounting for workers moving between camp and the construction corridor, water cartage, waste disposal, fuel deliveries, and floating of tracked plant and equipment around obstacles.

A detailed breakdown of estimated trip statistics is provided in Table 2-8 of the PER and Supplement and in the transport maps provided in the draft Road Use Management Plan (RUMP). Estimated total vehicle movements for the Wadeye-Daly River Road vary between 359 – 392 loaded, and between 419 – 452 unloaded, a total of approximately 800 ± 50 trips. Line pipe haulage accounts for less than half of this total and is anticipated to be in the order of 7 per day during the peak period, assuming double semi-trailers are used. Not all of these trips would cover the full length of the road between Wadeye and Daly River as vehicles would need to access work sites in the construction corridor. Few vehicles would need to make the full trip to Wadeye. These estimates also assume that for every load shift an empty transport is brought in to move the load and then vacate; in reality, some of these vehicles would park up along the pipeline route while not in use, therefore not contributing to traffic congestion on the roads. Further, many of these road trips are intermittent and the proponent expects that logistics planning will minimise the interaction of construction traffic with pipe trucks.

Nevertheless, these added movements could be considered significant to a member of the public sitting behind a slow-moving semi-trailer generating significant dust with limited or no passing opportunities due to restricted visibility.

The proponent acknowledges in the Supplement the safety issues associated with the existing road standard and traffic volume and indicates that a traffic management consultant has been engaged to review the transport data and to update the RUMP with appropriate traffic management measures. The amended RUMP will need to be submitted to the NT Department of Planning and Infrastructure for approval prior to mobilisation of equipment. If the measures outlined in the RUMP prove insufficient to address real impacts on the local communities on the Wadeye-Daly River Road, then the requirement for further action may need to be explored, for example, dust suppression measures used on the working sections of the road. Any water requirements as a contingency measure to mitigate impacts should be appropriately identified and approved in accordance with Recommendation 3 of this Assessment Report.

Recommendation 19

The Road Use Management Plan must include management measures that specifically address safety issues associated with traffic movement along the Wadeye to Daly River Road.

In the event that watering of sections of the road is deemed to be necessary, the proponent will obtain all necessary access permission and approvals to source water appropriately in accordance with Recommendation 3 of this Assessment Report.

The Northern Territory and Australian Governments are funding an upgrade of the Wadeye-Daly River Road, which will include widening, sheeting (re-gravelling) and drainage. This will benefit all users of the road including the BGP and Blacktip project teams. Since the frequency of project-related vehicles and their combined weight over time has the potential to damage road surfaces and verges, it is understood that the proponent has been negotiating with DPI Road Network Division (RND) on its contribution to the maintenance costs of the road during its use for pipeline construction. The EPA Program supports DPI on this matter. Following completion of construction, the proponent should ensure the road is in a condition at least as good as when pipeline construction commenced.

Recommendation 20

The proponent is to negotiate a cost-sharing strategy with the RND to maintain the Wadeye-Daly River Road during the BGP construction project. At the conclusion of construction, the road should be in a condition as good as or better than its condition at the commencement of construction.

4.11 Historic and Aboriginal Cultural Heritage

Issues raised during the PER period with respect to the *Heritage Conservation Act* and sites protected under the *Northern Territory Aboriginal Sacred Sites Act* have largely been addressed through the assessment process. The potential for pilfering of archaeological material can be appropriately managed with the supervised implementation of 100m-long temporary fences to discourage visitation. In addition, employees will only be made aware of archaeological site locations when works could directly impact upon those sites.

Any access requirements or proposed clearing activities that have not been brought to the attention of Traditional Owners will require a Clearance Certificate. The proponent has committed to ensuring the necessary approvals are obtained prior to commencement of works. This issue has been addressed in Section 4.3 of this Report and approvals should be obtained in accordance with Recommendation 3 of this Report.

4.12 Social Impact

The proponent has been engaged in consultation with the NLC with respect to social issues.

Few concerns regarding negative social impacts have been raised during the assessment process. The inconvenience and safety issues associated with increased use of the Wadeye-Daly River Road have been discussed in Section 4.10 of this Report. Key issues identified in consultation include local employment opportunities and any economic advantage the BGP Project may have for communities.

The proponent has entered into an agreement with the NT Industry Capability Network (NTICN) to assist with resourcing local businesses and labour during the construction period, and has committed to including clauses requiring similar use of NTICN processes in all major contracts. The proponent will consider applications from any interested Indigenous contractors qualified for particular work on the project. The Thamarrurr Regional Council has already registered strong interest in resourcing projects such as ongoing weed management along the pipeline route. There may also be opportunities within the fauna management component during construction of the BGP.

The proponent is actively engaged in negotiations with the NLC in regard to access to Aboriginal land and a range of broader Indigenous Project participation issues. According to the PER, the NLC have held meetings with all Traditional Owners along the route, including Native Title claimants, in order to give approval for the route. The route has avoided all known Sacred Sites and any others identified will need Clearance Certificates prior to works. The proponent is unaware of any social impact from this aspect of the project.

NLC permit procedure requirements will be implemented and consultations will continue through the NLC throughout the lead up to and during the construction phase of the Project. The proponent has provided assurances that management measures for contractors during construction will focus on promoting understanding of Indigenous culture, minimising the need for a high level of interaction between communities and the workforce, and reducing potential impacts on community infrastructure. A Cultural Heritage Management Plan (CHMP) is being developed in conjunction with, and requiring the approval of, the NLC and the AAPA.

In terms of interaction with local communities, the proponent has made a number of commitments, which are included in Appendix 1 of this Report. In the first instance, interaction will largely be avoided because the construction crew will be housed away from communities in fully self-contained construction camps. 'Wet mess' facilities will be provided within the construction camps to avoid the need for workers to visit hotels, and suitable arrangements will be made for prohibiting the sale of alcohol within construction camps to people other than construction workers. A code of conduct for all workers will also be in place. Penalties for breaching this code of conduct will need to be established and included in the CEMP.

The EPA Program is satisfied that social impacts can be positive for the communities along the pipeline route if all management measures outlined in the PER and the approved CHMP are adhered to and ongoing consultation between the proponent and the NLC is conducted.

All possible opportunities for encouraging local employment in the project should be explored.

4.13 Unauthorised Access to Pipeline Corridor

Unauthorised access to the pipeline corridor during construction and operation is an important ongoing issue facing the proponent and possibly one of the most difficult to manage. Unauthorised use of the corridor as a thoroughfare has major environmental management and safety implications as well as social consequences. For example, the uncontrolled movement of vehicular traffic along the pipeline could result in the transfer of weeds and other pests, unplanned fire risks, increased erosion potential, and impacts relating to trespass on pastoral leases and Aboriginal Freehold Land. It is acknowledged that some watercourses and topographical features could present natural barriers to movement along the pipeline route, but there are some regions where, in the Dry season, significant lengths of the pipeline route will be navigable by four-wheel drive vehicles. The NLC has indicated that this issue is of concern to Traditional Owners.

According to the PER, the form of tenure sought and given from landowners, including Traditional Owners, does not give the pipeline proponent rights to impede access to the pipeline construction corridor other than those expressly provided for under the *Energy Pipeline Act*. However, section 66 of the *Energy Pipelines Act* prevents interference with the pipeline without the permission of the licensee, and therefore limits activity over the pipeline. The opportunity to enforce this would appear to be limited given the remoteness of some sections of the pipeline.

The proponent contends that unauthorised access will be made more difficult due to the fact that the majority of the route is on Aboriginal or private land, and fines will be incurred for trespassing. There will also be erosion control structures and berms constructed along the 6m wide access road, which could deter vehicles.

This issue has not been adequately addressed and further consideration must be given to managing this risk in the OEMP.

4.14 Environmental Management

A number of management plans have been proposed through the course of the assessment process for the BGP project. All management plans and procedures developed for the project must be approved by, or developed to, the satisfaction of relevant Government agencies and stakeholders within specified timeframes. It is recommended that, as a minimum, the NLC should be a key stakeholder to which management plans are submitted for comment prior to finalisation. These approved plans and procedures will be one of the primary tools by which the proponent will implement management and monitoring commitments made in the PER and the recommendations detailed in this Assessment Report.

It is vital to the performance of the project that the requirements in management systems, plans and procedures are incorporated into the proponent's tendering and contracting procedures and that all contractors are fully aware of, and act in compliance with, relevant management plans. The information should be provided to all personnel as part of an induction process.

The proponent has provided frameworks for many of the sub-plans within the PER. The proposed sub-plans and procedures that form the CEMP for the BGP project are listed below.

- Alignment, access and site selection;

-
- Campsites, offices and site management;
 - Clearing and Grading;
 - Trenching;
 - Pipe stringing and welding;
 - Pipe laying and backfilling;
 - Hydrotesting;
 - Clean up and restabilisation;
 - Flora and fauna protection;
 - Weed management;
 - Watercourse management;
 - Erosion management;
 - Air emissions;
 - Noise and vibrations;
 - Waste management;
 - Archaeological and Historic site management;
 - Handling and disposal of dangerous goods;
 - Fire Management;
 - Biting Insects management;
 - Safety and Emergency Management;
 - Special Area Plans – HDD crossings, Acid Sulphate Soils, Open-cut with flow diversion, Dee Creek, Fenton Airstrip/Camp, Archaeological site – rock cairn;
 - Road Use Management Plan (RUMP); and
 - Cultural Heritage Management Plan (CHMP).

A Draft Operational Management Plan will need to be approved by the regulating authority prior to commissioning of the pipeline.

Recommendation 21

A revised Construction Environmental Management Plan for the Bonaparte Gas Pipeline project is to be submitted to DPIFM and the EPA Program for approval prior to commencement of construction of the pipeline and ancillary infrastructure. The approved EMPs will be included as an appendix within the Pipeline Management Plan.

In preparing the Environmental Management Plan, the proponent will include any additional measures for environmental protection and monitoring contained in this Assessment Report, and recommendations made by the Northern Territory Government with respect to the proposal. This must include further details provided by the Construction Contractor, particularly if these details change any aspect of the project. The CEMP shall be referred to relevant NT Government agencies and the NLC for review prior to finalisation.

The CEMP shall form the basis for approvals and licences issued under relevant NT legislation.

The proponent is ultimately responsible for the CEMP and will ensure the contractor complies with all requirements of the CEMP.

5 References

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Charles Darwin University (CDU) (2003) *Standard Operating Procedure: Addressing Animal Welfare in Fauna Surveys*, CDU Animal Ethics Committee.

EcOz (2007) *Bonaparte Gas Pipeline Public Environmental Report: Wadeye to Ban Ban Springs Station*, Prepared for Australian Pipeline Trust.

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Jackson, S. (2004) *Preliminary Report on Aboriginal perspectives on land-use and water management in the Daly River region, Northern Territory*, A report to the Northern Land Council, CSIRO.

Taylor J. (2004) *Social Indicators for Aboriginal Governance: Insights from the Thamarrurr Region, Northern Territory*, CAEPR, ANU, Research Monograph No. 24.

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Appendix 1

Table of commitments by Australian Pipeline Trust for the Bonaparte Gas Pipeline project. Underlined text represents commitments made in the Supplement to the PER.

Subject	Commitment/Safeguard
Disturbance to Geology	<p>Extraction will be from existing borrow pits and quarries wherever practicable, and development of any new borrow pits will be managed in accordance with an EML or EMP negotiated with Minerals and Energy.</p> <p>Particular care and vigilant observance of trenching activities will occur when working in areas that contain karst.</p>
Erosion, Runoff and Soil Compaction	<p>The pipeline will be buried with a minimum depth of cover of 750mm in accordance with AS2885.</p> <p>Access during construction and operation will only be via environmentally approved access tracks and the construction corridor.</p> <p>Erosion and sediment control management associated with watercourses will include: HDD (geotechnical constraints permitting) at the main watercourses; 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.</p> <p>Monitoring of erosion and rehabilitation progress will be undertaken for the duration of construction and after the first wet season.</p> <p>Erosion control will be applied especially to exposed soil, vegetation stockpiles and water crossings during construction.</p> <p>Management measures during construction will include topsoil conservation and the installation and maintenance of erosion control measures.</p> <p>Rehabilitation will be undertaken post construction, and will include installation and maintenance of erosion and contour banks spaced in accordance with the physical composition of the soils, catchment size, and slope angles.</p> <p>Reinstatement will be completed prior to the first storms of the wet season.</p> <p>Short and long term erosion and sediment control measures (e.g. whoaboys, contour banks, earth banks, turn off drains, silt fences) will be installed and maintained throughout construction.</p> <p>Landforms, including any erosion controls established prior to construction, will be re-contoured to their original condition.</p> <p>Vehicle movement will be avoided on restored easement until the vegetation has re-established.</p> <p>Rehabilitation progress will be monitored and will be remediated where necessary.</p>

Subject	Commitment/Safeguard
Generation of Acid Sulfate Soils	<p>A Special Area Plan (SAP) will be developed and implemented if ASS is encountered on the route.</p> <p>Excavated soils will be stockpiled for a minimal amount of time, thus reducing the potential time for oxidation of ASS, and subsequent runoff.</p> <p>Excavated soil containing ASS will be stockpiled within a bunded area and treated with lime.</p> <p>ASS will be retained within the original location of excavation to reduce the potential for spreading acidity.</p> <p>The trench will be backfilled and compacted to a level at least similar to that of the surrounding soil profile, ensuring that the structure does not provide a permeable pathway for acid leachate migration, and that permanent lowering of the water table does not occur.</p>
Seismic activity	<p>If a fault line with potential for activity is identified, then the pipeline design will be modified at that location using design techniques appropriate to the expected fault movement and in accordance with the relevant safety requirements of AS2885.1.</p> <p>Further research and correspondence on regional seismicity will be completed in the detailed engineering phase of the Project.</p>
Impact on Hydrology and Ground and Surface Waters	<p>Watercourses that are trenched will be stabilised.</p> <p>The streambed of trenched watercourse crossings will be restored to as near original condition as possible.</p> <p>If required, bank stabilisation and repairs during operation will be scheduled for the Dry season.</p> <p>Watercourse approaches on access tracks will be stabilised using the most suitable method for the conditions, and temporary culverts will be constructed at flowing watercourses.</p> <p>Access tracks to watercourse crossings will be designed and constructed in accordance with environmental guidelines.</p> <p>Watercourses that happen to have a significant amount of flow (approaching 1,000L/s) at the time of construction will be reassessed and crossed with an appropriate method, including flow diversion.</p> <p>At locations where temporary watercourse crossings are created, all excess materials will be removed at the completion of construction and the area reinstated.</p> <p>Extraction from open water sources, such as creeks and rivers, will be in accordance with a Water Extraction Licence.</p> <p>A licence will be sought for the short term use of the bore on Tipperary Station which produces a flow rate higher than 15L/s.</p> <p>Extraction will be spread over a number of bores and water sources where possible.</p>

Subject	Commitment/Safeguard
Hydrotest	<p>Hydrotest water will be treated and disposed of in accordance with a Hydrotest Management Plan.</p> <p>The geofabric, which contains the residue from each flush, will be disposed of to a landfill.</p> <p>The disposal water will be released under pressure to aerate and manage soil erosion.</p> <p>Disposal water from the hydrotesting will be irrigated to land, in accordance with the recommendations of the CMIT (2005) report.</p> <p>Flush water will be disposed to land, well separated from any water bodies.</p> <p>The flush water will be treated in accordance with the recommendations of the CMIT (2005) report on hydrotests.</p> <p><u>Turkey's nest dams will be constructed only with agreement from the landholders, on land adjacent to bores where the supply is intended to be extracted. Construction will be subject to requirements under the <i>Water Act</i>.</u></p> <p><u>Should biocides be necessary, APT will submit a detailed proposal on the use and disposal of waters containing biocides.</u></p>
Disturbance to Visual Amenity	<p>The pipe will be installed underground.</p>
Death, Injury and Disturbance to Fauna	<p>The construction workforce will be briefed during inductions about their obligations to protect fauna.</p> <p>Construction activities will be confined to the Dry season when the activity levels of reptiles are lower.</p> <p>Fatalities of animals that fall into the trench will be minimised through the installation of temporary refuges or escape routes.</p> <p>Wildlife handlers will be available on-site to inspect the trench daily from sunrise.</p> <p>Wildlife handlers will remove wildlife from the trenches, identify, record data and release the captures into nearby vegetated areas.</p> <p>Wildlife handlers will be legally permitted, trained in appropriate handling protocols, and will possess the necessary Personal Protection Equipment (PPE) for the handling of animals.</p> <p>Animal handlers will follow the Australian National Health and Medical Council's <i>Australian Code of Practice for the Care and Use of Animals for Scientific Purposes (2004)</i> when dealing with injured fauna.</p> <p>Wildlife data will be given to the PWSNT, and any dead animals found will be preserved and submitted as voucher specimens.</p> <p>Animals that are unable to be identified in the field will be taken and lodged as voucher specimens with MAGNT.</p> <p>A permit to interfere with wildlife from the PWSNT will be obtained before trench construction commences.</p> <p>Issues arising with stock will involve the landowner as the first point of contact.</p> <p>Logs and fallen vegetation will be pulled back over the alignment to provide habitat for native fauna.</p> <p>Construction activities will be planned so the excavated trench will be open for the minimum amount of time.</p>

Subject	Commitment/Safeguard
Damage and Destruction of Vegetation and Flora	<p>Project personnel will be briefed during inductions about their obligations to protect native vegetation.</p> <p>Removal of large trees on riverbanks will be avoided where possible.</p> <p>Only saplings that may grow into large trees close to the pipeline will be removed during the maintenance of the pipeline corridor.</p> <p>Large fruiting trees, which provide important food resources for native fauna, will be retained where possible.</p> <p>Understorey cover will be allowed to regenerate over the entire construction corridor after construction.</p> <p>The majority (80%) of woodland and forest cleared by the Project will be allowed to grow back across the pipeline corridor.</p> <p>Construction activities will be designed, planned and managed so that only specified areas of native vegetation, referred to in Alignment Sheets are cleared (e.g. 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).</p> <p>Clearing, reinstatement and rehabilitation will be undertaken progressively over the construction period.</p> <p>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.</p> <p><u>During the clear-and-grade operation of the construction, an environmental scientist will identify any <i>Cycas</i> species and have them removed for the horticulture trade.</u></p>
Impacts on Aquatic Ecosystems	<p>Machinery and equipment that is submersed in a waterway will be washed down and decontaminated before being used in another waterway.</p> <p>Culverts will be designed to be environmentally sensitive, and to avoid restricting channel width.</p> <p>All in-stream maintenance will be scheduled for the Dry season to avoid critical periods of fish passage.</p> <p>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.</p> <p>Construction camps and fuel and chemical storages will be located away from watercourses.</p>
Disturbance to Ecologically Sensitive Habitats	<p>Clean up and reinstatement measures will be implemented as soon as possible after construction.</p> <p>Boundaries of special areas will be shown on alignment sheets.</p> <p>Construction activities will maintain a distance of at least 100m from isolated wetlands.</p> <p>New access tracks shall avoid environmentally sensitive areas.</p>

Subject	Commitment/Safeguard
Introduction and Spread of Exotic Flora and Fauna	<p>Before entering the area, all plant, vehicles and equipment will be certified 'weed free'.</p> <p>Weed eradication programs will be implemented as required, and a weed and exotic species management plan will be implemented during construction.</p> <p>Weed washdown bays will be developed and managed.</p> <p>Workers undertaking the following tasks will be required to fulfil all washdown requirements: surveying; fencing / gating; clearing and grading; and reinstating.</p> <p>The remainder of the workforce will be required to stay on Project approved roads or on the construction corridor, where they will not come into contact with weeds.</p> <p>Equipment and material introduced to the region, especially those from interstate, will be screened for pest species.</p>
Fire Management	<p>The Project will not intentionally light fires for any purpose.</p> <p>Fire management measures will include; spark arrestors, exclusion zones for combustible materials, and firewater tankers located near activities requiring naked flame.</p>
Biting Insects	<p>Personal protection measures encouraged for construction workers will involve: avoiding peak mosquito biting times (sunset to sunrise); wearing personal repellent containing the active ingredient DEET or Picaridin; and wearing loose, light coloured, long-sleeved clothing and full length trousers.</p> <p>Construction Camps will be located as far as possible away from major mosquito breeding sites.</p> <p>If imported malaria cases occur, the individual will be kept indoors at night away from mosquito bites until the Medical Entomology Branch (MEB) makes a risk assessment.</p> <p>Artificial receptacles, <u>machinery items and other equipment that have previously held water</u> sourced from North Queensland or Groote Eylandt will be treated with a chlorine solution to kill any mosquito eggs that may be present.</p> <p>Infrastructure such as water tanks, sewage systems and wastewater treatment facilities will be screened to prevent mosquito entry.</p> <p>After installation, the pipeline route will be finished to a level surface in order to prevent ponding of water.</p> <p>All personnel will be advised of the mosquito borne diseases.</p> <p>All borrow pits will be rendered free draining, and borrow pits will be constructed more than 5km from human settlement.</p> <p>Areas around construction camps and work areas at high risk of biting insects will be sprayed with bifenthrin or <u>alpha-cypermethrin</u>.</p> <p>Personnel clothing will be impregnated with <u>permethrin</u> if serious biting insect problems are encountered.</p> <p>Bifenthrin, if used will be applied in accordance with the MSDS for the product.</p>
Non-hazardous Solid Waste Stream	<p>All work areas will be maintained in a neat and orderly manner.</p> <p>Putrescibles and camp wastes (including food scraps) will be contained in bins and disposed of regularly to avoid attracting vermin.</p>

Subject	Commitment/Safeguard
Non-hazardous Liquid Waste Stream	<p>Transportable Waste Water Treatment Systems (WWTSS) will be used at the construction camps for the period of the construction works, with the effluent being disposed of to land.</p> <p>Waste discharge will be separated into 'grey' and 'septic water'.</p> <p>The discharge system will be in accordance with Northern Territory Environmental Health Guidelines, including <i>Code of Practice for Small On-Site Sewage and Sullage Treatment Systems and the Disposal or Reuse of Sewage Effluent</i> November 1996 where it is relevant to transportable systems, and with a Type Approval and specific approvals for the WWTSS.</p> <p>Discharge from the septic system will be by spray irrigation, in accordance with Northern Territory Environmental Health requirements.</p> <p>Disposal of sludge (biosolids) will be to a licensed facility.</p>
Chemical or Hydrocarbon Spills	<p>All hazardous materials and dangerous goods will be purchased, transported, stored and used in accordance with the relevant Australian Standards, National Occupational Health Safety Commission (NOHSC) guidelines, Work Health (Occupational Health and Safety) Regulations, Dangerous Goods Regulations and Northern Territory guidelines.</p> <p>Spill kits and containment devices (such as drip trays) will be available and used wherever required.</p> <p>Main fuel and chemical storage and wastewater treatment facilities will be designed and constructed to Australian Standards.</p> <p>No refuelling of plant, equipment, or vehicles will be undertaken within 100m of a watercourse.</p>
Greenhouse Gases	<p>Cleared vegetation will be allowed to decompose naturally, and will not be intentionally converted to CO₂.</p>
Other Gaseous Emissions	<p>Sensing devices, including pressure sensors and flow meters, will be in place for the detection of accidental gas release.</p> <p>Regular aerial patrols will identify any areas of natural or third party activity, which could threaten the integrity of the pipeline so that preventative measures can be implemented.</p> <p>Valves will be inspected at regular intervals to ensure that: each valve is supported; support points are not corroding; valves are not leaking; valves and actuators are fully operable; valves are secured to prevent unauthorised access and usage; and valves are regularly tested and operated to confirm operability.</p>
Dust Emissions	<p>The construction corridor and access routes will be watered to maintain the integrity of the road and prevent bulldust formation.</p> <p>The time exposure for surfaces such as stockpiles and cleared areas will be minimised.</p> <p>The site induction will include dust generation awareness and applicable control measures.</p> <p>The construction corridor will be reinstated as early as possible to assist in soil stabilization.</p> <p>There will be controls on Project vehicle speeds, and their travel will be restricted to approved roads during construction.</p> <p>Vehicle speeds will be limited when travelling and water trucks will be used to improve soil moisture.</p>

Subject	Commitment/Safeguard
Noise Emissions	<p>Transport movements, which have the most potential to impact sensitive noise receptors, will be managed through the Road Use Management Plan (RUMP).</p> <p>Plant and equipment will be maintained regularly to minimise the potential for noise impacts.</p> <p>Truck movements along the construction corridor, access tracks and main roads, will take place during daylight hours where possible.</p> <p>Local residents will be notified in advance of construction activities.</p> <p>Local residents and communities will be notified at least 24 hours in advance of planned noise events (e.g. blasting of rock if required).</p> <p>Construction will be during daytime hours as far as possible (hydrotesting will involve evening and night-time work).</p> <p>Noise levels during operations at the boundary of the future compressor station will be within the limits specified under the relevant legislation.</p>
Vibration and Blasting	<p>All blasting activities will be in accordance with the Northern Territory Dangerous Goods Act and associated Regulations, and Australian Standard 2187.1 and 2 (2006).</p> <p>Special safety and licensing requirements for the manufacture, sale, storage, transport and use of explosive material will be adhered to.</p> <p>Blasting activities will only be undertaken by highly trained and approved operators.</p> <p>An explosives contractor will provide management procedures including: an overview of blasting; safety practices; alert notices; types of explosives and detonation technique; and debris control.</p>
Archaeology and Historic Heritage	<p>All recommendations in the Archaeology and Historic Heritage Report, such as monitoring, will be carried out during the Project.</p> <p>Areas of archaeological importance have been logged into the Project GIS system and will be included in the alignment sheets for construction contractors.</p> <p>Where the route passes near identified archaeological sites, fences will be installed along the boundaries of the construction corridor for a distance of 100 metres.</p> <p>An archaeological survey will be carried out over the proposed route from KP38 to the Moyle River (KP84).</p> <p>Brightly coloured flagging tape will be placed around the historic features at risk of disturbance.</p> <p>Should any suspected human remains be unearthed or located during works, the police will be immediately notified and the remains will not be disturbed until all necessary investigations are complete.</p>

Subject	Commitment/Safeguard
Cultural and Regional Economic Impacts	<p>Consultations with the Traditional Owners, through the NLC, will continue throughout the lead up to and during construction phase of the Project.</p> <p><u>Before tracks and areas are to be cleared, an Authority Certificate will be obtained.</u></p> <p><u>All conditions required by the AAPA Authority Certificate will be fulfilled.</u></p> <p>Local communities will be advised of (employment) opportunities available in association with the Project.</p> <p>APT has entered into an agreement with the NTICN to assist with resourcing local businesses and labour during the construction period.</p> <p>The final pipeline route will be presented to the NLC Full Council meeting.</p> <p>A Cultural Heritage Management Plan will be developed, and will be approved by the NLC before construction commences.</p> <p>NLC permitting procedure requirements will be implemented.</p> <p>Any newly constructed access tracks will be managed in accordance with the Cultural Heritage Management Plan (CHMP).</p>
Social Impacts	<p>The construction crew, which may reach a peak of around 250, will be housed in fully self-contained construction camps.</p> <p>Machinery operators (a large proportion of the workforce) will be under a zero (alcohol) tolerance limit.</p> <p>There will be random breath testing of workers.</p> <p>A 'Fit for Work Program' will be implemented to protect the health and well being of all workers.</p> <p>Induction programs will be conducted for all workers to provide background information on the area (e.g. Indigenous history, culture, current status of the land and cultural awareness so as to reduce cross-cultural misunderstanding).</p> <p>'Wet mess' facilities will be provided within the construction camps to minimise the need for workers to visit local hotels.</p> <p>Suitable arrangements will be made for prohibiting the sale of alcohol within construction camps to people other than identified construction workers.</p> <p>Local communities will be advised of (employment) opportunities available in association with the Project.</p> <p>A paramedic and an ambulance will support the construction crew.</p>

Subject	Commitment/Safeguard
Safety and Risk	<p>All personnel working in the area of Fenton Camp will be informed of the possibility of buried unexploded ordnance.</p> <p>Workers on the alignment will have constant radio contact.</p> <p>Any over size loads will be transported in accordance with the <i>Motor Vehicles Act (MVA) 1959</i> and Motor Vehicles (Standards) Regulations (MV(S) R).</p> <p>Shutdown valves will be located at the inlet to the pipeline at Wadeye and at the ADP interconnection.</p> <p>A Road Use Management Plan (RUMP) has been developed, and will be implemented in the lead up to, and throughout construction.</p> <p>Public entry will be prevented within construction areas.</p> <p>All visitors will be supervised.</p> <p>There will be continual communication between the Project and public, landowners, and other relevant stakeholders.</p> <p>Staff training will be provided to ensure that all risk management measures are understood and implemented.</p> <p>All signage for traffic management will be in accordance with the requirements of the Department of Planning and Infrastructure.</p> <p>A Safety and Operating Plan will be developed that deals with all risks identified in the AS2885 risk assessment. Controls will include:</p> <p>Patrolling the pipeline to monitor for external threats, pipeline damage and environmental issues. The pipeline will be monitored on a regular basis for third party work occurring along the ROW.</p> <p>Remote and onsite monitoring for corrosion, pipeline coating damage, equipment faults, alarms, etc</p> <p>Routine maintenance and inspection programs</p> <p>Regular contact with the stakeholders along the pipeline and supplying them with maps to ensure that they have the necessary information to identify the location of the pipeline.</p> <p>Use of trained, competent and authorized personnel</p> <p>Preventing access to above-ground facilities through security fencing, monitoring and patrols.</p> <p>Installation of pipeline marker signs at inter-visible intervals to indicate the location of the buried gas pipeline. Signage will show the Gas Operations Company contact phone numbers so that contractors can call prior to commencing work or in case of an emergency.</p> <p>A Construction Safety Management Plan will be prepared by the construction contractor to meet the requirements of: APT: APIA construction safety guidelines; Northern Territory Worksafe Standards; National Standard for Construction Work [NOHSC 1016 (2005)]; and AS2885.1.</p>

Subject	Commitment/Safeguard
Land Tenure Approvals	<p>APT are in continual consultation with all landowners on or near the proposed corridor (refer Chapter 8) and will provide notice of construction activities.</p> <p>APT will provide notice of construction activities.</p> <p>Detailed description of the route and accompanying GIS coordinates and maps will be made available to all future land-users and developers on application.</p> <p>Pipeline marker posts will be indicating the presence of the pipeline, and will be installed, in accordance with the requirements of AS2885, at crossings, fencelines, bends, and above ground facilities.</p> <p>Fencing crews will be mobilized to set up temporary gates and fences where necessary at the start of construction.</p> <p>Creation of any new access tracks will be scheduled to minimize disturbance to landholders, and will be rehabilitated in accordance with landowner requirements.</p> <p><u>If any specific locations for access or works, which were not agreed in the field with Traditional Owners, are required then they will be negotiated via the NLC Project Liaison Officer prior to works commencing on those areas, in accordance with the terms of the Land Access Agreement between NLC and APT.</u></p>
Legislation and Permits	<p>All applicable legislation will be followed and all applicable licences and permits will be obtained before the Project commences.</p>
<u>Environmental Management</u>	<p><u>APT will be ultimately responsible for the implementation of the EMP. APT will require its Construction Contractor to undertake construction in accordance with the requirements of the CEMP. APT will also monitor the Construction Contractor's performance against the stated objectives and commitments under the CEMP through routine inspections and audits, and where improvements or non-conformances are identified APT will require its Construction Contractor to address these.</u></p>

Appendix 2

List of Recommendations:

Recommendation 1

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:

- Identified in the Bonaparte Gas Pipeline Public Environmental Report; and
- Recommended in this Assessment Report (No. 59)

All safeguards and mitigation measures outlined in the Public Environmental Report are considered commitments by Australian Pipeline Trust.

Recommendation 2

The proponent shall advise the Minister of any changes to the proposal in accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act*, for determination of whether or not further assessment is required.

Recommendation 3

Access to, and use of, any resources or infrastructure required for the purposes of the project, must be negotiated appropriately with the relevant Traditional Owners and non-Indigenous land owners. All necessary approvals must be obtained prior to commencement of works.

Recommendation 4

An updated Construction Environmental Management Plan is to be provided to the Environmental Protection Agency Program addressing outstanding matters and information as identified in this Assessment Report.

Recommendation 5

Geotechnical Reports are to be provided to NRETA to determine the feasibility or not, at all four proposed HDD sites. In the event that HDD is not feasible, the proponent is required to negotiate an alternative crossing technique.

The proponent will consult with all key stakeholders until an appropriate alternative crossing is agreed.

Recommendation 6

The proponent will ensure that construction activities at watercourse crossings are conducted as agreed by respective landowners and Government agencies, and in accordance with the management measures described in the approved Construction Environmental Management Plans and Special Area Plans.

Recommendation 7

The proponent will ensure, through the Construction Contractor for the project, that best-practice erosion and sediment control measures are fully implemented for all disturbed areas prior to the onset of the 2008/2009 wet season.

Erosion and sediment control measures, including monitoring and maintenance, should be implemented in accordance with the commitments made in the PER, and in the approved Construction and Operational Environmental Management Plans for the project.

Following the first wet season, a monitoring or audit report is to be prepared and provided to Natural Resource Management Division, NRETA, before June 2009. This report should include details on the effectiveness of erosion and sediment control measures and any rectification works undertaken or proposed.

Recommendation 8

The proponent will ensure that disturbance to riparian and aquatic environments is minimised to the greatest extent possible during water extraction activities. Proposed management measures are to be described in the CEMP. Any disturbance as a result of water extraction will be restored prior to the onset of the 2008/2009 wet season.

Recommendation 9

If mine pit water is considered for use, the proponent must obtain an analysis of the water to determine suitability for purpose and discharge into the environment. Analysis results must be provided to the EPA Program and DPIFM for review prior to use.

Recommendation 10

All pipe washing or pressure test water should be:

- Irrigated onto a stable soil surface using appropriate wastewater reuse guidelines; and
- Discharged away from watercourses.

Recommendation 11

Should biocides be shown to be necessary for hydrotesting, APT will submit a detailed proposal on the intended use and disposal of waters containing biocides. The CEMP should be amended to include a biocide sub-plan for management of this disposal water. Any such proposal, including the biocide sub-plan, shall be submitted to DPIFM and the EPA Program for approval prior to the use of biocides.

The CEMP is to provide full details of chemical usage and information relevant to **hydrotest** water management strategies including ecological consequence of discharge.

Recommendation 12

All dedicated fauna surveys will be completed and the results provided to the Australian Government Department of the Environment and Water Resources for consideration of an approval prior to commencement of any works in these locations.

Specific management and monitoring strategies for issues arising from these surveys should be included in the relevant sub-plans in the CEMP.

Recommendation 13

A Blasting Sub-Plan is to be prepared as part of the CEMP in the event that blasting is required and submitted for approval by the Australian Government Department of the Environment and Water Resources. The plan should outline management measures that will be employed in the context of risks to species listed under the EPBC Act.

Recommendation 14

- Maximum length of open trench is to be limited to 60km;

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- The proponent will ensure the pipeline contractor adheres to all management measures outlined in the EMP;
 - Audits of the pipeline construction work will be conducted by DPIFM;
 - If the recommended management strategies are not effective in managing fauna mortality, further measures may be required of the proponent and their principal contractor to ensure this is rectified (reduce allowable length of open trench, reduce allowable time that trench can remain open in more ecologically rich areas);
 - Appropriately trained fauna handlers will be employed in sufficient numbers to enable the open trench to be cleared at least once daily.

Recommendation 15

Fauna survey and management information is to be submitted to the EPA Program prior to the commencement of works in targeted locations in accordance with Recommendation 12 of this Report. Specific matters to be dealt with must include, but not be limited to, EPBC listed species and species of significance under the *NT Parks and Wildlife Conservation Act*.

Recommendation 16

Monitoring and management of exotic species along the operating pipeline corridor must be ongoing. A revised Weed Management sub-plan is to be submitted to NRETA for approval following input from the Construction Contractor prior to commencement of works. Compliance reports for the monitoring program must also be submitted to NRETA.

The proponent should engage with the Thamarrurr Regional Council to discuss employment opportunities associated with ongoing exotic species management.

Recommendation 17

Within the nominated boundaries of the Moyle Floodplain and the Hyland Bay System, the proponent is to implement all possible measures to confine construction activities to the 30m corridor.

Access through the area is to occur on the main road or within the construction corridor and no ancillary infrastructure is to be built within this section of the pipeline unless absolutely necessary and following discussion with the NRETA.

Recommendation 18

A revised Waste Management sub-plan is to be submitted to the EPA Program for approval following input from the Construction Contractor. The sub-plan should include a detailed waste minimisation strategy. The Project should ensure a detailed waste inventory is recorded to inform future project management improvements.

Recommendation 19

The Road Use Management Plan must include management measures that specifically address safety issues associated with traffic movement along the Wadeye to Daly River Road.

In the event that watering of sections of the road is deemed to be necessary, the proponent will obtain all necessary access permission and approvals to source water appropriately in accordance with Recommendation 3 of this Assessment Report.

Recommendation 20

The proponent is to negotiate a cost-sharing strategy with the RND to maintain the Wadeye-Daly River Road during the BGP construction project. At the conclusion of construction, the

road should be in a condition as good as or better than its condition at the commencement of construction.

Recommendation 21

A revised Construction Environmental Management Plan for the Bonaparte Gas Pipeline project is to be submitted to DPIFM and the EPA Program for approval prior to commencement of construction of the pipeline and ancillary infrastructure. The approved EMPs will be included as an appendix within the Pipeline Management Plan.

In preparing the Environmental Management Plan, the proponent will include any additional measures for environmental protection and monitoring contained in this Assessment Report, and recommendations made by the Northern Territory Government with respect to the proposal. This must include further details provided by the Construction Contractor, particularly if these details change any aspect of the project. The CEMP shall be referred to relevant NT Government agencies and the NLC for review prior to finalisation.

The CEMP shall form the basis for approvals and licences issued under relevant NT legislation.

The proponent is ultimately responsible for the CEMP and will ensure the contractor complies with all requirements of the CEMP.