

DRAFT ENVIRONMENTAL IMPACT STATEMENT

BLACKTIP PROJECT

EXECUTIVE SUMMARY OCTOBER 2004



Executive Summary

Introduction

Woodside Energy Limited (Woodside) with its Joint Venture Partner Eni Australia B.V (Eni), propose to develop the Blacktip gas field located in the Joseph Bonaparte Gulf, approximately 245 km south west of Darwin. This proposed development, known as the Blacktip Project, will extract natural gas and liquid hydrocarbons in the form of condensate from the gas field and transfer these products by subsea and an onshore pipeline to an onshore gas plant located near Wadeye in the Northern Territory. **Figure ES1 & Figure ES2** show the location of the Blacktip Project.

The Blacktip gas field is being developed to supply natural gas to Alcan's alumina refinery at Gove in the Northern Territory. The supply of gas is due to commence in late 2007. The gas will be transported to Gove via the 940 km long Trans Territory Pipeline (TTP) which is a separate project and environmental approvals process. Infrastructure put in place to support the Blacktip Project may also be used to process and transport additional gas and condensate reserves from other fields in the Joseph Bonaparte Gulf, should the necessary markets emerge.

The key elements of infrastructure proposed for the Blacktip Project are:

- an offshore gas and condensate gathering system comprising up to six wells and an unmanned wellhead platform;
- a 107.5 km subsea pipeline running from the Blacktip gas field to the Northern Territory coastline, taking natural gas and condensate to shore;
- a 2.5 km onshore gas and condensate pipeline running below ground from the shore crossing to the gas plant;
- an onshore gas plant located approximately 10 km west south-west of Wadeye;
- a subsea condensate export pipeline to a mooring approximately 4.5 km offshore;
- a produced water pipeline for the discharge of waste water from the production process approximately 3 km offshore;
- an access road from Wadeye airstrip to the project area.

Initially two production wells will be drilled with the possibility of a further four wells being drilled in the future. The Blacktip field has a Scope For Recovery of approximately 933 billion standard cubic feet of raw gas and 5.7 million barrels of condensate. The production and export facilities are being designed for a life span of 30 years.

Environmental Assessment Process: The Blacktip project is subject to two environmental assessment procedures and has been set at an Environmental Impact Statement (EIS) level of assessment. The project will be assessed by both the Northern Territory and Commonwealth Governments in accordance with Northern Territory *Environmental Assessment Act 1982* and the *Environment Protection and Biodiversity Conservation Act 1999*. To avoid duplication the

Draft EIS has been prepared to meet the requirements of one set of guidelines prepared by both jurisdictions.

The Draft EIS addresses the environmental issues associated with the proposed Blacktip Project. The document has been prepared to provide the Northern Territory Government, agencies of the Commonwealth of Australia, non government organisations, and the public with the information necessary to inform them of the project and enable them to assess the potential environmental impacts and the associated preventative and management measures, put forward by the proponent.

Project Benefits

The main environmental benefits of the project can be attributed to the substitution of high-sulphur fuel oil for natural gas at the Alcan Gove alumina refinery. This will result in improvements in local air quality as well as reductions in greenhouse gas emissions per tonne of product produced at the refinery.

The project will also create the opportunity for social and economic benefits for the Wadeye community directly, as well as indirect regional and national benefits by expanding economic activity, employment, income and expenditure. Direct employment numbers will vary with the phases of the project. Numbers will peak during the construction phase at 130 for onshore and 250 for offshore activities. Only a minimal number of full time jobs will be created during the operations phase of the project, which includes the requirement for maintenance staff throughout the life of the project on an as needs basis.

The Project

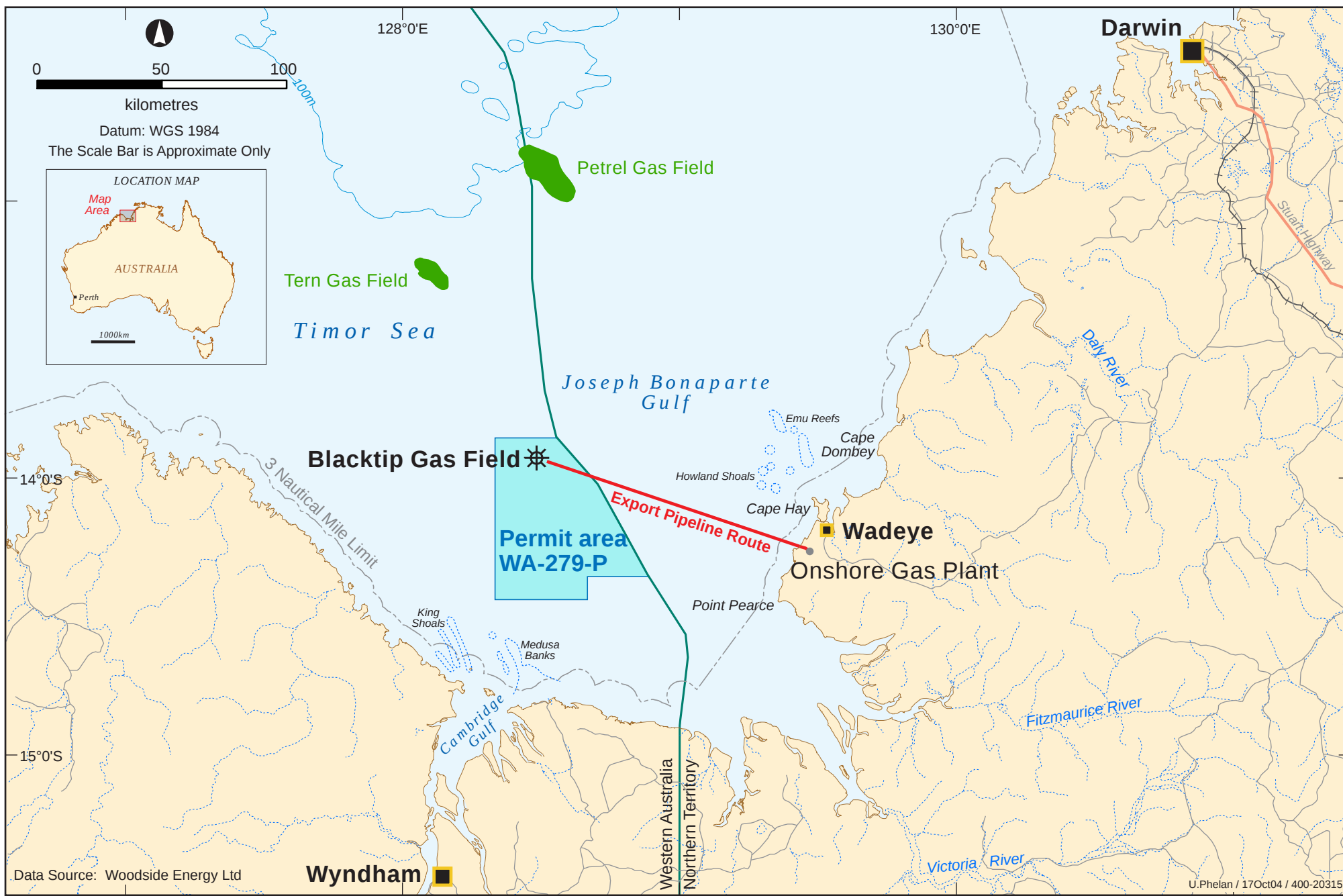
The Blacktip gas field is located in exploration permit WA-279-P, a Western Australian-administered Commonwealth permit. It is a cooperative development between Woodside as Operator (53.85%) and Eni (46.15%).

Offshore Gas Gathering System

The offshore gas gathering system will consist of wells, located in approximately 52 m of water, linked to an unmanned wellhead platform. All gas treatment will be conducted onshore.

Export Pipeline

The reservoir fluids will be transported from the wellhead platform to an onshore gas plant via a 107.5 km subsea export pipeline. The pipeline is expected to be trenched for its entire length between the wellhead platform and landfall unless seabed conditions dictate otherwise. The subsea export pipeline will cross the coastline at the northern end of Yelcherr Beach, and continue for 2.5 km below ground to an onshore gas plant.



Blacktip Project

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LOCATION OF THE BLACKTIP PROJECT

Figure ES1

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Offshore the export pipeline will require a construction corridor 1–1.4 km wide; near shore this will be reduced to 60 m between the low water mark and high water mark. Landward of the high water mark and leading to the onshore gas plant, the corridor will be reduced to 40 m. It is expected that two temporary laydown areas, approximately 100 m by 50 m in size, will be required near the shore crossing construction site.

Onshore Gas Plant and Product Export

The onshore gas plant will take up an area of 64 ha, and will be located on the proposed onshore pipeline alignment and an existing track (**Figure ES2**). Once onshore, the gas will be separated from the other reservoir fluids: namely, produced water and condensate. The gas will then be exported to customers via the TTP.

Following treatment of the produced water a saline effluent will be discharged to sea through a short pipeline and diffuser approximately 3 km offshore. The condensate will be stabilised onshore and exported through a pipeline to a mooring 4.5 km offshore, where it will be loaded onto tankers approximately four times per year for export. A 13 km long access road from south-east of Wadeye to the gas plant will also be required. For part of this route the access road will make use of an existing track, which will be upgraded for all weather use, the remainder will be constructed as new.

Stakeholder Engagement

Woodside has embarked on a stakeholder engagement programme, which is an integral part of the EIA process. Consultation with stakeholders was initiated in 1999 through the identification of key stakeholders with an interest in the Blacktip Project. Key stakeholders identified include:

- Indigenous groups such as the traditional Aboriginal owners and regional councils;
- Northern Territory Government and Commonwealth Government departments;
- Non government organisations including environmental groups.

A wide range of consultation methods have been adopted and continue to be used. In each case the approach selected was based on the interests and geographical location of the group being consulted. Consultation methods used have included project workshops, project briefings, direct consultation with interested groups and public displays of project information. Consultation undertaken to date has been focused on keep interested groups informed of the project and providing these groups with the opportunity to comment on the project.

Specific stakeholder engagement has been undertaken to support the EIA process. This has been focussed on encouraging individuals and groups to comment on the proposal with particular emphasis on environmental issues. The issues raised have been addressed in the Draft EIS and other issues raised as part of the public review process will be addressed subsequently in the Supplement document to this Draft EIS.

Woodside will continue to undertake consultation with key stakeholder groups throughout the construction, operation and decommissioning phases of the project.

Environmental Baseline Studies

Several environmental studies and field surveys were undertaken as part of the EIA process to provide specific baseline information and to gain a better understanding of the potential environmental issues. Baseline field surveys included: noise, offshore and intertidal environment, sea turtles, dugongs and seagrasses, soils, flora and fauna, social impact assessment and archaeology. Based on the findings of all these studies impact assessments were undertaken to determine the predicted impact on the receiving environments as a result of the Blacktip Project. The assessment covered all potential effects associated with the construction, operation and decommissioning phases of the project.

A summary of the key marine and terrestrial impacts is provided below. A complete list of potential impacts assessed is given in **Table ES-1** and **Table ES-2**, and discussed in detail in the Draft EIS.

Marine Impacts

Beach Disturbance: Construction of the shore crossing will involve near shore beach/dune trench excavation for the pipeline. All construction activities will occur during the dry season, which coincides with the period in which flatback turtle nesting occurs. Construction lighting and vibration may affect turtle nesting and hatching. Particular attention will be paid to minimising the impact of construction activities on turtle nesting activities and hatchling success, and to the restoration of the beach profile following the completion of the pipeline shore crossing. Given the low level of nesting activity on the proposed pipeline crossing beach (less than 20 turtles) and the limited duration of construction activity, any impact is expected to be localised and minor. Several detailed environmental management plans will be drawn up which will cover construction activities in the shore crossing area including a Turtle Management Plan, Lighting Management Plan, Sediment and Erosion Control Plan and Rehabilitation Management Plan.

Drilling Waste: Drilling of the offshore wells will generate wastes such as drill cuttings, drilling muds and well completion fluids which will be discharged to sea. The lack of sensitive habitats at the offshore drilling location, and the chemical selection procedures which will ensure that only those chemicals acceptable from an environmental perspective will be selected for use.

Oil Spills: Condensate tanker loading close to the shore presents a remote risk of condensate spills. For a spill to occur all extensive safeguard measures would need to fail. The safeguard measures include vetting of tankers to ensure seaworthiness and competence of crews, the presence of support vessels to assist in tanker movements, an on board pilot to take charge of tanker movements at the loading location, and restriction of tanker loading operations to calm weather conditions. The risk of a spill occurring is reduced further due to the infrequent loading operations which are planned to take place no more than four times a year. In the event that a

spill does occur during loading operations a spill contingency plan will be in place which will have the ability to monitor and contain the spill to minimise any potential impact on any sensitive marine habitats.

Hydrotest Water: Hydrotest water containing corrosion inhibitor will be used to test the integrity of the pipelines prior to first gas being commissioned. The used water will be discharged to the marine environment. A corrosion inhibitor with the best environmental performance will be selected and therefore will not pose a negative impact to the receiving marine waters. Once discharged to the sea the hydrotest water will be diluted and dispersed rapidly. Hydrotesting and dewatering procedures will be developed which will ensure appropriate environmental management procedures are in place.

Produced Water: Produced Water brought to the surface during production will contain hydrocarbons. The produced water will be treated onshore at the gas plant to meet legislative requirements and then discharged to sea approximately 3 km offshore. The discharge location and the design of the PW treatment plant have been selected to ensure no adverse impacts occur from this discharge. A Produced Water Management Plan will also be implemented which will include monitoring procedures for the produced water before discharge, to ensure that the final effluent meets agreed limits.

Terrestrial Impacts

Vegetation Clearing, Fauna Disturbance & Habitat Loss: Construction of both the onshore pipeline and gas plant will require the clearing of approximately 74 ha of vegetation dominated by tall open forest and eucalyptus woodland. The pipeline and gas plant has been located to avoid all significant threatened vegetation and habitats. A Vegetation Clearing Management Plan will be drawn up which will specify measures to ensure no clearing takes place outside of designated areas.

Pipeline Trenches: Construction activities, especially trenching for the onshore export pipeline, have the potential to cause fauna mortality due to capture of wildlife in the open excavations. Animals captured in excavations are exposed to various elements such as predators, effects from the sun and subsequent dehydration. Fauna mortality as a result of capture will be minimised through appropriate pipeline construction measures such as regular escape ramps and monitoring of the trench to facilitate fauna escape or removal. A Terrestrial Fauna Management Plan will be drawn up which will specify measures to ensure open trenches will be inspected frequently.

Introduction/Spread of Weeds, Feral & Pest Animals: Weeds are present in low numbers in the project area. Feral pigs are already known to be in the area and cane toads will inevitably arrive in the area in the very near future, regardless of the project's influence or control. The greatest potential for transfer of weeds, and feral and pest animals will be through the introduction of earthmoving equipment, vehicles, and construction materials and fill, sourced from elsewhere in the region, Australia and overseas.

The risk of the introduction and spread of weeds, and feral and pest animals will be minimised through the implementation of an Exotic Species and Weed Management Plan. This plan will specify appropriate hygiene measures and specify the need for all plant, equipment and vehicles to be clean prior to entering the project area. Wash down facilities will be provided and operators required to use them if vehicles, plant and equipment are found to be unclean.

Fires: Bushfires are frequent and widespread throughout the savannas of northern Australia. The integrity of the vegetation in and surrounding the project area could be diminished by frequent fires. The potential increased risk of unplanned fire accidentally caused by construction activities during the construction phase, and to a lesser extent, operational phase of the project, will be managed through a Fire Management Plan. The plan will address issues such as emergency response, the establishment of fire breaks and the reduction of weeds to minimise fire fuels.

Biting Insects & Mosquito-Borne Disease: Biting insects pose two types of problems. They cause a nuisance because of their bites, and they can cause a health risk to workers involved with the Blacktip Project. The largest biting midge and mosquito breeding sites are associated with two swamps located 1.5–3 km from the proposed gas plant. Although the development will not reduce or affect the identified breeding sites a Biting Insects Management Plan will be developed. This plan will include a range of preventative and management measures including the use of bifenthrin barrier treatments around personnel areas and the burning of two swamps annually during the construction phase.

Greenhouse Gas Emissions: The majority of atmospheric emissions will occur onshore during the operation phase of the Blacktip Project. The emission of approximately 90,000 tonnes a year of greenhouse gas equivalent should be balanced against the beneficial uses of gas in terms of the reduction in emissions of particulates and sulphur dioxide when compared to other fossil fuels. This will result in a cleaner production process and positive impacts on existing local atmospheric quality in the vicinity of the Alcan Gove refinery. The use of Blacktip gas at Gove will also result in a reduction of greenhouse gas emissions per tonne of product produced at the refinery.

Other Atmospheric Emissions: Other atmospheric emissions include minor amounts of NO_x and SO_x from combustion of gas to supply energy for the operating plant, and low levels of fugitive emissions of non methane hydrocarbons. The ambient concentrations of these emissions will be insignificant compared to those levels known to result in adverse impacts on local climate and vegetation.

Noise Emissions: The most significant noise impacts are expected to occur during flaring, both planned maintenance and emergency flaring. Planned maintenance flaring will only occur quarterly or possibly annually, over a 1–24 hour period. Emergency flaring will be infrequent occurring maybe annually or only every five years for approximately 15–20 minutes. A Noise Management Plan will be implemented which will specify management measures to minimise noise levels wherever possible.

Spills: During operation the potential for leaks from the onshore condensate tanks will be managed through the appropriate design of the condensate storage tanks. A spill protection system will also be put in place. Significant leaks will be detected by measuring the condensate levels in the tanks. Small leaks, not detectable by this method, will be contained within bunded areas and will then be diverted to the plant process system where the water and condensate will be separated.

Waste: Packaging and general construction waste will generate the largest volumes of waste onshore. A compactor will be provided to reduce waste volumes. An assessment of the existing landfill site at Wadeye will be undertaken to assess its suitability to deal with waste from the proposed development. Waste will only be disposed of at this site if it has sufficient capacity, the correct handling facilities and with the agreement of the local community. All waste not suitable for disposal at the local landfill site will be transported offsite for disposal at appropriate facilities.

A Waste Management Plan will be developed for each phase of the development to ensure that waste is handled, stored and disposed of promptly and correctly. The plans will include minimisation, recycling, reuse and recovery options.

Economics and Land Use Impacts

An assessment of the potential impacts concluded that both positive and negative impacts could materialise. The potential negative impacts could include disturbance or destruction of archaeological and historical heritage sites, and changes and restrictions to land use. Potential positive impacts could include the creation of direct and indirect employment opportunities, and enhanced revenue streams into the local and Northern Territory economies. Management measures have been identified and will be developed further with the local community to maximise the potential positive impacts and minimise the potential for negative impacts. Management measures will include social impact management plans, employment and training strategies focused on maximising opportunities for local communities and cultural heritage management plans to provide safeguards for sensitive cultural heritage issues.

Cultural Heritage: The potential impacts on Aboriginal cultural sites as a result of the Blacktip Project are expected to be minimal as great care has been taken to avoid disturbance to any sites during the planning and site selection stage of the project. Discussions with traditional Aboriginal owners have and continue to take place to reach agreement on appropriate locations for the various project components. A Cultural Heritage Management Plan will be developed in consultation with the traditional owners. This plan will incorporate procedures to raise the awareness of the workforce of cultural issues and the need to protect areas sensitive to the local community.

Indigenous Conservation Values: Specialist consultants were commissioned to specifically assess any potential impacts on species and environments with Indigenous conservation values and the cultural values associated with the natural environment. This assessment concluded that

provided particularly culturally significant environments adjacent to the proposed shore crossing are protected, all species, habitats and biological communities with Indigenous conservation values are adequately represented elsewhere in Yak Maninh and Yak Diminh clan estates. This assessment also identified opportunities for support to be provided to current community initiatives focused on protecting and managing knowledge pertaining to the cultural values in the community. These opportunities will be further explored outside the EIS process.

Traffic: The construction and operation of the onshore project facilities will unavoidably result in increased traffic, potentially causing damage to existing road surfaces from heavy construction vehicles and disruption to existing road users between Daly River and Wadeye. These disruptions will only occur during the dry season when construction takes place. Furthermore, a new access road is proposed between the airstrip and project area, which will divert traffic away from Wadeye township. A Traffic Management Plan will be developed to manage and minimise these potential disruptions and will have road user safety as a key focus.

Economics: The construction phase of the Blacktip Project is expected to add an average of \$12 million per annum to the Northern Territory's economy. The anticipated impact on the rest of Australia is \$14 million per annum. During operational activities, the Blacktip Project will also add additional revenue to the Australian economy.

Currently, there is no strong economic base in the Thamarrurr Region, other than service provision, a fledgling construction industry being developed by the Council and a small-scale cattle industry based at Palumpa Station. The Blacktip Project provides an opportunity for Indigenous business development or employment of Indigenous people living close to the operations. Examples include the provision of security services at the Blacktip gas plant and maintenance of rights of way and access tracks. Skilled opportunities also exist for road maintenance and general maintenance of equipment and infrastructure. Management measures will be focussed on maximising local content and providing opportunities for local employment.

Social Impact Assessment

The project has adopted a three phase approach to potential social impact issues associated with the development of the Blacktip Project.

The first phase of the process involved an independent consultant compiling a Social Impact Assessment Report to assist Woodside in identifying potential social impacts in addition to providing valuable information to the statutory regulators responsible for overseeing the approvals processes.

The second phase of the process involves Woodside developing a comprehensive Social Impact Management Plan in close consultation with the affected community and other key stakeholder organisations. The third phase of the process involves implementing the plan as well as instituting appropriate monitoring and review mechanisms.

At the time the Draft EIS was finalised (October 2004), only the first phase had been completed, with the proposed Social Impact Workshop (an integral part of the development of the Social Impact Management Plan) tentatively scheduled for November 2004. Once developed, measures and resources will be put in place to implement, monitor and if necessary review and amend the plan. It is expected that this will be an ongoing and intensive process during the construction phase of the Blacktip Project.

Health, Safety and Environmental Management System

Woodside employs a structured approach to the management of Health, Safety and Environment (HSE) issues via a formal and documented HSE management system (HSE-MS). The HSE-MS will ensure that impacts from the construction and operation of the Blacktip Project are either avoided or kept as low as reasonably practicable.

Woodside is committed to achieving a level of environmental management and performance consistent with national and international standards and statutory obligations in its pursuit of sound business and financial objectives. The most economically effective, environmentally sound technology and procedures will be incorporated into the design of the project to ensure optimal management of all emissions, discharges and waste. Furthermore, Woodside is committed to ensuring that the Blacktip Project will be undertaken in a manner that minimises impacts on the surrounding biophysical and social environments. Preventative and management measures will be applied throughout the life of the Blacktip Project to ensure that all significant environmental effects associated with the proposed project are minimised or avoided.

Environmental aspects of the Blacktip Project will be managed through a comprehensive environmental management framework, which comprises:

- a project specific Environmental Management System;
- detailed Environmental Management Plans for onshore facilities including the gas plant, pipeline and shore crossing, and Environment Plans for offshore activities.

Environmental monitoring programmes for the offshore and onshore components of the Blacktip Project will be implemented. This will include offshore, intertidal and turtle marine monitoring programmes and onshore, weed and biting insects monitoring programmes.

Conclusion

Development of the Blacktip gas field provides a secure and competitive gas supply for Alcan's proposed gasification of its Gove facilities.

Detailed assessment of the potential impacts of the project on the social, economic and natural environments presented within this Draft EIS demonstrates that the Blacktip Project can be developed to achieve a sustainable outcome. The project will be managed to achieve the anticipated economic benefits with minimal impacts on the natural and social environments.

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■ Table ES-1 Summary of Marine Impacts

Hazard	Source	Potential Impact	Preventative and Management Measures
Physical Environment			
Physical Presence	Jack-up and laybarge. Support and supply vessels. Trading tankers. Subsea export, condensate and PW pipelines. Condensate export mooring. Unmanned wellhead platform.	Physical presence of marine infrastructure presents a navigation hazard to shipping and fishing.	Gazetted safety zone will be implemented to protect the facilities and reduce the risk of marine collisions. Navigation marks and fog and illumination lighting will be installed on the wellhead platform and condensate export mooring to reduce the risk of marine collisions.
Seabed Disturbance	Temporary anchoring of Jack-up, laybarge and construction vessels. Anchoring/piling of wellhead platform and installation of subsea equipment. Subsea export, condensate and PW pipelines. Condensate export mooring. Propeller wash of trading tankers and installation vessels.	Short-term disturbance to benthic sediment habitats from jack-up rig, anchor and chains, trenching of pipelines and propeller wash. Permanent loss of seabed habitat beneath wellheads and platforms, moorings and anchors. Altered geomorphic processes caused by exposed pipelines interfering with natural sediment transport. Disturbance to seabed in the event that drill and blasting are required during pipeline installation.	A relatively small area of seabed will be affected compared to the area of similar habitat, which is widespread in the region. Benthic infauna are known to recover rapidly following disturbance. Pipeline installation will be conducted outside prawn migration season. Pipelines will be trenched so there will be no interference with geomorphic processes.
Beach Disturbance	Pipeline construction through beach including trenching and installation of a temporary groyne. Rock removal/blasting (if required).	Shore crossing construction activities reducing turtles' nesting and hatchlings success. Altered geomorphic processes caused by exposed pipelines and potentially a temporary groyne interfering with natural sediment transport.	A Turtle Management Plan will be developed and implemented during construction activities. A Lighting Management Plan will be developed and implemented during construction activities. The construction corridor and duration of shore crossing construction reduced to minimum required. The construction corridor will be fenced off to exclude turtles from entering the pipeline trench. Light spill will be minimised provided the safety of personnel is not compromised. Turtle nests will be removed from the beach each morning during construction and placed in a hatchery to the south. Hatchlings will be returned to Yelcher Beach to enter the sea. A Rehabilitation Management Plan will be developed and implemented prior to construction activities. A Sediment and Erosion Control Management Plan will be developed and implemented prior to construction activities.
Ecological Environment			
Marine Pest Species	Ballast water and hull fouling from Jack-up, laybarge, support vessels and trading tankers.	Introductions of pest species via ballast water discharge or from hull fouling. Displacement of native species by exotic species.	Very low likelihood of successful establishment of exotic species, as open ocean, habitats are not suitable for exotic species that originate from sheltered port environments. Vessels will follow AQIS ballast water requirements. The jack-up, lay-barge and support vessels will exchange ballast water prior to arrival at the Blacktip Project area, where it is safe to do so.
Waste			
Drilling Waste and Discharges	Drill cuttings. Drilling muds and additives eg barite. Pipe dope cement.	Increase in receiving water turbidity. Smothering and alteration of sediment characteristics.	There are no sensitive benthic habitats located near the drilling locations. Marine organisms and benthic communities are common and widespread, so no significant impacts on ecological communities are likely. The discharge of drilling waste will be localised and of a short duration. As area has naturally high turbidity, additional suspended solids will have a minimal impact. A regulatory approved Drilling Environment Plan will be implemented during drilling operations.
		Depletion of oxygen in sediments.	Strong tidal currents will aid rapid dispersion ensuring that oxygen depletion will only have an impact over a localised area. The local marine environment is not highly sensitive, and there is a wide distribution of similar habitat in the region. Impacts in the local area are therefore not critical. A regulatory approved Drilling Environment Plan will be implemented during drilling operations.
		Toxicity of drill cuttings, drilling muds and additive to organisms in the water column and benthos.	Low toxicity water-based muds will be used where practicable and selected in accordance with Woodside's Drilling Fluid Selection Procedure. Non water-based muds will not be discharged to sea (except for small amounts associated with drill cuttings). Discharged muds will rapidly disperse, be diluted or will biodegrade - only a small area will be affected. A regulatory approved Drilling Environment Plan will be implemented during drilling operations.

Hazard	Source	Potential Impact	Preventative and Management Measures
Drilling Mud Spills	Drilling.	Increase in receiving water turbidity. Alteration of sediment characteristics. Toxicity impacts to organisms in the water column and benthos.	Non-toxic or low toxicity drilling muds will be used wherever possible. Transfer and handling procedures will be in place to minimise risks from the transfer of drilling muds between the support vessel and jack-up.
Hydrotest Waters	Testing of subsea export pipeline and condensate pipeline. Contains oxygen scavenger, biocides and other chemicals.	Toxicity impacts to marine flora and fauna. Oxygen depletion.	Pre-commissioning of systems offsite to reduce the amount of hydrotesting required. Selection of hydrotest chemicals with low potential for environmental harm. Hydrotest discharge from dewatering will be rapidly diluted generating only localised effects. Dewatering discharge from the condensate pipeline will be at the seabed level, and will re-oxygenate the water with minimal effects on marine habitat. A Pipeline Flooding and Hydrotesting Procedure and a Pipeline Pre-commissioning Procedure will be implemented which will detail the chemicals and quantities to be used.
Scale (containing NORMS)	Subsea wells and export pipeline. Equipment in the gas plant, especially water systems. Maintenance and clean-up during decommissioning.	Potential accumulation of low level radioactive material NORMS.	Low potential for scale in Blacktip reservoir. Scale inhibitors will reduce formation of scale, and there is low potential for scale in the well or flowlines. No expectation of NORMs in Blacktip Project. If required, scale will be disposed of in accordance with Northern Territory or Western Australian Government guidelines.
Ballast Water	Jack-up and laybarge. Supply and support vessels. Trading tankers.	Pollution of marine environment by hydrocarbon contaminated ballast water.	A Ballast Water Management Plan will be prepared and implemented. Segregated ballast tanks used on the Jack-up, laybarge and support vessels to prevent hydrocarbon contamination of the ballast water. In the unlikely event that contaminated ballast water is released, it would involve a small volume of hydrocarbons which would be rapidly diluted and dispersed. All vessels will comply with MARPOL regulations, Northern Territory Marine Pollution Act, Australian Quarantine Act and the AQIS guidelines for ballast water management, where applicable.
Produced Water	Reservoir water brought to surface during production (may contain hydrocarbons, heavy metals, finely dispersed oil remaining after separation of production chemicals).	Potential toxicity impacts (chronic) to marine flora and fauna. Oil sheen on water surface.	Produced water will meet legislative requirements for oil and grease content, so hydrocarbon loads will be low. The discharge location and design have been selected to maximise the dilution and dispersion of the produced water. Discharge timed to coincide with daily maximum tidal flows. Continual on-line monitoring of oil-in-water quality will be implemented to ensure regulatory compliance.
Hydrocarbon Spills – Small Spills	Drilling, installation, commissioning, production and decommissioning. For example spill from tanker loading hose.	Marine flora and fauna effects through: ■ Increase in toxicity ■ Physical coating ■ Disruption of physiological processes ■ Disruption of behavioural activities ■ Alteration of species interactions ■ Oil sheen on water surface	Extensive preventative, management and emergency response measures will be in place to prevent spills. A Blacktip specific Oil Spill Contingency Plan will be prepared addressing the project specific oil spill risks. All facilities and vessels will meet legislative and Woodside requirements including PSLA, MARPOL and Northern Territory legislative requirements.
Hydrocarbon Spills – Large Spill	Production for example tanker rupture during loading.	Marine flora and fauna effects through: ■ Increase in toxicity ■ Physical coating ■ Disruption of physiological processes ■ Disruption of behavioural activities ■ Change of habitat characteristics ■ Oil sheen on water surface	The likelihood of a large spill is remote, as only four tankers will be loaded per year and due to the extensive preventative management and emergency response measures that will be in place. A major spill is unlikely to impact marine mammals as there are no known migration paths or breeding areas in the region, or reach important turtle and dugong areas around Point Hay and Cape Hay. A Blacktip specific Oil Spill Contingency Plan will be prepared addressing the project specific oil spill risks. All facilities and vessels will meet legislative and Woodside requirements including PSLA, MARPOL and Northern Territory legislative requirements.
Non-Hazardous Solid Waste Stream	Drilling, installation, commissioning, production, decommissioning. Jack-up and laybarge. Supply and support vessels. Trading tankers. Wellhead platform.	Incremental addition to impacts of existing onshore waste management facilities.	Only low levels of waste will be generated from wellhead platform and support vessels. Waste will be segregated to ensure appropriate disposal, and recycling where receival facilities and markets are available. The primary management measure is to avoid waste generation where possible. Waste will be segregated to ensure appropriate disposal, and recycling where receival facilities and markets are available. Waste disposal will be at approved onshore waste management facilities. A project specific Waste Management Plan will be developed and implemented for all stages of the Blacktip Project.

Hazard	Source	Potential Impact	Preventative and Management Measures
Liquid Waste Stream	Sewage & greywater. Jack-up and laybarge. Supply and support vessels. Trading tankers.	Pollution and nutrient enrichment of the surrounding waters. Saprogenic effects (of, causing or resulting from putrefaction). Toxicity effects on marine flora and fauna.	Laybarge and jackup will have certified and operational sewage treatment plants. Solid components of the waste stream will be macerated to less than 25 mm. Liquid waste will be treated and discharged according to legislative requirements eg PSLA, MARPOL or NT legislation as applicable. A project specific Waste Management Plan will be developed and implemented for all stages of the Blacktip Project. Liquid waste will have small volumes and nutrient loads, and will disperse and be diluted rapidly.
Hazardous Waste Stream & Chemicals	Used oils and grease, chemicals. Jack-up and laybarge. Supply and support vessels. Trading tankers.	Incremental addition to impacts on existing waste management facilities.	A project specific Waste Management Plan will be developed and implemented for all stages of the Blacktip Project. Woodside's chemical selection process targets chemical avoidance and/or selection of chemicals with the lowest health, safety and environmental risks. Avoid waste generation where possible. Offshore, hydrocarbon recovery and recycling systems will be in place. Recovered hazardous waste will be transported to shore for disposal.
Atmospheric Emissions			
Atmospheric Emissions	Power generation required for drilling, installation, commissioning, production and decommissioning. Flaring from Jack-up during commissioning.	Construction is of a relatively short duration. During production greenhouse gas emissions will be negligible.	Offshore greenhouse gas emissions are expected to be extremely low, given the relatively short duration of construction activities. Diesel generators will not be used on the wellhead platform. There will be no processing of gas offshore.
Noise & Vibration	Jack-up and laybarge. Blasting and trenching. Support & supply vessels, trading tankers. Helicopters, wellhead platform and trenching for pipeline nearshore.	Interference with fauna, including turtles, fish and marine mammals. Interference with other users (for example beach users or fishing activity).	Noise and vibration activities such as shipping and drilling will be temporary, and largely confined to the initial installation period. Whale activity in the area is low; the site is situated over 500 km from humpback whale migration and breeding areas. Equipment will be designed to normal petroleum practise, which includes specifications for noise levels and standard installation and drilling activities will be used.
Lights	Lighting from Jack-up, wellhead platform, all vessels, and onshore processing facility. Flaring at Jack-up and onshore facility during commissioning and production.	Attraction of seabirds and marine life. Disorientation of breeding / nesting turtles or hatchlings.	The offshore facilities are 90 km from nearest coast and turtle hatching grounds and are not expected to impact upon them. Construction activities of relatively short duration. A Lighting Management Plan will be developed and implemented during construction activities. A Turtle Management Plan will be developed to provide management measures during construction and operations phases. Flaring from the onshore gas plant will be limited to commissioning, maintenance and emergency situations and will be scheduled during daylight hours where possible. Flare pilot light will not be visible from the marine environment.

■ Table ES-2 Summary of Terrestrial Impacts

Hazard	Source	Potential Impact	Preventative and Management Measures
Physical Environment			
Erosion and Runoff and Soil Compaction	Development of stockpiles and trenches, and 'cut and fill' activities. Vegetation clearing. Earthworks for trenching of the pipeline and construction of the plant. Road upgrades and borrow pits. Vehicle movements. Increased traffic.	Localised changes to topography and physical environment. Increased run-off leading to erosion of soil and deposition. Increased scouring or accretion in beach/dune areas. Reduced soil permeability and recharge to groundwater. Compaction of soil.	There are no watercourses in close proximity to plant or pipeline that could be affected by increased run-off or erosion. Construction activities and rehabilitation will occur in the dry season prior to the onset of the rains. Erosion and surface water controls such as sediment control fences, temporary drains and banks will be installed during the construction phase for both the plant and pipeline where practicable. A Rehabilitation Management Plan will be developed and implemented prior to construction. An Erosion and Sediment Control Management Plan will be developed and implemented.
Generation of Acid Sulfate Soils	Excavation, drainage or dewatering especially in nearshore/coastal areas.	Impacts on human activities and health. Changes in the quality and properties of the soil, groundwater, surface water, wetlands, watercourses and estuaries.	ASS site investigation took place in 2004, based on preliminary findings ASS is not likely to be an issue. A project-specific Acid Sulphate Soils Management Plan will be developed if field investigations indicate ASS are likely to be encountered.
Pollution of Groundwater Change to Water Quality or Characteristics	Vegetation clearing & land disturbance. Processing, storage and transport of hydrocarbons.	Change in chemical & biological composition. Increased turbidity. Hydrocarbon contamination.	Land disturbing activities will be confined to the dry season wherever possible. An Erosion and Sediment Control Plan will be prepared prior to construction and implemented. A Groundwater Protection Management Plan will be implemented prior to construction. A Waste Management Plan will be prepared prior to construction.
Ecological Environment			
Planned Vegetation Clearing, Fauna Disturbance & Habitat Loss	Vegetation clearing. Excavation activities. Vehicle and traffic movement. Construction of access routes and borrow pits.	Habitat and species loss of 74 ha. within project footprint. Destabilisation of the dune system. Habitat fragmentation. Short-term loss of species from area. Damage to or destruction of significant vegetation, habitats and species.	Construction activities will disturb only the minimum area of vegetation necessary. Sensitive vegetation communities and fauna habitats that occur in proximity to the area will be fenced off. A Rehabilitation Management Plan will be prepared and implemented, and rehabilitation undertaken as soon as possible.
Unplanned Vegetation Clearing, Fauna Disturbance & Habitat Loss	Excavation activities. Vehicle and traffic movement. Construction of access routes and borrow pits.	Habitat and species loss outside development footprint. Decline in the physical condition of vegetation and habitats beyond the actual zone of disturbance. Reduction in the suitability of surrounding habitat. Short-term loss of species from area.	Construction activities will disturb only the minimum area of vegetation necessary. Project will use existing access tracks where possible to minimise the amount of vegetation clearing. Construction activities in the vicinity of watercourses will take place as early as possible in the dry season. Sensitive vegetation communities and fauna habitats that occur in proximity to the area will be fenced off. Laydown areas, shore anchors, borrow pits, washdown bays etc. will not be located in areas of environmental sensitivity. A Rehabilitation Management Plan will be prepared and implemented, and rehabilitation undertaken as soon as possible.
Pipeline Trenches	Fauna capture in open trench for pipelines A 2.5 km trench open for several weeks.	Fauna mortality due to increased exposure to predators, effects from the sun and subsequent dehydration and starvation.	Soft plugs or lateral escape ramps will be used to allow fauna to escape the trench. The open trench will be monitored by expert wildlife personnel and animals identified, recorded and released, or preserved and lodged with NT Museum. A Fauna Management Plan will be developed.
Introduction and Spread of Weeds, and Feral & Pest Animals	Vehicles, plant and construction materials transportation on and off the project site.	Displacement of native species. Creation of increased fuel loads from grassy weeds to change fire behaviour and frequency. Direct competition for resources with existing flora. Degradation of vegetation communities.	All plant, equipment and vehicles will be clean prior to entering the project area. Wash down facilities will be provided and operators required to use them if vehicles, plant and equipment are found to be unclean. Only native plant species will be used in rehabilitation. An Exotic Species and Weed Management Plan will be prepared and implemented. A Cane Toad reporting strategy will be included in the Exotic Species and Weed Management Plan .
Unplanned Fire	Vehicle and plant exhausts. Sparks from contact with rock. Cooking or camp fires and cigarettes.	Alteration of habitat.	An Emergency Response Plan will be developed and implemented. A Fire Management Plan will be prepared and implemented.
Planned Fire	Deliberate ignition	Alteration of habitat	A Fire Management Plan will be prepared and Implemented.

Hazard	Source	Potential Impact	Preventative and Management Measures
Biting Insects & Mosquito-borne disease	Existing sources. Import of materials, provisions, equipment containing mosquito larvae. Creation of breeding habitat through works.	Increased sources of irritation to workforce and locals. Illness of workers. Introduction and spread of disease. Creation of additional mosquito habitat. Increased sources of irritation to workforce and locals.	A Biting Insects Management Plan will be prepared and implemented.
Waste			
Non-Hazardous Solid Waste Stream	Generation and storage of general non-hazardous waste.	Impact on visual amenity. Injury or death of individual fauna.	Woodside's Waste Minimisation Policy and Guidelines will be implemented. Waste Management Plans will be developed for each phase of the development.
Liquid Waste Stream	Generation and storage of domestic wastewater (sewage and grey water), and stormwater.	Generation of odours. Health impacts. Contamination of soil, surface water and/or groundwater. Degradation of vegetation communities or fauna habitats. Erosion and sedimentation of waterways.	Sewage treatment facilities will be provided during both construction and operation. A Groundwater Protection Management Plan will be implemented. Sites will be designed so that all stormwater generated from potentially contaminated or contaminated areas drain separately to an oily-water system.
Hazardous Waste Stream	Generation and storage of hazardous waste	Negligible to slight incremental increase in the environmental impact associated with existing facilities.	All hazardous waste materials will be disposed of/recycled at an approved facility in accordance with the project Waste Management Plan . All chemicals and waste products will be stored according to Australian legislation and guidelines where applicable.
Chemical or Hydrocarbon Spills	Generation and storage of hazardous liquids including hazardous chemicals and fuels. Spills from diesel generators and vehicles. Spills from condensate storage tanks.	Contamination of soil profile and/or groundwater Contamination of watercourses	A Spill Protection System will be put in place for the condensate storage tanks. Appropriate spill kits will be available where fuel and hazardous materials are used and stored.
Atmospheric Emissions			
Greenhouse Gases	Power generation. Flaring.	Incremental increase in global concentration of greenhouse gases.	A Flaring Management Plan and a Greenhouse Gas Management Plan will be implemented.
Other Combustion Products	Onshore gas plant. Emission of NO _x and Sox.	Potential impact on cultural sites or vegetation due to photochemical smog, acid rain and acid deposition.	Management measures applied to maximise the plant efficiency and minimise fuel use will effectively reduce SO _x emissions.
Other Atmospheric Emissions & Pollutants	Non Methane Hydrocarbons venting to atmosphere. Pumping condensate into the storage tanks. Transfer of condensate from the gas plant onto a tanker.	Potential impact on cultural sites or vegetation due to photochemical smog, acid rain and acid deposition. Non Methane Hydrocarbons (NMHC) Emissions are estimated to be minor. There will be a negligible amount of Volatile Organic Compounds (VOC's) emitted during the life of the project	High levels of fugitive emission control. Condensate will be stabilised and tanks will have floating roof tanks.
Ozone Depleting Substances	Ozone Depleting Substances contained in fire extinguishers and deluge systems. Refrigerants. Emergency situations.	Damage to ozone layer, global warming.	The use of ODSs by contractors during the construction and commissioning phases will be strictly controlled. Contractors will be required to use ODS free systems wherever alternatives are available.
Odour Emissions	Plant upset conditions resulting in gas leaks	Odours can present a nuisance to nearby residences, members of the public and workers if they are not managed effectively.	The plant is located in a remote area with the closest (temporary) community 2.5 km from the plant site and the closest permanent residence some 10 km away. No mercaptans will be added to the gas stream. Onshore condensate tanks will have floating roofs significantly reducing the potential for emissions. Only trace amounts of H ₂ S and mercaptans will be present (if at all) in the gas. Preliminary dispersion calculations indicate that beyond 350 m there should not be any odour impact due to H ₂ S. The plant will be designed to high industrial standards ensuring that upset conditions and associated leaks are minimised.
Dust Emissions	Clearing of vegetation. Stockpiling of earth. Vehicle and machinery movements.	Health impacts. Impact on vegetation and amenity. Loss of topsoil.	A Dust Management Plan will be prepared and implemented.

Hazard	Source	Potential Impact	Preventative and Management Measures
Noise Emissions	Vehicle Movement. Construction machinery and equipment. Processing plant operation. Commissioning/Maintenance eg flaring.	Direct disturbance to fauna. Disturbance to residences.	A construction Noise Management Plan will be approved and complied with. A Flaring Management Plan will be developed to reduce non-emergency flaring to as low as reasonably practical. Traffic and Noise Management Plans will be developed and implemented which will address impacts from traffic.
Light Emissions	Road lights within the plant fence. Safe illumination of the plant and accommodation areas. Flaring at the onshore gas plant.	Disturbance to fauna. Attraction of some fauna species.	All lighting will comply with AS4282. All non-essential lighting (minimum requirements to meet HSE standards) will be minimised. A Lighting Management Plan will be prepared and implemented. A Flaring Management Plan will be developed to reduce non-emergency flaring to as low as reasonably practical.

■ Table ES-3 Summary of Economic and Land Use Impacts

Resource/ Receptor	Source	Potential Impact	Preventative and Management Measures
Land Use and Land Tenure	Changes to existing land uses particularly during the construction phase.	Loss of access by local Aboriginal people. Inappropriate and unapproved movement of project personnel through Aboriginal lands.	The project infrastructure components have been designed and sited to ensure that impacts on surrounding land use activities are avoided or minimised. All access to the areas by project personal will be strictly controlled to avoid unauthorised and inappropriate access.
Infrastructure and Transport	Increased traffic volumes. Provision of sewerage and waste facilities.	Damage to existing road surfaces. Disruption to existing users of roads primarily during peak construction periods. Project demand for water and sewage facilities creating pressure on existing facilities.	Upgrading of existing tracks and the provision of new tracks leading to the onshore plant. A Traffic Management Plan will be developed and implemented. Water, waste and sewage facilities required by the project will be provided or existing facilities will be upgraded to manage increased capacity requirements.
Archaeology	Vegetation clearing and earthworks. Installation of subsea pipeline, wellhead platform and condensate loading facilities.	Impact on archaeological site 'Shell Midden 1'. Short-term destabilisation of sand dunes. Disturbance of unrecorded archaeological material and cultural sites.	The archaeological materials present in the Shell Midden 1 site will be thoroughly recorded and collected. A Cultural Heritage Management Plan will be developed.
Aboriginal Cultural Sites	Vegetation clearing and earthworks for trenching of the pipeline and construction of the plant. Sourcing of fill material. Construction of access tracks. Off-road driving. Excavation for nearshore pipelay. Shore pull.	Disturbance to Aboriginal cultural sites through off-road driving, sourcing of fill or raw materials and through exploration of the area surrounding the onshore facilities by construction workforce. Disturbance to <i>Walpinhthi Reef</i> during nearshore pipe laying and shore pull.	A Cultural Heritage Management Plan will be developed. Consultation will be undertaken with the Traditional Owners to agree appropriate management measures associated with the potential disturbance to <i>Walpinhthi Reef</i> .
Species with Indigenous Cultural Values	Vegetation clearing and earthworks for trenching of the pipeline and construction of the plant. Sourcing of fill material. Construction of access tracks. Off-road driving. Excavation for nearshore pipelay. Shore pull.	Temporary or permanent damage to environments and biological communities including species of cultural significance. Change in status of cultural knowledge and practices associated with species and environments. Ongoing social and economic changes in the Wadeye region have the potential to impact negatively and positively on the status of environmental cultural values held by Aboriginal people.	Gas plant site and access road are located in open woodland environments that are well represented elsewhere in traditional owners' clan estates; loss of opportunity for hunting, gathering and collection of other cultural resources is expected to be minimal. Mangrove and jungle environments will be avoided during pipeline construction. Every effort will be made to avoid disturbing nesting marine turtles. There are opportunities for Blacktip to contribute positively to the maintenance of environmental cultural values by supporting community initiatives already underway, including the Thamarrurr Rangers and the Wadeye Aboriginal Languages Centre.
Visual Amenity	Physical presence of fenced footprint Support vessels, drill rig, condensate export mooring facilities and wellhead platform.	Impact of flare on existing landscape. Impact of plant construction equipment.	Revegetation of cleared areas at the site will be undertaken using native flora, and through appropriate design of plant features. Tree felling will be minimised as far as practicable during construction activities. A Flaring Management Plan will be prepared and implemented to reduce non emergency flaring.
Economic Environment	Construction and operational phases.	Potential impacts associated with the Blacktip Project on the existing economic environment are likely to be positive. A wide range of economic benefits from the Blacktip Project will be delivered to the local area, the Northern Territory and Australia, including: employment benefits, business opportunities, household consumption, government revenue.	Capacity studies to maximise local content and opportunities for local employment will be undertaken.

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How to View a Copy of the Draft EIS

The Draft EIS describes the project proposal, and addresses the potential environmental impacts and how these impacts will be mitigated. This document will be available for review from 2nd of November 2004 until 18th January 2005 at the following locations:

- Darwin Public Library, Civic Centre, Harry Chan Avenue, Darwin, NT
- Casuarina Public Library, Bradshaw Terrace, Casuarina, NT
- Palmerston Public Library, Civic Plaza, Cnr University Avenue & Chung Wah Terrace, Palmerston, NT
- Litchfield Shire Offices, 7 Bees Creek Road, Bees Creek, NT
- Environment Centre, 3/98 Woods Street, Darwin, NT
- Thamarrurr Regional Council Offices, Wadeye, NT
- Wadeye Knowledge Centre, Wadeye, NT
- Palumpa - Nganmarriyanga Community Inc, NT
- Daly River - Nauiyu Nambiyu Community Government Council, NT
- Peppimenarti - Peppimenarti Community Council, NT
- Northern Land Council Offices, 9 Rowling Street, Casuarina, NT
- Commonwealth Department of Environment and Heritage Library, John Gorton Building, King Edward Terrace, Parkes, ACT
- State and Territory Libraries:
 - Northern Territory Library, Parliament House, Cnr Bennett & Mitchell Streets, Darwin
 - Wyndham Library, Koolama Street, Wyndham
 - Kununurra Library, Mangaloo Street, Kununurra
 - State Reference Library of Western Australia, Alexander Library Building, Perth Cultural Centre, Northbridge Perth

To support the public review process the Draft EIS will also be on display at Casuarina Shopping Centre on the 6th November between 9.30 am and 3.30 pm and at Palmerston Shopping Centre on the 20th November between 9.30 and 3.30pm. Members of the project team will be available at these times to address any questions that may arise.

The report can be examined for the duration of the public review period either on the Office of Environment and Heritage Internet site at www.lpe.nt.gov.au/enviro/ or on Woodside's Internet site at www.Blacktip.woodside.com.au. The Executive Summary of the Draft EIS is available free of charge and Volume 1 of the Draft EIS is available at a cost of \$40. These are available from the Woodside Darwin office at: 8th Floor, NT House, Mitchell Street, Darwin, NT, Fax No; (08) 8980 2710.

Making a Submission

Persons wishing to comment on the Draft EIS are invited to make written submissions by close of business on 18th January 2005 to:

Roderick Johnson
Office of Environment and Heritage
GPO Box 1680
DARWIN NT 0801
Email: roderick.johnson@nt.gov.au
Fax: (08) 8924 4053

All submissions should be in writing and should include the following details

- The project name
- Your name and address
- Note the appropriate section number and heading used when commenting on specific sections in the Draft EIS.

Further Information

Further information on the project can be obtained from our website at www.Blacktip.woodside.com.au. Alternatively contact:

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