Allocation of Oakajee Gas Pipeline Corridor

Gas Pipeline Sale Steering Committee

Advice of the Environmental Protection Authority to the Minister under S16 (e) of the *Environmental Protection Act 1986*

(This is not an assessment of the Environmental Protection Authority under Part IV of the *Environmental Protection Act 1986*)

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Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice to the Minister for the Environment and Heritage on the strategic assessment of the proposal by the Gas Pipeline Sale Steering Committee (GPSSC) on behalf of the Western Australian State Government to establish a land corridor from the Dampier to Bunbury Natural Gas Pipeline to the Oakajee Industrial Estate. The corridor is needed in order to enable future lateral gas pipelines to be constructed to service industries on the Oakajee Estate.

The GPSSC, on behalf of the Western Australian State Government, requested early advice from the Environmental Protection Authority (EPA) on any potential fatal flaws, from an environmental impact perspective, identified in the corridor proposed for reservation for a gas lateral pipeline(s). The EPA's report also highlights areas where further work would be required by proponents for pipeline proposals prior to referral of the proposal under Section 38 of the *Environmental Protection Act 1986.*

Relevant environmental factors

Although a number of environmental factors were considered by the EPA in the strategic assessment, it is the EPA's opinion that the following are the environmental factors that would need to be addressed in detail in any individual proposal:

(a) Terrestrial flora

(b) Specially protected (threatened) fauna;

(c) Surface water and groundwater;

(d) Soil and erosion;

(e) Rehabilitation;

(f) Construction pollution issues;

(g) Risk and hazards; and

(h) Culture and heritage

Conclusion

The EPA has strategically assessed the proposal to establish a land corridor for a lateral gas pipeline from the Dampier to Bunbury Natural Gas Pipeline to the Oakajee Industrial Estate.

The EPA notes that no constraints that would preclude the use of the proposed pipeline corridor for the construction of a gas pipeline have been identified on the basis of the information currently available.

The EPA also notes the management measures proposed by the GPSSC that would need to be fulfilled in a future proposal for a pipeline. The EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the future proponent(s) of the management measures proposed in the strategic review document.

Future pipeline construction proposals will require referral to the EPA for it to decide whether to assess the proposal or not.

Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

- That the Minister notes that the proposal on which advice is being provided is the establishment of a land corridor for a lateral gas pipeline(s) from the Dampier to Bunbury Natural Gas Pipeline to the Oakajee Industrial Estate.
- That the Minister considers the report on the relevant environmental factors as set out in Section 3;

3. That the Minister notes that the EPA has concluded that no constraints that would preclude the use of the proposed pipeline corridor for the construction of gas pipelines have been identified on the basis of the information currently available.

4. That the Minister notes that the EPA has concluded that the management measures proposed for the implementation of proposals for the construction of gas pipelines are appropriate.

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1. Introduction and background

This report provides the strategic advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment and Heritage on the environmental factors relevant to the proposal by the Gas Pipeline Sale Steering Committee (GPSSC) to establish a land corridor from the Dampier to Bunbury Natural Gas Pipeline (DBNGP) to the Oakajee Industrial Estate (Figures 1 and 2). The GPSSC on behalf of the Western Australian State Government requested the Environmental Protection Authority (EPA) to undertake a strategic assessment of the concept of reserving the land corridor for the DBNGP to Oakajee gas lateral pipeline.

The GPSSC was established to facilitate the privatisation of the DBNGP. The GPSSC is chaired by the Department of Resources Development (DRD). Membership of the Committee comprises representatives of DOLA, the Office of Energy and the State Treasury.

Cabinet approval included the establishment of a Gas Pipeline Working Group (GPWG) to undertake the practical implementation of the corridor reservation.

As the concept to reserve the land corridor for the Oakajee lateral gas pipeline corridor did not constitute a "proposal", it could not be subject to environmental impact assessment with associated Conditions imposed by the Minister for the Environment and Heritage, as detailed in Part IV of the *Environmental Protection Act 1986*. The EPA decided to provide strategic advice on the corridor under Section 16 (e) of the *Environmental Protection Act 1986*.

The GPSSC has produced a Strategic Environmental Review (SER) document, which was available for public review from 11 December 2000 to 22 January 2001. Nine submissions were received as a result of the public review.

The EPA's advice has been formulated after consideration of the proponent's information, advice from various sources and review of submissions.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses environmental factors relevant to the proposal. Management measures proposed by the GPSSC for future pipeline construction proposals, are commented on in Section 4. Section 5 provides Other Advice by the EPA, Section 6 presents the EPA's conclusions and Section 7, the EPA's Recommendations.

Appendix 6 contains a summary of submissions and the proponent's response to submissions and is included as a matter of information only. It does not form part of the EPA's report and recommendations. Issues arising from this process and which have been taken into account by the EPA appear in the report itself.

2. The proposal

It is proposed to establish a 50 metre (m) wide corridor from approximately four kilometres (km) north of Compressor Station 7 on the DBNGP to the Oakajee Industrial Estate. The corridor will extend for approximately 54km in the Shires of Mullewa and Chapman Valley. The location of the DBNGP, the Oakajee Industrial Estate and the proposed pipeline corridor is shown on Figure 1 and in Figures 2 and 3 the corridor is shown in more detail, including woody vegetation and stream and river locations.

The proposed corridor is being established to service the future gas requirements of industry within the Oakajee Industrial Estate. The corridor will be able to contain two or more pipelines so that further pipelines can be constructed as the demand for gas increases. Industrial quality gas may also become available at some future date and the option to utilise a second pipeline may then become attractive. At this stage the size and operating conditions of the pipeline(s) are not known.

Numerous alignments for the pipeline corridor were considered (Figures 5 and 6) to obtain the optimum alignment on environmental, engineering and social grounds.

As described in the SER, key factors considered in the route selection process were:

- avoidance of severe physical constraints such as granite outcrops, erosion gullies and very steep slopes;
- avoidance of remnant vegetation, nature reserves and other environmentally sensitive features;
- avoidance of residences and other sensitive land uses;
- avoidance of potential Native Title and heritage conflicts;
- minimisation of landscape impacts from public viewing points such as North-West Coastal Highway;
- minimisation of river crossings;
- minimisation of length and cost of the pipeline; and
- start and finish points of the corridor.

The preferred alignment was selected over the other alternatives as:

- it presents no severe physical constraints to construction;
- it maintains a safe separation distance from all residences;
- it minimises impacts on native vegetation. In the few areas where vegetation must be crossed, the corridor follows the most degraded areas, edges of vegetation remnants or existing cleared lines such as firebreaks and tracks. The total clearing of good-quality remnant vegetation required for one gas pipeline within the 50km preferred corridor is estimated at about three hectares. These small areas of disturbance will be rehabilitated following construction;
- it minimises watercourse crossings;
- it avoids known heritage sites (Aboriginal or European) and minimises potential conflict with current and possible future Native Title claims;
- it minimises landscape impacts by avoiding crossings of ridges and mesas; and
- it largely avoids rocky ground and unstable soils, thereby minimising the risk of subsequent erosion.

A detailed description of the proposed pipeline corridor can be found in the SER. Areas where vegetation clearance or other environmental impacts are possible are mentioned below.

The corridor is routed immediately north of a band of remnant vegetation on Loc. 10645. The corridor runs in a south westerly direction parallel to the band of vegetation, until it passes through a cleared area at CH8905.68. Small areas of vegetation may need to be cleared at this location to enable construction of future pipelines.

At the boundary between Loc. 3377 and 3376 the corridor runs immediately south of a large block of remnant vegetation. The pipeline crosses through this vegetation in a small gap at the western boundary of Loc. 3376. Small areas of vegetation may also require removal at this location for construction purposes.

The corridor runs in a south westerly direction across an area in LTO Lot 2/LTO Plan 19494 that is salt affected and which the property owner has recently replanted in an attempt to rehabilitate the area.

In Estate Lot 88 the pipeline crosses a band of native vegetation immediately north of a small breakaway with erosion gullies. There are no cleared areas within this vegetation band, so it will be necessary for any future proponent to remove vegetation from this area prior to construction.

From New Marracarra Road the corridor runs west, passing approximately 150m north of a farm house. In Estate Lot 44, the corridor crosses a vegetated creek line.

The corridor passes through a sparsely vegetated area in LTO Lot 11. Immediately west of Chapman Valley Road on Location 1840, the corridor crosses a discontinued railway line and the Chapman River. The corridor crosses the Murphy – Yetna Road and a heavily vegetated creek line approximately 108m south of an historic residence.

The corridor follows an existing track though a large area of remnant vegetation on Loc. 6769. Future proponent(s) will need to widen this track to enable for safe working, which will necessitate the removal of some vegetation.

The corridor passes to the north of a residence on Loc. 328. The corridor crosses a discontinued railway line on LTO Plan 13356.

The potential impacts of the proposal predicted by the proponent in the SER document (Bowman Bishaw Gorham 2000) and their proposed management are summarised in Table 1 (Appendix 3).

Figures 3 and 4 show the proposed pipeline route, including woody vegetation and streams and rivers.

3. Relevant environmental factors

Section 16 (e) of the *Environmental Protection Act 1986* requires the EPA to advise the Minister on the environmental matters generally and on any matter which he may refer to it for advice, including the environmental protection aspects of any proposal or scheme, and on the evaluation of information relating thereto.

It is the EPA's opinion that the following are the environmental factors would need to be addressed in detail in any referral of an individual proposal and upon which advice should be provided in this report:

(a) Terrestrial flora;

(b) Specially protected (threatened) fauna;

(c) Surface and groundwater;

(d) Soil and erosion;

(e) Rehabilitation;

(f) Construction pollution issues;

(g) Risk and hazards;

(h) Culture and heritage

The above relevant factors were identified from the EPA's consideration and review of all preliminary environmental factors.

Details on the relevant environmental factors and their assessment are contained in Sections 3.1 - 3.8. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor considers the measures proposed and required to ensure that the EPA's objective is met. The EPA's advice considers whether its objective for the factor can be met and further recommendations.

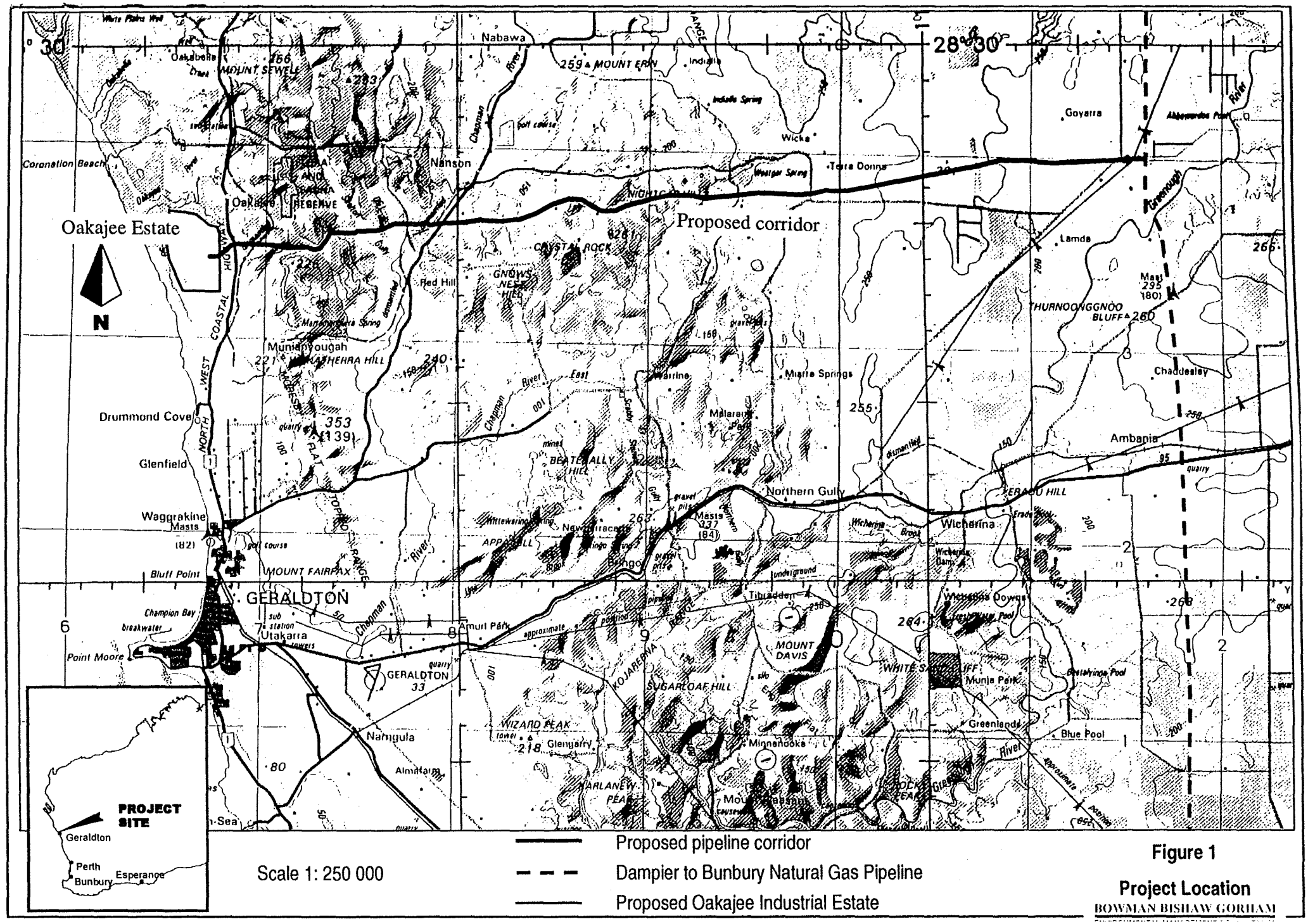

Figure 1

Project Location

BOWMAN BISHAW GORHAM

Figure 1. Locality map.

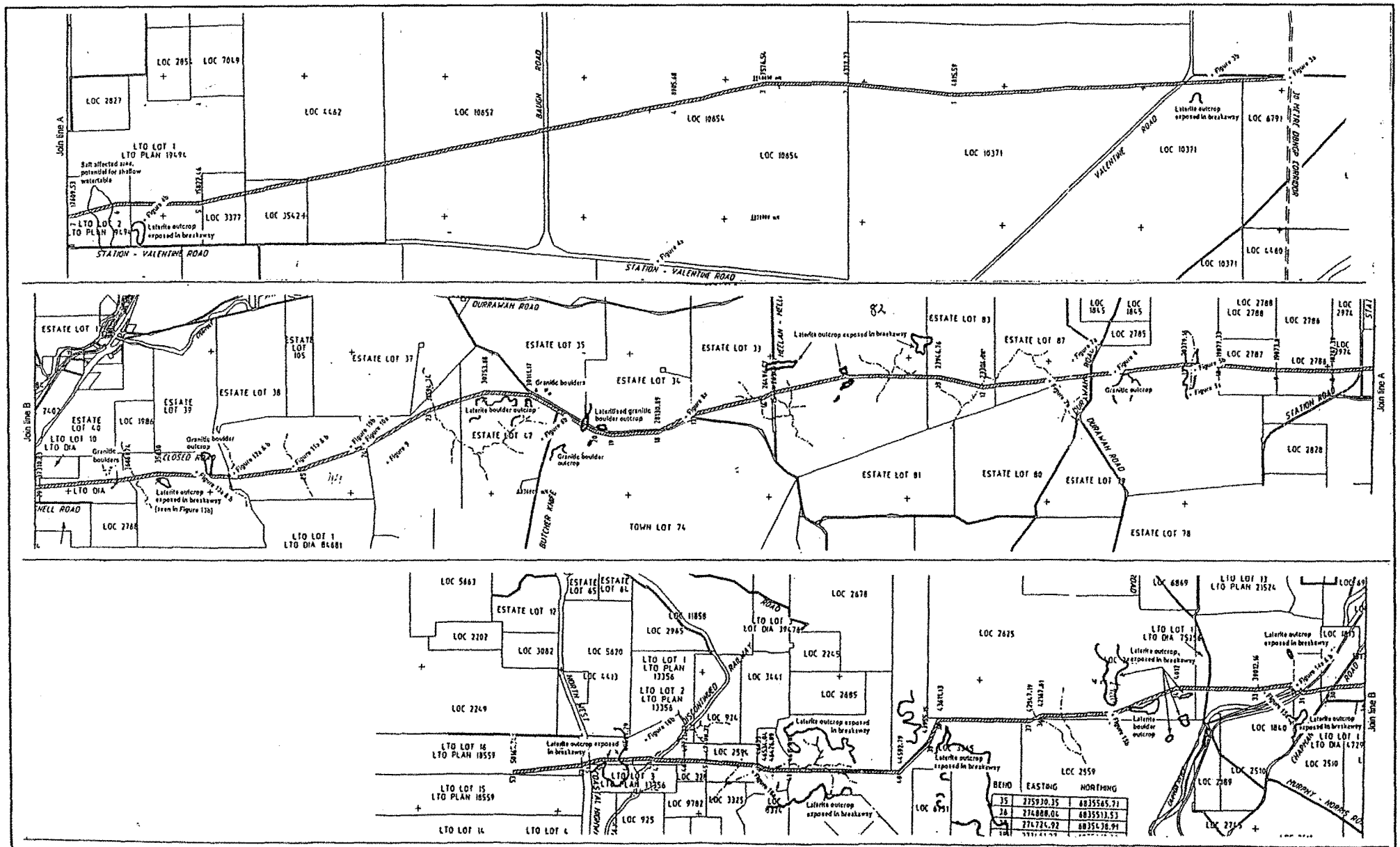

Figure 2. Proposed corridor showing lot numbers.

Coffey Geosciences Pty Ltd ACN 056 335 516

Geotechnical | Resources | Environmental | Technical | Project Management

Scale 1:50,000

Revision	Description	Drawn	Approved	Date

Drawn	PJM
Checked	
Date	25-7-00

BOWMAN BISHAW GORHAM
OAKAJEE – CS7 GAS LATERAL

SITE PLAN

Figure No: 2

Job no: P2538/1-AD

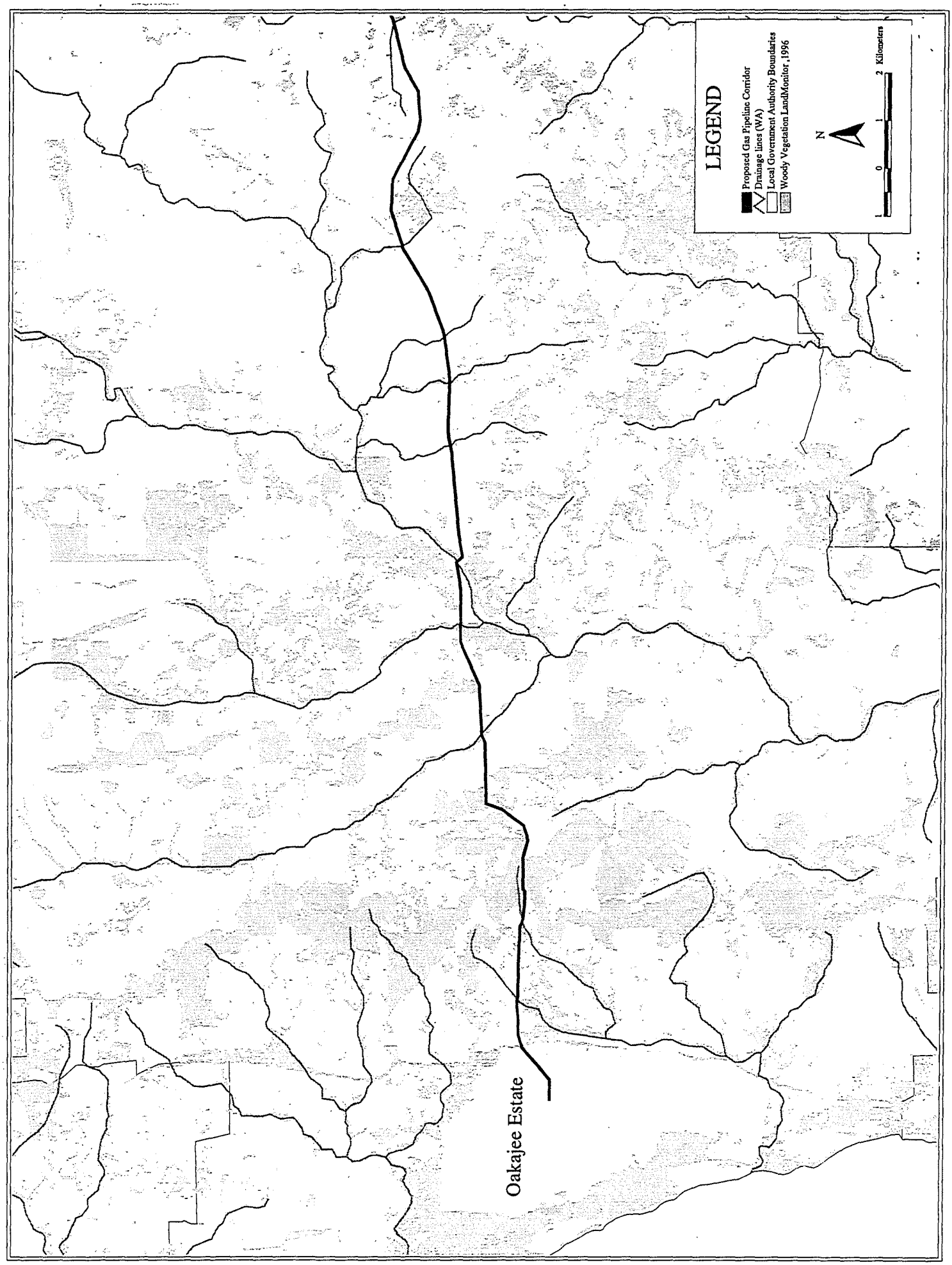

Figure 3. Proposed gas pipeline corridor route, west end.

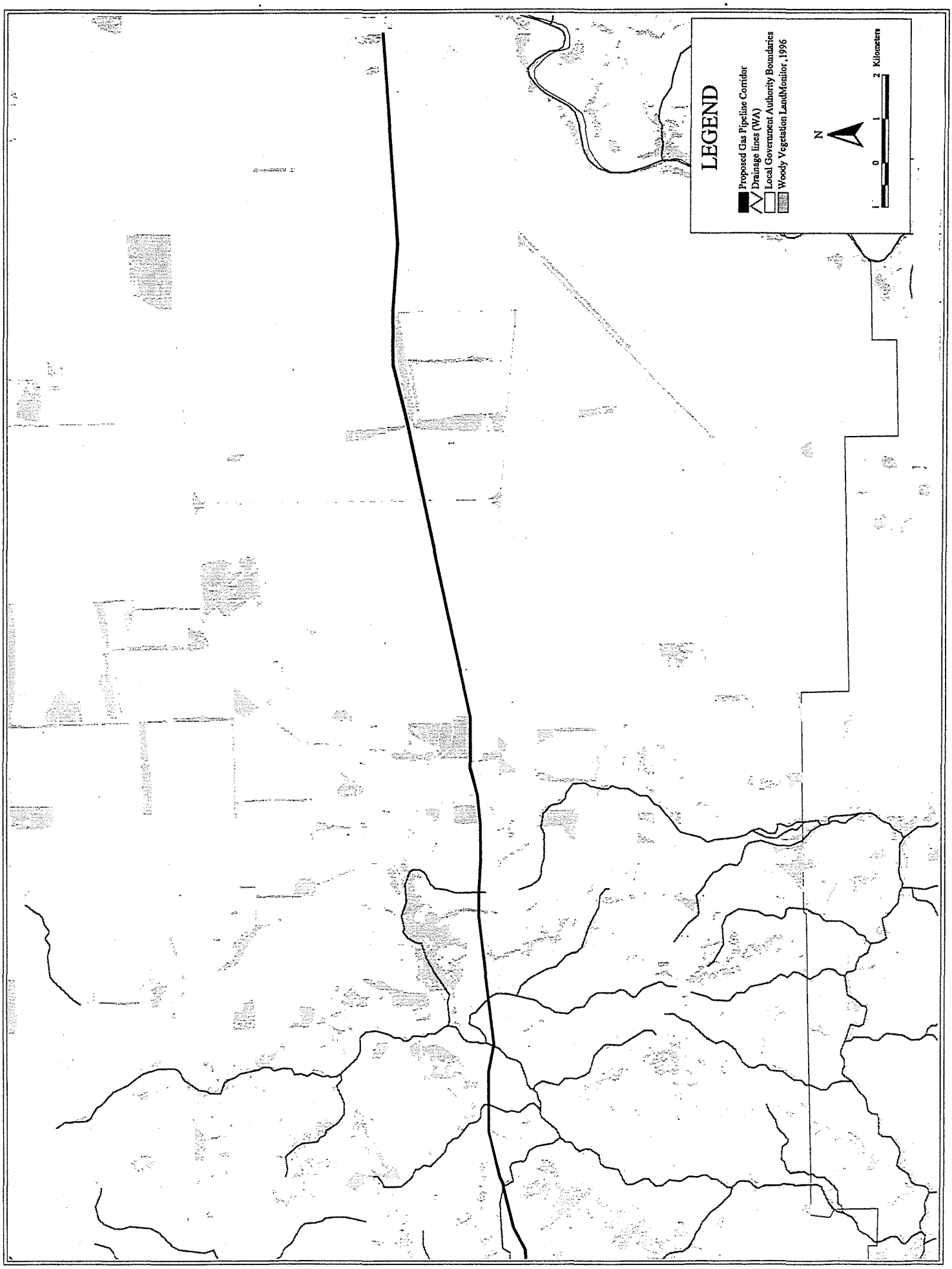

Figure 4. Proposed gas pipeline corridor route, east end.

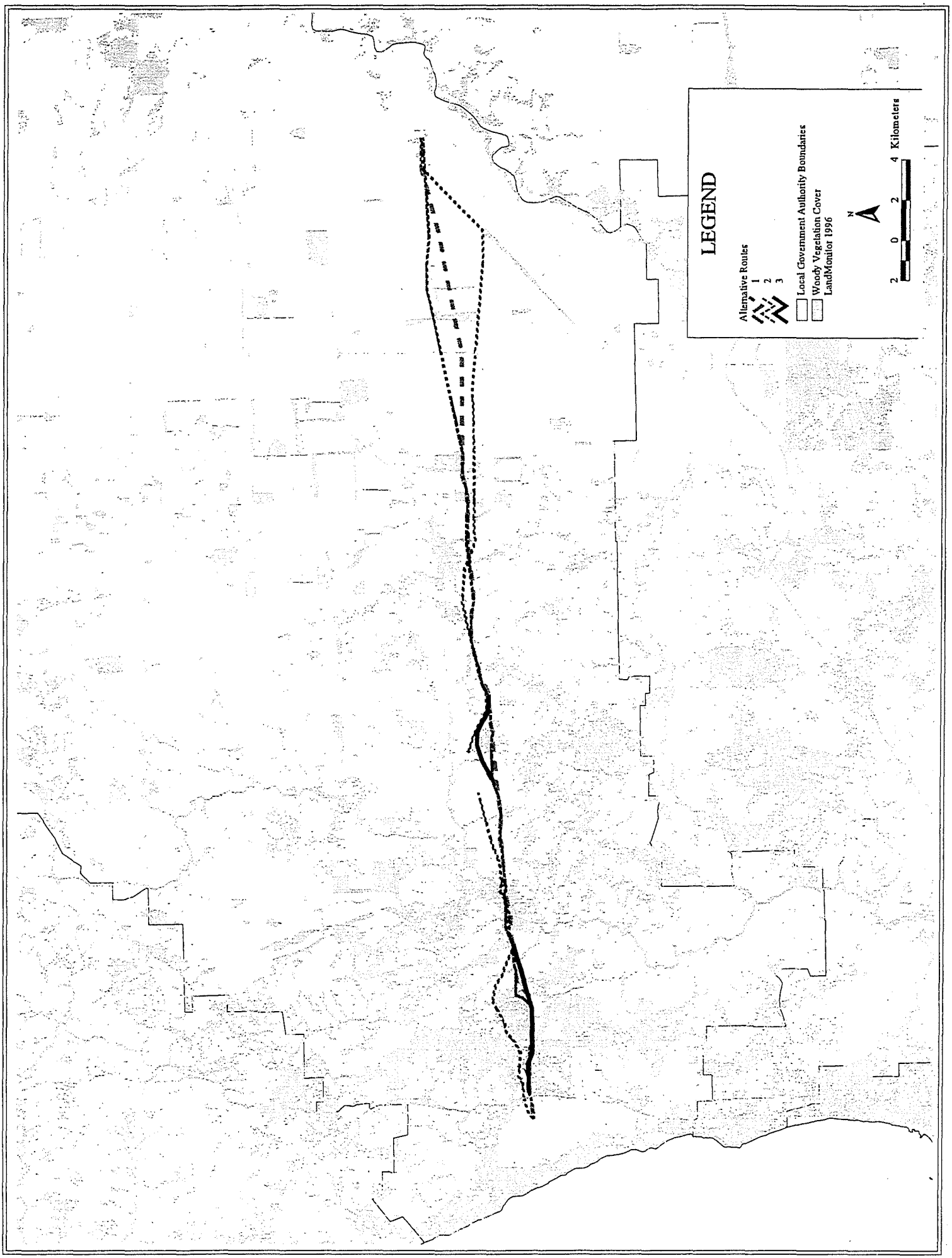

Figure 5. Alternative routes 1 to 3 and alignments for pipeline corridor.

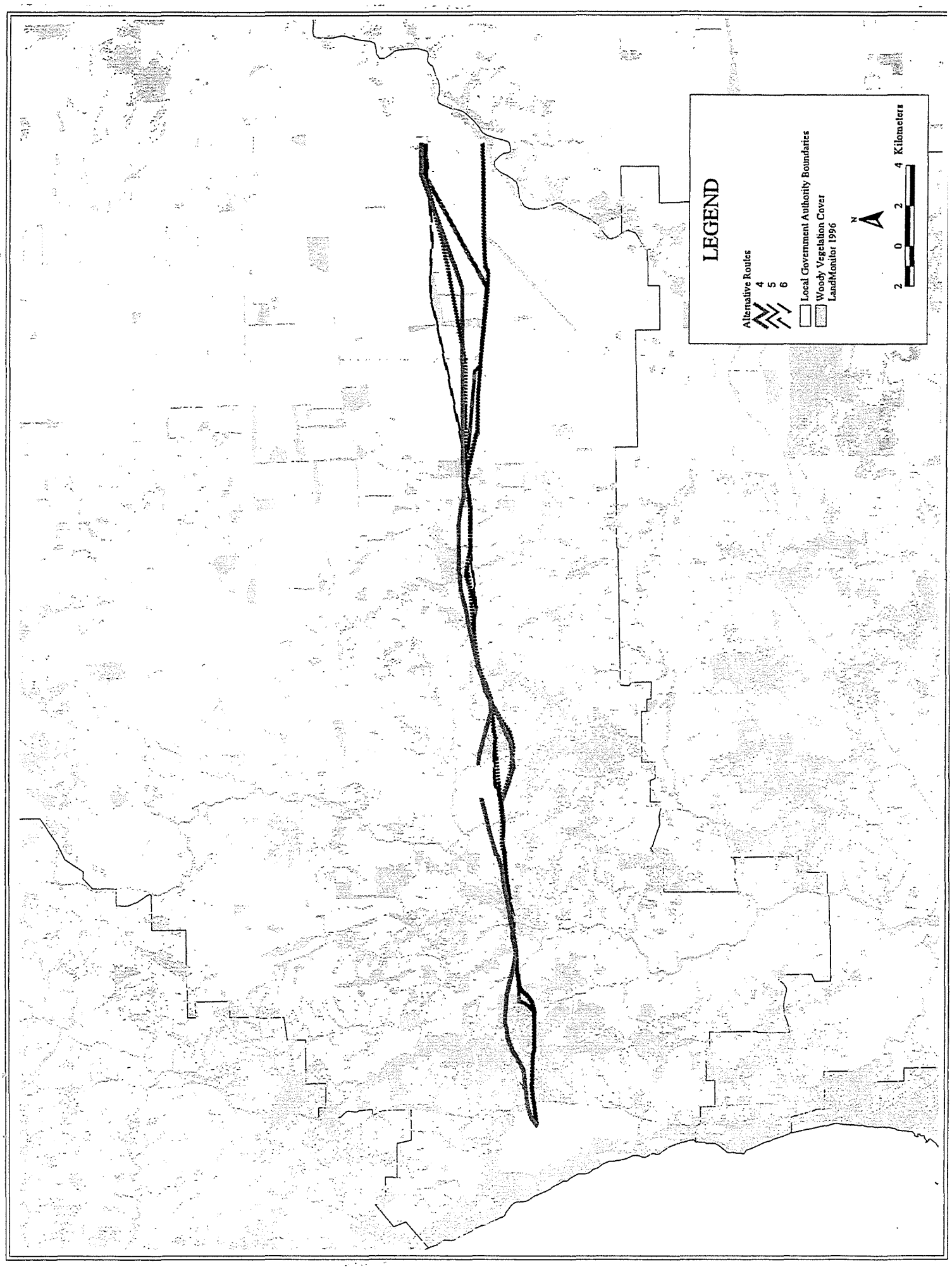

Figure 6. Alternative routes 4 to 6 and alignments for pipeline corridor.

3.1 Terrestrial flora

3.1.1 Declared rare and priority flora

Description

The majority of the proposed route passes through cleared farmland. A survey was conducted of the areas of remnant vegetation within the proposed pipeline corridor between July and September 2000, which is considered the optimum period for spring flora surveys in the Oakajee area. A search was undertaken for rare, endangered or significant flora species.

No plant taxa gazetted as declared rare flora under the *Wildlife Conservation Act 1950* or listed on Schedule 1 of the *Commonwealth Environment Protection Biodiversity Conservation Act 2000* were located either within, or adjacent to, the proposed pipeline corridor during the surveys (Mattiske, 2000).

However, four priority flora species were preliminarily identified within the pipeline corridor during the surveys. Two priority flora species were recorded in vegetation community 6a, *Gastrolobium ?rotundifolium* (Priority 1) and *Stenanthemum ?tridentatum* (Priority 3). *Verticordia argentea* (Priority 2) was recorded in vegetation community 2b. *Grevillea triloba* (Priority 3) was recorded in vegetation communities 2a, 4a and 4b.

Submissions

One submission from the Department of Conservation and Land Management (CALM) dealt with the impact on priority species. CALM recommends that a comprehensive survey be carried out pre-construction and during the appropriate season. Strategies to ameliorate any impacts should be developed to the EPA's requirements on CALM's advice.

EPA Advice

The EPA's environmental objective for this factor is to protect declared rare and priority flora, consistent with the provisions of the *Wildlife Conservation Act 1950.*

Although it is not a legal offence to take flora classified as being priority taxa., it is recommended that these flora be retained wherever possible.

The pipeline corridor has been selected to minimise the removal of native vegetation. However in some locations along the corridor vegetation removal will be necessary to enable construction to proceed. Preliminary analysis, based on a cleared working width of 25m for the majority of the corridor and 15m in environmentally sensitive areas, indicates that a total of approximately three hectares of native vegetation will be temporarily cleared for the construction of one pipeline within the corridor.

The priority flora in community 2b should not be impacted as the corridor traverses the adjacent paddock and firebreak area only.

The GPSSC has proposed that the pipeline alignment within the corridor should avoid priority flora as necessary and where practicable. Remnant vegetation retained within the working width should be flagged with yellow tape to indicate that it is to be avoided. The EPA agrees with the GPSSC that future proponent(s) should prepare and implement an environmental management programme to minimise construction impacts on flora (Item 2, Appendix 5).

Future pipeline proponent(s) may also need to complete additional flora and vegetation surveys prior to construction to supplement existing information. The Proponent(s) will determine the need for additional surveys in consultation with the DEP (Item 2, Appendix 5).

Full rehabilitation of the working width will be required following construction. However, a minor long-term reduction in species diversity, including trees and other deep-rooted species immediately over and adjacent the pipeline trench, will occur.

In conclusion, no declared rare flora were identified in the corridor. The intention that further vegetation survey work will be undertaken if additional species are added to the declared rare and

priority list and other management measures, as outlined above, to protect priority species made in the SER, are considered appropriate. The EPA advises that all practicable efforts should be made to avoid, retain or replace priority species.

3.1.2 Vegetation communities

Description

A total of 51 families, 126 genera and 205 plant taxa (including varieties and subspecies) were recorded during the surveys. Species representation was greatest among four families: Myrtaceae (31), Proteaceae (25), Mimosaceae (16) and Poaceae (21). This floral composition is typical of the Geraldton Region (Beard, 1976, although the majority of the Poaceae species were introduced) (Mattiske, 2000).

Twelve different vegetation communities were identified along the proposed pipeline corridor. Descriptions of the communities are provided in Table 2 in Appendix 4.

Of the 12 vegetation communities mapped, communities 2b and 6a appear to be the most diverse and support three of the four priority flora species recorded during the survey. Potentially the most regionally significant vegetation complex along the corridor is Community 6a, which occurs within the Moresby Ranges. The proposed pipeline corridor passes through this community along an existing track between two large areas that are in excellent condition and relatively undisturbed

Submissions

Submissions from the DEP raised the fact that the proposed corridor route cut through one of the larger areas of remnant vegetation as identified in the Conservation Assessment of the Moresby Ranges (MRMC 1998) and also through the central distribution of the Moresby Range Threatened Ecological Community (TEC) as mapped in the CALM TEC data base as held on the DEP's Geographical Information System. This TEC is categorised as data deficient.

Another submission suggested that as the corridor was not using the rail alignment, it was creating more disturbance of vegetation.

EPA Advice

The EPA's environmental objective for this factor is to maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities.

The GPSSC has selected the proposed pipeline corridor route to minimise impact on remnant vegetation. It was not proposed to use the rail alignment for the pipeline corridor as:

a) the separation distance required from the railway may have meant increased vegetation removal;

b) this would incur significant costs in extra cover for the pipeline to reduce risk of damage to the pipeline; and

c) railways require lesser gradients than pipelines and the pipeline can take a more direct route.

Community 6a is considered to be potentially the most regionally significant vegetation complex along the proposed corridor. This community can be allocated to Beard vegetation type mhSc (Numerical code no. 675) as identified in the CALM assessment of the Moresby Range (MRMC 1998). It is estimated that there is 24% remaining of the original extent of this vegetation type, of which 0.1% is in secure conservation reserves.

The Moresby Range TEC identified as *Melaleuca megacephala* and *Hakea pycnoneura* thicket on stony slopes of the Moresby Range is categorised as data deficient and the extent and condition of the community and occurrences are unknown. There are recordings of the community in the Oakajee and Wokatherra Nature Reserve. This community has not been recorded along the proposed pipeline corridor.

The vegetation of the Moresby Range reflects the geomorphological pattern, the hot dry climatic conditions and rainfall distribution. Much of the vegetation has high diversity, but has been insufficiently surveyed. In providing advice on the Geraldton Region Plan, the EPA supported a proposal that an inventory of regionally significant remnant vegetation in both private and government ownership should be compiled with a view to conserving significant remnant vegetation (EPA, May 1998). The Moresby Range Management Committee produced a Conservation Assessment of the Moresby Range in September 1998, which identified the area between the Oakajee and Wokatherra Nature Reserves and east to the Chapman River as a potential candidate area of remnant vegetation for conservation management. The proposed pipeline corridor passes through this area. The assessment also noted that "flora of the Moresby Range is poorly recorded. Additional survey work is required, particularly for the upland areas of the range."

In accordance with its Position Statement 2 (EPA, 2000a), the EPA would like to see an overall environmental benefit as a result of the proposal. The GPSSC has undertaken to ensure that this is achieved by implementing an appropriate mechanism such as conserving an area in a secure reserve, assisting with vegetation surveys or protection or rehabilitation of land in private ownership (Item 1, Appendix 5). The EPA wishes to reiterate its opinion that remnant vegetation in this region requires identification, retention and conservation.

In conclusion, the EPA considers it appropriate that as much remnant vegetation as possible should be avoided. Although the EPA would prefer the pipeline corridor not to cross a large area of vegetation which is a poorly reserved vegetation type and was identified as suitable for conservation in the assessment of the Moresby Ranges (CALM, 1998), the EPA accepts the advice of the GPSSC's consultant and the DEP that this is the best practicable route. The EPA endorses the GPSSC's undertaking to provide an "offset" for any loss in vegetation and recommends that the GPSSC work with the DEP and the Moresby Range Management Committee to decide the best use of resources to advance the conservation of remnant vegetation in the Moresby Range.

3.1.3 Conservation areas

Description

Victoria Location 6769 in the Moresby Ranges is currently protected by an 'Agreement to Reserve' under the *Soil and Land Conservation Act 1945*, which has been established to ensure that the area is managed in such a manner so as to retain and promote the growth of native vegetation. The pipeline corridor has been routed along an existing firebreak adjacent to the boundary of this property. The proposed route has been selected to ensure minimal removal of vegetation. For the installation of a pipeline up to 0.03ha (0.03%) of vegetation could be temporarily removed from the reserved area.

Submissions

DEP advice stated that one of the main issues addressed in the Moresby Range Management Strategy is the protection of vegetation on private land. A submitter felt that any disturbance of vegetation within private land that has an agreement to reserve may impact on future efforts to reserve other privately owned vegetation.

It was submitted that the clearing of a 15m width between two areas of significant vegetation will have a much greater impact on the continuity of the vegetation than the existing track.

EPA Advice

The EPA's environmental objective for this factor is to protect the environmental values of nature reserves.

The route selected is considered to be the best practicable route available. While it would be preferable not to traverse the block of vegetation, any other feasible route through the Ranges would involve the clearance of significantly more vegetation than along the proposed corridor.

The proposed corridor will follow an existing track/firebreak which will minimise the impact on native vegetation in the area.

It is unfortunate that the corridor impacts, although to a very minor degree, on an area protected by an "Agreement to Reserve" under the *Soil and Land Conservation Act 1945*. Voluntary agreements of this nature should be encouraged and approval of this corridor route should not be interpreted as undermining the significance of these agreements. However the EPA accepts the advice of the GPSSC's consultant and the DEP that this is the best practicable route and the proposed management measures will further reduce impacts to the area.

3.1.4 Weeds

Description

A total of 23 introduced weed species were observed during the surveys. Some of the species recorded are particularly aggressive and are of management concern. These include the black berry nightshade (*Solanum nigrum*) and Paterson's Curse (*Echium plantagineum),* which were mainly recorded in areas that have been grazed or cropped (Mattiske, 2000).

Paterson's Curse and Saffron Thistle (*Carthamus lanatus*), which was also recorded during the surveys, are classified as Declared Weeds under the *Agriculture and Related Resources Protection Act 1976*. Both of these species are classified as category P1 throughout the state on the 1999 list of declared plants prepared by the Agriculture Protection Board (APB, 1999). Therefore, any spread of these weeds must be prevented.

Construction activities may provide conditions for opportunistic weed species to invade and thrive in disturbed soils along the pipeline route. This problem is compounded by the fact that many weed seeds remain dormant in soil until the area is disturbed (APIA, 1998a). The linear development of a pipeline route also introduces the potential for weeds to be spread along the corridor and carried into previously weed free areas.

Weed species can compete with, replace or compromise native species and in agricultural areas they can reduce primary industry productivity and produce quality. Areas that are particularly vulnerable to weed infestation include watercourses where higher moisture levels may encourage rapid infestations and agricultural areas where species competition is limited and soil disturbance is high (BBG, 2000).

Submissions

A submission suggested that the training of contractors in weed control and identification may not be sufficient and that for control to be effective, the project required people already trained in weed identification and control. Soil movement should also be controlled, vehicles cleaned down and tyres checked to prevent the spread of weeds. Weed control should also be on going after construction of the pipeline.

Other submissions mentioned the need for weed management and the fact that reference is not made to the State Weed Plan or the Environmental Weed Strategy for WA.

EPA Advice

The EPA's environmental objective for this factor is to minimise the potential for the spread of weeds.

The GPSSC has proposed that future proponents should be required to complete a weed survey prior to construction (Item 3, Appendix 5). This survey will enable infested areas to be marked and delineated on construction plans and will also allow for the identification of appropriate sites for the location of vehicle and equipment clean-down areas.

Future pipeline proponent(s) will also be required to develop a Weed Control Programme as part of the Environmental Management Plan to ensure that weed species are not introduced to, or spread along, the working width. The GPSSC has proposed that the Programme should be developed in consultation with Agriculture WA and CALM as appropriate and should include:

- methods to avoid or minimise disturbance to areas with, or vulnerable to, weed infestation;
- identification of practical vehicle and equipment hygiene measures to be implemented as required along the spread;
- segregation of topsoil from agricultural and remnant vegetation areas to ensure that pasture or agricultural crop species are not carried into vegetated areas;
- measures to ensure that topsoil is reinstated to the same area from which it was removed;
- development of appropriate measures for the treatment of weed infestations following rehabilitation. Such measures may include the treatment of areas with appropriate herbicides;
- ensuring that all imported construction materials (topsoil, straw bales, revegetation material, etc.) are certified weed free by the supplier prior to acceptance onto the spread;
- training/induction programmes for contractors to ensure that weed control measures are appropriately implemented and that key weed species can be readily identified and treated; and
- development of reporting procedures to ensure that any declared weeds located along the construction route are reported to Agriculture WA as soon as practicable (BBG, 2000).

The State Weed Plan and Environmental Weed Strategy were not referred to in the SER as the GPSSC considered them to be generic policy documents that seek to bring about weed management of the kind proposed.

Prompt revegetation of disturbed areas with native species is recommended to maintain ecosystem values and to prevent weed invasion.

In conclusion, the EPA advises that it is appropriate for future proponent(s) to conduct a weed survey and implement a Weed Control Programme. It is anticipated that this programme will be formulated prior to referral of the proposal to the EPA and contain, at a minimum, details of implementation of the measures outlined in the SER.

3.1.5 Dieback

Description

The vegetation survey found that along the proposed corridor route the majority of pockets of native vegetation were relatively healthy and where there was some evidence of physiological stress it appeared to be related to grazing pressures and past fire events (BBG, 2000). No specific soil or plant material sampling was undertaken to test for dieback disease.

The dieback of plant species can be related to a range of fungal diseases, such as the widespread occurrence of *Phytophthora cinnamomi,* in the southwestern areas of Western Australia. The latter species causes root rotting and destroys the structure of native communities, reducing their floristic diversity, decimating primary productivity and destroying habitat for dependent native fauna (BBG, 2000).

Dieback disease may be spread by surface or subsurface water flow or, more likely, by the transport of infected soil or plant material. This can be by the importation of fill or mulch or by soil adhering to vehicles and machinery. Therefore in areas of known or suspected dieback infection, measures such as the restriction of work during wet soil conditions, designation of hygiene zones and washing down of vehicles, are required to minimise the transfer of soil and plant matter during construction works.

Submissions

No submissions were made on the topic of dieback disease.

EPA Advice

The EPA's environmental objective for this factor is to minimise the potential for the spread of dieback disease.

No specific soil or plant material sampling was undertaken for dieback disease as the majority of pockets of native vegetation were relatively healthy. As the potential exists for areas of disease to be identified in or adjacent to the corridor a dieback survey will need to be conducted prior to construction of the pipeline(s) in accordance with current protocol and methods recommended by CALM.

Surveys should be undertaken in appropriate seasonal conditions to ensure that the identification of infected areas is maximised. All diseased areas are required to be flagged in accordance with CALM conventions and appropriate hygiene measures implemented.

Future proponent(s) for the pipeline construction will need to develop a site specific Dieback Disease Control Programme, in consultation with CALM, prior to construction to ensure that the risk of disease spread along the pipeline route by construction activities is minimised (Item 4, Appendix 5). The following management techniques have been proposed by the GPSSC as a minimum:

- blowdown/washdown areas should be established in infected areas. All vehicles, machinery and equipment exiting infected areas should be cleaned to remove soil. Only clean vehicles should enter disease free areas;
- all imported construction materials (topsoil, straw bales, revegetation material, etc.) will need to be certified disease-free by the supplier prior to acceptance onto the spread;
- topsoil and vegetation removed from dieback free areas will need to be segregated from that removed from infected areas;
- diseased/disease free material will need to be reinstated to its point of origin;
- stockpiled, diseased material will be stored on the downslope side of the working width, where practicable, to prevent material being washed into the trench;
- infected material (vegetation or topsoil) will not be stockpiled adjacent to watercourses wherever practicable. Where this cannot be avoided, bunds and/or drains will be constructed to prevent diseased material being carried into the watercourse by surface flow;
- drainage from infected areas will be managed to prevent drainage into disease-free areas;
- water for dust suppression and bushfire control will be obtained from dieback free sources, or water will be sterilised prior to use. No untreated water from a potentially infected source will be used on site;
- construction activities will be scheduled to minimise works in wet conditions; and
- a training programme for all personnel with access to the spread will be implemented to ensure that the workforce is aware of management strategies and hygiene procedures.

In addition, no permanent vehicular access will be maintained along the constructed pipeline(s) as all routine surveillance will be conducted by air. This will minimise the ongoing risk of dieback disease spread.

Where vehicular access has to be provided to key points along the route, such as to monitoring locations and pipeline valves, the access tracks should be routed and constructed to minimise potential dieback spread (BBG, 2000). Routine hygiene measures should also be applied to maintenance vehicles.

In conclusion, the EPA agrees that it is appropriate that future proponent(s) conduct a dieback survey and implement a Dieback Control Programme. It is anticipated that this programme will

be formulated prior to referral of the proposal to the EPA and contain, at a minimum, details of implementation of the measures outlined in the SER and measures for minimising the risk of spreading the disease during operation of the pipeline.

3.2 Specially protected (threatened) fauna

Description

A desktop assessment of rare, threatened or vulnerable vertebrate fauna that could potentially occur along the proposed corridor has been undertaken. A fauna survey on the ground has not been carried out.

The study found that sixteen rare, threatened or vulnerable fauna species could occur within the region along the proposed corridor. These species comprise four mammals, eight birds and four reptiles, and were considered as their known geographic range encompasses or is adjacent to the project area. The species were Heath Rat (*Pseudomys shortridgei),* Western Mouse (*Pseudomys occidentalis),* Western Brush Wallaby (*Macropus irma),* Southern Brown Bandicoot (Quenda) (*Isoodon obesulus),* Malleefowl (*Leipoa ocellata),* Peregrine Falcon (*Falco peregrinus),* Square-tailed Kite (*Lophoictinia isura),* Bush Stone-curlew (*Burhinus magnirostris),* Major Mitchell's (Pink) Cockatoo (*Cacatua leadbeateri),* Carnaby's (Short-billed) Black Cockatoo *Calyptorhynchus latirostris,* Rainbow Bee-eater *(Merops ornatus),* Fork-tailed Swift *(Apus pacificus), Cyclodomorphus branchialis, Lerista yuna,* Carpet Python *Morelia spilota imbricata* and Woma *Aspidites ramsayi.* There is a low probability of the Heath Rat, Western Mouse, Mallee Fowl, Bush Stone curlew or Woma occurring in the area.

There are three locations considered to be of particular significance to vertebrate fauna along the proposed pipeline corridor. These are:

- remnant vegetation on the Moresby Range;
- riverine vegetation along the Chapman River; and
- areas of York Gum (*Eucalyptus loxophleba* – Community 1b) woodland.

Submissions

The DEP considered that the methods used in the assessment of significant fauna habitats were inadequate. Vegetation community types should have been examined to determine their value as fauna habitats. Also the databases held at the Western Australian Museum were not consulted and a number of other references were available.

The Western Spiny-tailed Skink, *Ergernia stokessi badia,* listed in Schedule 1 of the *Wildlife Conservation Act,* was not considered which is the most likely threatened species to occur in the project area. The skink lizard, *Lerista axillaris,* should also have been considered.

EPA Advice

The EPA's environmental objective for this factor is to protect Specially Protected (Threatened) Fauna, consistent with the provisions of the Wildlife Conservation Act 1950.

An on-ground fauna survey was not undertaken at this time as it is not known when a proposal for a pipeline will eventuate and a survey done at this stage may be no longer valid several years into the future. Future proponent(s) will need to determine the need for detailed fauna surveys at the time of proposal and include the information in the referral document to the EPA It is expected that future proponent(s) will prepare a Fauna Management Plan (Item 5, Appendix 5). The GPSSC has suggested that the Fauna Management Plan should include:

- determination in consultation with the DEP of the need for detailed fauna surveys of the proposed pipeline(s) route;

- provision of crossing points at suitable locations along the spread throughout the construction period to minimise the risk of animals becoming trapped in the trenches. Every practicable effort will be made to maintain existing faunal runs where they cross the trenchline;
- provision of ramps at appropriate locations within open trenches to allow trapped animals to escape;
- daily inspections of trenches for trapped animals. Any found will be released by suitably trained personnel;
- avoidance, where possible, of direct contact with fauna; and
- prohibition of feeding, hunting, firearms and domestic pets from construction areas.

It may be necessary to conduct a specific search for the Western Spiny-tailed Skink and the EPA notes that this has been included in the proposed management measures (Item 5, Appendix 5).

As the majority of the pipeline passes through cleared agricultural land, there will be no impact on native vegetation habitat for most of the route. However as there is very little remnant vegetation in the area, any remaining vegetation communities are likely to be of significance to fauna. In the Moresby Range where the proposed corridor passes through remnant vegetation very little information on fauna has been documented. However there are no fauna species of conservation importance known to occur in the range area(MRMC, 1998).

The EPA considers that the proposed management measures for implementation by future proponent(s) are appropriate for a proposal for the construction of a gas pipeline and anticipated that the information required for these management measures will be available when the proposal is referred to the EPA. The EPA is aware that retention of existing native vegetation is the best means of protecting native fauna and notes that the proposed corridor has been selected to largely avoid remnant vegetation.

3.3 Surface and groundwater

3.3.1 Surface water

Description

Impacts to surface water bodies may be caused by the construction of river crossings, run-off from adjacent workings, contamination due to spills of fuel or oil, dewatering or abstraction of water or discharge of dewatering or hydrostatic water.

The proposed pipeline route crosses the Chapman River and at least fifteen ephemeral watercourses and tributaries to the Chapman and Greenough Rivers. Minimisation of river crossings was one of the factors considered in the selection of the proposed corridor route.

Typical methods of construction across crossings fall into two categories; open cut and non-open cut. The construction methods adopted at each crossing will depend on the results of the borehole surveys and the availability of specialised construction equipment.

The degree of impact pipeline construction may have on a watercourse is dependent upon factors such as the volume of water carried by the river or stream during the construction period, the construction methods used and the stability of the watercourse beds and banks.

Construction of the pipeline may cause impacts to surface water bodies which may include:

- physical disturbance of the watercourse system, which could cause erosion and could have implications for long-term bank stability and rehabilitation of the system;
- disturbance or impact to riparian and aquatic flora and fauna, due to crossing construction, diversion or dewatering impacts;

- direct and indirect release of suspended solids into the watercourse, with the potential for high levels of suspended sediments to impact on the integrity and functions of watercourse systems. Direct sediment release usually arises during construction of wet crossings. Indirect release originates from run-off from the adjacent working width or via water pumped from excavations during dewatering;
- increased risk of contamination through spillage of fuels and oils into or adjacent to watercourses; and
- discharge of water from dewatering and hydrostatic testing, impacting on the quality of surface water.

Submissions

The Water and Rivers Commission recommended that refuelling and location of generators should be at least 10m from dry ephemeral streams and at least 100m from waterways with standing water. A buffer distance of 100m is also recommended for latrines and chemical storage to standing or running waterways and 50m to seasonal waterways.

EPA Advice

The EPA's environmental objective for this factor is to maintain the integrity, functions and environmental values of surface water bodies and to ensure that alterations to surface water drainage do not adversely impact indigenous vegetation and any beneficial use.

It is recommended that river crossings are constructed during low rainfall periods so that the impacts of flooding or erosion during construction are minimised. Vegetation removal along stream banks should also be minimised to maintain bank stability and reduce erosion.

It is noted that further hydrogeological investigations have been recommended prior to construction to provide information to assess appropriate river crossing construction techniques (Coffey, 2000).

Future proponent(s) will be required to provide an Environmental Management Plan (EMP) for the management of impacts to surface water bodies (Items 6 and 8, Appendix 5). The GPSSC has proposed that proponent(s) should provide, as part of the EMP, details of construction methods and environmental management procedures for each watercourse crossing, measures to minimise sediment release to watercourses and measures to minimise the risk of contamination to watercourses from fuel and oil spills. Measures to be detailed in the EMP should include:

- implementation of restricted working widths, where practicable, across watercourses;
- development of methods to control and maintain water flow during pipeline construction;
- methods for the sequential storage and reuse of riverbed materials so as to enable reinstatement of material to the correct location and depth within the watercourse. This is of particular importance where the stream bed consists of rocks, pebbles or coarse gravel overlying finer material;
- delaying clearing and grading of approaches to watercourses until construction is imminent to minimise the risk of erosion and sediment run-off into the watercourse;
- establishment of appropriate stabilisation and scour prevention measures on the banks and beds of watercourses to limit erosion potential;
- where appropriate, scheduling crossings to coincide with dry or low flow periods;
- avoiding the construction of access tracks across watercourses wherever practicable;
- installation of sediment traps immediately downstream of all wet crossings;
- storage of segregated topsoil and subsoil piles away from the watercourse to limit the possibility of sediment suspension through surface run-off;
- provision of settling devices for dewatering activities to reduce suspended solid loads to acceptable levels prior to discharge;

- prohibition of fuel storage on the pipeline spread. All fuel and/or lubricants will be stored at a central location such as the pipe storage area, in impermeable bunds with a capacity not less than 110% of the total volume of products stored;
- prohibition of refuelling within 10m of a watercourse;
- siting site generators and pumps at least 10m from the edge of a watercourse;
- use of drip trays during refuelling activities; and
- development of a Spill Management and Contingency Plan prior to construction (Item 7, Appendix 5) (BBG, 2000).

Testing of water quality will also be required prior to any discharge of wastewater to surface water bodies.

The EPA agrees with the GPSSC that all watercourses should be reinstated as close as possible to their original profile and condition. Stability, channel profile and bed composition equivalent to that existing prior to construction should be achieved wherever possible.

The GPSSC has confirmed that all fuel and chemical storages, latrines and generators should be located at least 100m from waterways with standing water.

In conclusion, the EPA considers that the management measures proposed by GPSSC for implementation by future proponent(s) are appropriate for the management of impacts to surface water bodies of a proposed gas pipeline. Details of management should be submitted to the EPA with the referral for the construction of any pipeline proposal. It is expected that further hydrogeological investigations will be necessary to determine appropriate crossing construction techniques and baseline data on channel stability, profile and bed composition.

3.3.2 Groundwater

Description

Potential impacts on groundwater hydrology may arise during pipeline construction as a result of dewatering and water supply for hydrostatic testing. Groundwater quality may be impacted by discharge of hydrostatic test water, wastewater or spills of fuel or oil. Construction of the pipeline trench also has the potential to alter groundwater flows.

Dewatering may be required at river and creek crossings and also in low lying and salt affected areas where groundwater is close to the surface. Large volumes of water will also be required for hydrostatic testing of the pipeline prior to commissioning. Impacts associated with abstraction may include:

- reduced water availability to fringing and riparian vegetation along creek beds and rivers and also to newly planted vegetation in salt affected areas, which is particularly critical should construction occur during summer;
- intrusion of saline groundwater into fresher groundwater lenses; and
- permanent disruption of freshwater lenses.

Submissions

There were no submissions relating to groundwater.

EPA Advice

The EPA's environmental objective for this factor is to maintain the quality, quantity and distribution of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.

To ensure that dewatering operations do not affect existing and future beneficial uses of aquifers, future proponent(s) will need to prepare a Dewatering Management Plan in accordance with Water & Rivers Commission Guidelines prior to construction (Item 7, Appendix 5). The Plan should identify locations along the pipeline route where dewatering activities will be required and should include:

- aquifer characteristics, including depth, quality and use;
- volume of water to be removed, rate of drawdown and effects on beneficial uses, including ecosystem use; and
- testing of the quality of wastewater if discharged to groundwater.

Future proponent(s) will need to agree the timing, location and source of water for hydrostatic testing with the relevant statutory authorities prior to testing to ensure that impacts on limited resources are minimised.

Storage of fuels and oils and spill management has been discussion in Section 3.3.1 Surface water.

Disposal of testing water must not cause contamination of groundwater resources. Disposal options for wastewater are discussed further in Section 3.6.1, Liquid and solid wastes.

In conclusion, the EPA considers that the management measures proposed to develop a Spill Management and Contingency Plan and a Dewatering Management Plan as part of the EMP, are appropriate and it is anticipated that this information will accompany a referral of a pipeline proposal to the EPA. Attention will also need to be paid to appropriate backfilling of the trench to ensure subsequent groundwater flows are not significantly affected.

3.4 Soil and erosion

3.4.1 Topsoil and subsoil

Description

Topsoil stripping and stockpiling can lead to the destruction of soil structure and encourage wind and water erosion. Previous experience during construction of the DBNGP also indicates that topsoil stockpiles are prone to erosion during the construction period which can lead to a loss of topsoil available for reinstatement to the trench line (BBG, 2000).

Subsoil compaction can impede root development. Subsoil compaction is of particular concern in agricultural areas where the gas pipeline corridor is used for cropping (Haagensen, 1999).

The GPSSC has proposed that to minimise disruption to topsoil, topsoil will only be removed from immediately above the trench line. Topsoil will be stockpiled separately from vegetation and subsoil along the working width in a manner so as to maximise recovery for respreading and to minimise erosion. To minimise erosion potential of stockpiled topsoil, stockpiles will be stabilised by physical covering, hydromulching and similar as necessary and stored for the minimum practicable period to prevent loss through wind or water erosion (BBG, 2000).

Submissions

One submission was concerned with rehabilitation of land above the pipeline to maintain agricultural productivity. One submission supported the maintenance and replacement of topsoil to the same section of the corridor.

EPA Advice

The EPA's environmental objective for this factor is to ensure that the construction of the pipeline does not result in short or long term depletion of the quantity or quality of topsoil and to maintain subsoil structure so that vegetation growth or productivity of the soil is not adversely affected.

The APIA Code of Environmental Practice (APIA, 1998) provides advice for topsoil and subsoil management. This includes:

- utilization of existing roads and tracks where practicable;
- advice for stockpiling of topsoil which has been removed to protect it from traffic impacts or from pipeline construction;
- storage of topsoil away from areas of surface water flow;
- restricting vehicle parking to designated construction areas and preventing parking under trees to prevent root soil zone compaction;
- ripping to relieve compaction; and
- respreading of stockpiled topsoil.

It is expected that future proponent(s) for gas pipeline proposals will consider the best available measures for the protection of topsoil and subsoil structure, under local conditions, in formulating their Environmental Management Programme (EMP) and work practices. The EMP should be submitted with the referral for the construction proposal to the EPA.

Rehabilitation of the pipeline corridor and work areas is discussed further under the factor "Rehabilitation".

In conclusion, the EPA considers that the development of management measures to prevent the loss of topsoil during storage and to ensure that topsoil and subsoil stockpiles are successfully reinstated is appropriate. Measures to minimise subsoil compaction should also be included in the EMP. This information should be available at the time of referral to the EPA.

3.4.2 Erosion

Description

Erosion can result from the action of wind or water, leading to the loss of topsoil, soil nutrients and vegetation and creation of erosion gullies. Construction activities involving earthworks increase erosion risks by exposing soils.

The construction of pipelines on hill sides and through steep sided creek and river channels, in particular, may increase the risk of erosion.

Erosion may threaten the integrity of the pipeline as well as causing environmental impacts and impacts on agricultural productivity.

Submissions

No submissions on this factor were received.

EPA Advice

The EPA's environmental objective for this factor is to establish stable, sustainable landforms consistent with their surroundings in order to control erosion.

Erosion is a major environmental concern along the proposed alignment with existing erosion evident in adjacent cleared areas (Mattiske, 2000).

The GPSSC has proposed that future proponent(s) should develop and implement measures to prevent erosion during and following construction (Item 9, Appendix 5). Erosion measures to be implemented along the corridor should be documented in the EMP and should include:

- minimisation of ground disturbance and clearing of native vegetation;
- scheduling of river and creek crossings during dry conditions or low flow periods wherever practicable;

- reinstating watercourse beds, embankments and steep sections of the corridor where necessary with protection measures such as gabions, sandbags, seeded concrete bags and hydromulching;
- covering or stabilising topsoil stockpiles to prevent loss to wind and water erosion;
- returning material removed from the trench line to the original horizon to promote rapid revegetation and trench stabilisation;
- spreading cleared vegetation or hydromulch on disturbed areas as necessary to ensure re-establishment of vegetation cover;
- establishing drains and bunds as required to divert runoff away from disturbed areas to natural drainage lines; and
- constructing control banks on steep gradients or in areas where runoff may preferentially travel along the pipeline route (BBG, 2000).

In conclusion, the EPA considers that the development and implementation of measures to prevent erosion during and following construction to maintain the operating integrity of the pipeline(s) and the overall stability of the surrounding landscape and detailing these measures in an EMP is appropriate. This information should be available at the time of referral to the EPA.

3.5 Rehabilitation Programme

Description

Construction of a pipeline within the corridor will result in intense disturbance over a very restricted width. The aims of post-construction rehabilitation are:

- to leave a stable landform and soil surface that is not susceptible to wind and water erosion;
- in agricultural areas, to return the land to its former use for grazing and cropping without significant loss of productivity; and
- in remnant vegetation areas, to achieve a stable, diverse perennial cover that approaches the original vegetation in terms of its species composition, diversity, structure and ecological function (BBG, 2000).

In addition there may be disturbances for laydown and pipestringing areas, borrow pits, work sites and access roads and tracks.

Submissions

One submission questioned the achievability of returning native vegetation systems to their original diversity, structure, stability and function once they have been totally cleared. The submission recommended that the GPSSC find ways to further reduce the amount of native vegetation to be cleared and that they research the most successful rehabilitation techniques and produce a comprehensive rehabilitation plan which should be open to public scrutiny. The rehabilitation plan should be available before construction starts.

The Shire of Chapman Valley drew on previous experience with the Dampier to Bunbury pipeline, where borrow pits were not effectively rehabilitated and productivity of agricultural land not fully restored. The Shire has requested that landowners and the Shire are consulted on the requirements for rehabilitation.

EPA Advice

The EPA's environmental objective for this factor is to ensure that the areas affected by the proposed development are satisfactorily rehabilitated.

The GPSSC has proposed that prior to construction, future proponent(s) should prepare a Rehabilitation Plan that will detail specific measures to be implemented to assist in the successful reinstatement and regeneration of construction areas. The Plan should include:

- site clean-up measures and physical reinstatement techniques;
- revegetation measures; and
- provisions for monitoring and plans for additional rehabilitation work as necessary.

The rehabilitation works should include:

- removal of waste materials and equipment from the pipeline spread, including rock and excess soil, and disposal in accordance with the Waste Management Plan;
- re-profiling of the construction areas to achieve stable contours and implementation of specific measures as necessary to prevent slumping or erosion;
- re-establishment of surface drainage lines;
- installation of erosion and sediment control measures as necessary; and
- replacement of topsoil and then vegetation debris in the areas from which they were stripped; and
- ripping or scarifying soils along the contours to remove soil compaction, particularly in heavy trafficked areas such as the vehicle running track (BBG, 2000).

Additional measures such as supplementary plantings with suitable native plant stock or seeding may be required.

Borrow pits, temporary access roads and storage areas should be rehabilitated in the same manner and to the same standards as the working width (BBG, 2000).

In reply to submissions, the GPSSC has agreed that the EMP should be developed and implemented in consultation with affected landowners. In addition the Department of Land Administration, as corridor manager should continue to consult affected landowners after pipeline construction. Provision for affected landowners to be consulted prior to construction about rehabilitation measures has been added to management measure 11 (Appendix 5).

In conclusion, the EPA considers that the proposed management measures for implementation by future proponents are appropriate for rehabilitation of disturbed areas. The Rehabilitation Plan should be made publicly available before construction commences and the affected Shires so advised.

3.6 Construction pollution impacts

3.6.1 Liquid and solid wastes

Description

Liquid and solid wastes are generated by all aspects of pipeline construction, from the establishment of the site offices to reinstatement of the pipeline spread. Typical wastes include :

- office rubbish, paper, packaging and rubbish from the site office and yard;
- spent welding rods, grinding wheels, visors and shot blast from welding operations;
- surplus spoil and rock from boring activities or backfilling;
- sewage from temporary toilets both at the site and along the spread;
- used lubricating oils from machinery maintenance (BBG, 2000); and
- wastewater from dewatering activities or hydrotesting of the pipeline.

Inappropriate waste disposal can potentially lead to:

- soil, surface water or groundwater contamination;
- impacts on post-construction land uses; and
- loss of visual amenity (BBG,2000).

Hydrostatic testing and dewatering operations may produce considerable volumes of water of variable quality. Potential impacts associated with the discharge of water from these activities include:

- salinisation of creek lines and rivers through salt water incursion or direct discharge of saline water from dewatering operations;
- contamination of groundwater and surface water through discharge of chemical additives, such as corrosion inhibitors and biocides, in hydrotest water;
- increased turbidity of watercourses through release of discharge water with high suspended sediment levels; and
- increased potential for erosion through direct discharge to land of large volumes of water (BBG, 2000).

All water produced from dewatering will initially be discharged into settling devices of a sufficient capacity and residence time to allow the suspended sediment load in the water to fall to a level suitable for release. Methods of disposal of hydrotest water will depend on the quality of the water. Hydrotest water may contain corrosion inhibitors, biocides, etc. The wastewater may be disposed, as appropriate, by:

- land discharge to allow for disposal by infiltration;
- infiltration basins;
- overflow to watercourses;
- re-injection to the aquifer downgradient of the dewatering operations; and
- evaporation.

Appropriate disposal methods for dewatering water will need to be determined in consultation with the DEP. Disposal of saline water to sensitive areas will need to be avoided.

Submissions

No submissions were received on this factor.

EPA Advice

The EPA's environmental objective for this factor is to ensure that waste generation is minimised and that disposal of liquid and solid waste is consistent with relevant statutory requirements and acceptable standards.

The GPSSC has proposed that prior to construction, future proponent(s) should prepare a detailed Waste Management Plan, for inclusion within the EMP, which is to address all regulatory and Shire requirements (Item 12, Appendix 5). The Plan should identify likely wastes arising from construction activities and appropriate handling and disposal methods.

The Plan should be based on the accepted principles of waste minimisation, namely:

- Reduction of wastes at the source.
- Reuse of materials wherever possible.
- Recycling of wastes where practicable.
- Disposal of wastes appropriately and responsibly.

An important aspect of the Waste Management Plan will be the collection and control of waste on site. Waste should be regularly collected from the working width and placed in covered skips or similar containers at designated access points for disposal (BBG, 2000).

Where appropriate local Shire waste disposal facilities should be utilized.

Future proponent(s) should also prepare a Dewatering Management Plan which will address the disposal of wastewater from dewatering and hydrotesting activities (Item 7, Appendix 5).

In conclusion, the EPA considers that the proposed management measures for implementation by future proponents are appropriate for the disposal of liquid and solid wastes.

3.6.2 Dust

Description

Dust emissions may result during pipeline construction from:

- vegetation clearance and removal;
- topsoil removal and storage;
- trenchline excavation and blasting;
- exposure of soil surfaces to wind;
- movement of construction machinery along the pipeline spread; and
- reinstatement and rehabilitation activities.

The main impacts associated with dust generation include loss of visual amenity, nuisance and potential health issues (BBG, 2000).

No burning of vegetation will take place, therefore no smoke will be generated.

Submissions

There were no submissions on this factor.

EPA Advice

The EPA's environmental objective for this factor is protect surrounding land users such that dust emissions will not adversely impact upon their welfare and amenity or cause health problems by meeting the Guidelines for the Prevention of Dust and Smoke Pollution from Land Development Sites in Western Australia.

The GPSSC has proposed that future proponent(s) should prepare a Dust Management Plan prior to construction as part of the overall EMP. The Plan should consider potential dust sources from construction and identify management measures to minimise emissions.

The GPSSC has indicated that dust generation along the spread should be visually monitored during construction activities. Measures to minimise dust generation from the site may include:

- restriction of vehicle speeds along cleared tracks and the spread;
- application of water or dust stabilisers to exposed areas as required to prevent dust lift-off, particularly near residences and outbuildings;
- minimisation of dust generation from soil stockpiles by limiting exposure time, applying water, physical coverings or hydromulching; and
- ceasing construction activities temporarily should dust stabilisation techniques fail.

All water used for dust suppression should be obtained from dieback free sources or sterilised before use (BBG, 2000).

In conclusion, the EPA considers that the proposed management measures for implementation by future proponents are appropriate for the management of dust.

3.6.3 Noise

Description

Noise will be generated during construction of the pipeline by earthmoving machinery, blasting operations and the movement of trucks and small vehicles.

The pipeline corridor traverses mostly agricultural and grazing areas, with few residences. The pipeline does pass within 300m of eight residences where construction noise may be more noticeable due to the relatively low noise levels experienced under normal conditions. Noise generation will, however, be of short duration.

The majority of construction activities will occur during normal working hours but some, such as construction of non-open cut crossings, dewatering, pipeline cleaning and hydrostatic testing, may have to continue on a 24-hour basis.

The dominant noise associated with non-open cut crossings is the sheet piling of pits either side of the obstacle being crossed. Piling is an intermittent operation, the duration of which depends on such factors as the pit size and soil type. The use of sheet piling is dependent on ground conditions and may not always occur. Sheet piling may, however, be required at crossings where high water levels could affect the structural stability of the pit. Removal of piles and backfilling of the pit will generate similar noise levels to the excavation process (BBG, 2000).

Controlled blasting may be required at some locations along the pipeline to excavate hard rock or cemented materials such as laterite or granitic boulders. Noise levels associated with blasting activities will be intermittent and short term.

Construction traffic will cause temporary minor increases in traffic noise on roads in the vicinity of the pipeline spread.

Noise emissions from hydrostatic testing, pigging and vacuum drying are mainly associated with the pumps and compressors used and the venting of air from the pipe. These activities may generate high localised noise levels over short periods.

Submissions

There were no submissions on this factor.

EPA Advice

The EPA's environmental objective for this factor is to ensure that noise levels meet statutory requirements and acceptable standards.

Noise levels from construction activities are regulated by the *Environmental Protection (Noise) Regulations 1997* and these will apply.

In some cases it may be appropriate to consider the impact of noise on stock and wildlife, for example, the impact of noise on a colony of birds during the breeding season.

The GPSSC has proposed that, prior to construction, future proponent(s) should identify as part of the EMP expected noise levels from construction activities and also from the associated plant and equipment. The EMP should also indicate any steps necessary to control noise emissions from construction activities and plant, which may include:

- equipping construction equipment with appropriate noise control devices (e.g. mufflers) and maintaining all plant and machinery in good working order;
- locating fixed noise generating equipment (generators, compressors etc.) at appropriate distances from residences and/or within noise enclosures as necessary; and

- providing noise attenuation screens as appropriate.

The GPSSC has proposed that noise levels should be monitored if any complaints are received. If required, operating practices or machinery will be modified to reduce noise emissions.

Residents living in the vicinity of the pipeline should be advised of the proposed working schedule by the Proponent(s) and also of the times and duration of any abnormally noisy activity. Notification of residents should occur prior to the commencement of works within each section.

The GPSSC has proposed that blasting should be kept to a minimum. The pipeline corridor has been selected to avoid rocky areas wherever practicable. If blasting is required, the frequency of blasting operations should be minimised and blasting times should be restricted to normal working hours.

All blasting activities will need to comply with the *Explosives and Dangerous Goods Act 1961* and the *Mining Act 1978*.

Wherever possible, pipe venting should only be carried out during normal working hours in order to minimise disturbance. Air should be directed through 'vent stacks' wherever necessary to reduce noise levels (BBG, 2000).

In conclusion, the EPA considers that the proposed management measures for implementation by future proponents are appropriate for the management of noise.

3.6.4 Vibration

Description

Significant vibration levels during construction may be generated from blasting, rock breaking or compaction activities during reinstatement. Vibration has the potential to affect adjacent residences, farm structures or historical sites and also any adjacent pipelines within the corridor (BBG, 2000). There are few structures close to the pipeline route and only eight residences within 300m of the corridor.

Submissions

There were no submissions on this factor.

EPA Advice

The EPA's environmental objective for this factor is to ensure that vibration levels meet statutory requirements (including DME requirements) and acceptable standards.

The GPSSC has proposed that prior to construction, future proponent(s) should identify, as part of the EMP, potential vibration sources along the pipeline route and determine the proximity of vibration sources to sensitive premises.

Blasting is the most likely activity to cause vibration impacts. The pipeline corridor has been selected to avoid sensitive premises. It is considered that vibration impacts from activities other than blasting are likely to be undetectable outside the immediate vicinity of the corridor.

Where the potential exists for sensitive premises or other pipelines in the corridor to be impacted by vibration, the Proponent(s) should liase with the appropriate regulatory authorities to determine appropriate levels of vibration from construction activities. Maximum vibration magnitudes will need to prevent damage to other structures adjacent to the pipeline corridor.

Blasting operations are required to be undertaken in accordance with Australian Standard AS2187.2:1993 (Storage, Transport and Use of Explosives). This standard provides a recommended maximum Peak Particle Velocity (PPV) of 10mm/s for houses and low-rise buildings and a maximum PPV of 25mm/s for structures of reinforced concrete or steel construction, regardless of frequency. In specific circumstances, a PPV other than those recommended by AS 2187.2:1993 may be used if substantiated by careful investigation (BBG, 2000).

In conclusion, the EPA considers that the proposed management measures for implementation by future proponents are appropriate for the management of vibration.

3.7 Risks and hazards

3.7.1 Off-site individual fatality risk

Description

Any high pressure gas pipelines built in the proposed corridor will be required to meet the EPA's off-site individual risk criteria. These are an individual fatality risk of :

- 1×10^6 fatalities per annum for residential developments;
- 0.5×10^6 fatalities per annum for sensitive developments;
- 50×10^6 fatalities per annum for industrial facilities;
- 10×10^6 fatalities per annum for non-industrial activity in buffer zones;
- 5×10^6 fatalities per annum for commercial development.

In addition to meeting the above criteria, risk minimisation (as low as reasonably practicable, ALARP) must be demonstrated in all new proposals (EPA, 2000 (b))

High pressure gas pipelines, for the purpose of EPA Guidance Statement No. 50 (EPA, 2000 (c)) are defined as those with maximum allowable operating pressure above 5Mpa and subject to the requirements of Australian Standard AS2885.1 Pipelines – Gas and Liquid Petroleum (Part 1: Design and Construction). Guidance Statement No. 50 has a consultation distance of 300 m and if people reside or can congregate within this distance, then further investigation steps need to be carried out in accordance with the guidance.

The area through which the pipeline corridor is routed is sparsely populated. There is a separation distance of more than 300m to residences for the majority of the corridor, except for eight individual residences. Individual risk will need to be considered for these residences.

Due to the sparse population along the pipeline route and the low probability of large numbers of people congregating near the route, it is unlikely that societal risk will need to be considered.

Submissions

A submission from LandCorp pointed out that two residences thought to be within 300m of the pipeline corridor had not been taken into account.

A DEP submission advised that Handbook HB 105 (Australian Standards, 1998) should also be referenced during risk assessment for the pipeline.

EPA Advice

The EPA's environmental objective for this factor is to ensure that risk is managed to meet the EPA's criteria for individual fatality risk off-site and the DME's requirements in relation to worker and public safety near natural gas pipelines.

The objectives are to minimise the threats to the integrity of the pipeline from accidental interference, and also to minimise the risks from a breach of the pipeline which will result in a jet fire if ignited.

The closest residence is around 105 m away from the pipeline corridor and from the two case examples in Guidance Statement No. 50 it is likely that the EPA individual risk criteria can be met.

The EPA agrees with the GPSSC that future proponent(s) should undertake a detailed risk assessment in accordance with Australian Standard AS2885.1:1997 and HB105 prior to pipeline construction to demonstrate that the EPA's criteria are met (Item 16, Appendix 5). In addition, future proponent(s) will also be required to complete a safety case study in accordance with

DME requirements during the initial design phase for a specific proposal. The pipeline will require a licence pursuant to the *Petroleum Pipeline Act 1969*.

Even if risk from a proposed pipeline meets acceptable criteria there are a number of risk reducing measures that may be implemented to achieve ALARP. Such measures may include:

- increased depth of cover;
- incorporation of cathodic protection devices;
- pressure monitoring;
- on-ground inspection;
- erection of above-ground pipeline markers; and
- use of heavy walled pipe for pipelines sections in proximity to residences, where the threat of interference is high.

Proponent(s) will be required to ensure that individual risk criteria can be met once the exact location of a pipeline proposal is known.

In conclusion, it is likely that a pipeline proposal would be able to meet the EPA's individual risk criteria. Risk reduction measures are available for implementation should they be necessary.

However, consideration should be given to designating on the title of land affected by the corridor, in addition to the easement, an area of additional separation to meet the EPA's individual risk criteria for a buffer to any residential development as determined by the detailed quantitative risk assessment, once this has been carried out. Planning authorities should be made aware of separation requirements.

Planning authorities should consult with the Department of Resource Development if a development proposal within 300m of the pipeline corridor is received, prior to the quantitative risk assessment for a pipeline proposal being completed

The EPA considers that the proposed management measures for implementation by future proponents are appropriate for the management of risk from and to the pipeline.

3.7.2 Bushfire risk

Description

The construction of a gas pipeline may increase the risk of bushfires due to pipe cutting, welding and grinding and the operation of equipment or vehicles in high fire hazard areas (APIA, 1998).

Submissions

There were no submissions regarding this factor.

EPA Advice

The EPA's objective for this factor is to protect public safety, health and property, and vegetation and fauna from the impacts of accidentally ignited bushfires.

The GPSSC has proposed that future proponent(s) should prepare a Bushfire Management Plan prior to construction. as part of the Environmental Management Plan, and should detail bushfire prevention measures, equipment required, emergency contacts and training procedures.

All bushfire prevention measures should be developed in consultation with CALM, the Bushfires Board and the Shires of Mullewa and Chapman Valley and may include:

- maintenance of fire fighting equipment on all sections of the spread where welding activities are occurring;
- restriction of welding adjacent to stockpiled vegetation; and

- cessation of welding activities during harvest bans (BBG, 2000).

In conclusion, the EPA considers that the proposed management measures for implementation by future proponents are appropriate for the management of this risk.

3.8 Culture and heritage

Description

Pipeline construction has the potential to disturb or destroy both known and unknown Aboriginal sites and sites of European heritage value.

An archaeological and ethnographic assessment of the proposed corridor for sites of significance has been carried out. No ethnographic sites were identified. Seven archaeological sites and one site of cultural interest were recorded. All of the sites have been adequately recorded and are not considered to be of archaeological significance (BBG, 2000). Clearance under Section 18 of the *Aboriginal Heritage Act 1972* will be required to remove the sites.

One stone residence on Murphy-Yetna Road of historical significance is located 108 m from the pipeline. Blasting during construction may affect the residence. The ground in the vicinity of the house is currently believed to be free of rock outcrops that would need blasting.

Submissions

A submission from the Aboriginal Affairs Department raised the issue that the western end of the proposed corridor had been realigned and not surveyed. It was also thought that a final meeting with Aboriginal people had not been held.

A submission from the Aboriginal Affairs Department drew attention to the fact that the proposed pipeline corridor crosses and runs parallel for some distance to the first railway ever built in Western Australia.

EPA Advice

The EPA's environmental objective for this factor is to ensure that the implementation of the strategic plan complies with the requirements of the *Aboriginal Heritage Act 1972* and to ensure that changes to the biological and physical environment resulting from the proposed development do not adversely affect cultural associations or heritage values of the areas along and adjacent to the pipeline corridor.

The GPSSC has undertaken to apply for clearance under Section 18 of the *Aboriginal Heritage Act 1972* to remove those sites located along the proposed pipeline corridor during the heritage survey.

The GPSSC has also proposed that future proponent(s) should be required to ensure that an Aboriginal Heritage Officer will be present during all construction activities to monitor for additional sites not located during the heritage surveys.

An EMP should be prepared to ensure that any new sites located during construction are protected until assessed. If a suspected site is found it is proposed that all work in the vicinity of the area should cease immediately and that the Department of Aboriginal Affairs should be advised of the find and consulted with respect to management options

All personnel should be informed of the requirements for dealing with Aboriginal heritage areas prior to the commencement of construction activities, and should also be made aware of their responsibilities under the *Aboriginal Heritage Act 1972* (BBG, 2000).

In response to the submission from the Aboriginal Affairs Department, the GPSSC advised that at the western end of the proposed pipeline corridor, the realignment was within the Oakajee Industrial Estate which has been previously surveyed. All meetings with necessary groups had been completed.

The GPSSC has proposed that future proponent(s) should identify, as part of the EMP, whether blasting will be required in the vicinity of the historic building on Murphy-Yetna Road. Should blasting be necessary, it will need to be carefully controlled so as to minimise ground vibration.

The pipeline corridor crosses and runs parallel to two disused railway reserves. All tracks and sleepers have been removed and the Heritage Council have not expressed any concern regarding this issue.

The EPA considers that the proposed management measures for implementation by future proponents are appropriate for the management of impacts of a proposed pipeline on Aboriginal and European culture and heritage.

4. Commitments

Section 16(e) of the *Environmental Protection Act 1986* requires the EPA to advise the Minister for the Environment and Heritage on the environmental protection aspects of any proposal or scheme, and on the evaluation of information relating thereto. Section 16(e) does not allow for the setting of environmental conditions or for legally binding commitments.

Nevertheless the GPSSC has provided an array of management measures to ameliorate the impacts of a future proposal on the environment (Appendix 5). These management measures are considered by the EPA to be appropriate for a high pressure gas pipeline proposal although the implementation of the measures may need to be varied to apply to specific proposals. It is expected that when such a proposal is referred to the EPA, the referral will be consistent with the management measures proposed by the GPSSC and contain all information required in the proposed measures. If the referral documentation contains sufficient and satisfactory information, the process of environmental impact assessment would be considerably expedited.

5. Other advice

The responsibility for control of development in close proximity to the proposed pipeline corridor, either prior to the construction of a pipeline or after the construction of a pipeline, has not been resolved. It is the EPA's opinion that consideration should be given to designating on the title of land affected by the corridor, in addition to the easement, an area of additional separation to meet the EPA's individual risk criteria for a buffer to any residential development as determined by the detailed quantitative risk assessment, that will be undertaken when a pipeline is proposed. The local planning authority should be informed of separation requirements between the proposed pipeline corridor and developments.

On receipt of any development application within 300m of the proposed corridor, prior to a quantitative risk assessment being carried out for a pipeline proposal, the local authority should consult with the Department of Resource Development regarding a safe separation distance. This is only a consultation distance and does not mean that developments cannot be located within 300m of the corridor, but that risk and risk mitigation measures should be considered prior to development.

6. Conclusions

The EPA has strategically assessed the proposal to establish a land corridor for a lateral gas pipeline from the Dampier to Bunbury Natural Gas Pipeline to the Oakajee Industrial Estate.

The EPA notes that no constraints that would preclude the use of the proposed pipeline corridor for the construction of a gas pipeline have been identified on the basis of the information currently available.

The EPA also notes the management measures proposed by the GPSSC that would need to be fulfilled in a future proposal for a pipeline. The EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the future proponent(s) of the management measures proposed in the strategic review document.

Future pipeline proposals will require referral to the EPA for a decision on level of assessment.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment and Heritage:

1. That the Minister notes that the proposal on which advice is being provided is the establishment of a land corridor for a lateral gas pipeline(s) from the Dampier to Bunbury Natural Gas Pipeline to the Oakajee Industrial Estate.
2. That the Minister considers the report on the relevant environmental factors as set out in Section 3;
3. That the Minister notes that the EPA has concluded that no constraints that would preclude the use of the proposed pipeline corridor for the construction of a gas pipeline have been identified on the basis of the information currently available.
4. That the Minister notes that the EPA has concluded that the management measures proposed for the implementation of proposals for the construction of a gas pipeline are appropriate.

Appendix 1

List of submitters

Organisations:

Aboriginal Affairs Department
Department of Conservation and Land Management
Water and Rivers Commission
Department of Resource Development
Heritage Council
LandCorp
Shire of Chapman Valley
Wildflower Society of WA

Individual:

C Wormald

Appendix 2

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Appendix 3

Proponent's summary of potential environmental impacts and management

Table 1
Summary of Environmental Impacts and Management

Factor	Site Specific Factor	EPA Objective	Potential Impacts	Environmental Management	Predicted Outcome
BIOPHYSICAL					
Terrestrial Flora	Declared Rare and Priority Flora	Protect Declared Rare and Priority Flora, consistent with the provisions of the *Wildlife Conservation Act 1950.*	Loss of, or disturbance to, populations of Declared Rare and Priority Flora. Alterations to habitats supporting DRF and Priority Flora.	Pipeline alignment within the corridor will avoid DRF and Priority Flora as necessary and where practicable.	No impact on DRF or Priority Flora.
	Vegetation Communities	Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities (refer EPA Preliminary Position Statement 3, "General Requirements for Terrestrial Biological Surveys").	Assuming a 15m working width through sensitive areas, approx. 3ha of native vegetation will be temporarily cleared for the construction of one pipeline. Other potential impacts on vegetation include: • Increased bushfire risk. • Increased risk of introduction of weeds and disease	Avoid areas of native vegetation wherever possible. Maintain restricted working widths through areas of vegetation that cannot be avoided. Stockpile vegetation to provide seed store for rehabilitation.	Temporary disturbance to small areas of native vegetation. Minimal long-term impact.

Factor	Site Specific Factor	EPA Objective	Potential Impacts	Environmental Management	Predicted Outcome
	System 5 – Northern Sandplains	Ensure that the conservation values of System 5 recommended areas are not compromised. Ensure that regionally significant flora and vegetation communities in System 5 areas are adequately protected.	No System 5 recommended areas affected by corridor.	None required.	No impact on System 5 Areas.
	Nature Reserves	Protect the environmental values of nature reserves	There are no nature reserves along the proposed corridor.	None required.	No impact on nature reserves.
	Weeds	Minimise the potential for the spread of weeds.	Potential for spread along the corridor into previously weed free areas through soil disturbance and vehicle movements.	Weed survey to be completed prior to construction to allow infested areas to be delineated. Preparation of a Weed Control Programme prior to construction.	No spread of weed species along the corridor.
	Dieback	Minimise the potential for the spread of dieback.	Spread of dieback into or along corridor through the movement of vehicles, soil or plant material.	Survey of the corridor prior to construction to enable infected areas to be delineated. Preparation of a Dieback Control Programme prior to construction.	No spread of dieback along the corridor.
Terrestrial Fauna	Specially Protected (Threatened) Fauna	Protect Specially Protected (Threatened) Fauna, consistent with the provisions of the *Wildlife Conservation Act 1950.*	Temporary loss or subdivision of habitats, interruption of access to feeding grounds and water supplies, injury or death through falling into open trenches	Preparation of Fauna Management Plan prior to construction.	Temporary disturbance to habitats. No long term impacts on fauna.

Factor	Site Specific Factor	EPA Objective	Potential Impacts	Environmental Management	Predicted Outcome
Watercourses	Rivers	Maintain the integrity, functions and environmental values of rivers.	Physical disturbance of watercourse system, with potential implications for long-term bank stability and rehabilitation of the system.	Restricted working widths implemented at watercourse crossings. Watercourses reinstated as close as possible to original profile and condition.	Temporary disturbance to rivers. No long term problems with bank stability or erosion.
	Ephemeral Streams	Maintain the integrity, functions and environmental values of ephemeral streams. Ensure that alterations to surface drainage do not adversely impact indigenous vegetation.	As for rivers.	As for rivers.	As for rivers.
Wetlands	EPP lakes and other specially protected wetlands.	Maintain the integrity, functions and environmental values of wetlands. Ensure Environmental Protection Policy (EPP) lakes are protected and their key ecological functions are maintained.	No wetlands, EPP or otherwise, (other than watercourses) identified along the proposed corridor.	None required.	No impacts on wetlands.
Groundwater	Aquifers	Maintain the quantity and distribution of groundwater so that existing and potential uses, including ecosystem maintenance, are protected.	Dewatering may be required where groundwater is close to the surface. Impacts may include reduced water availability to fringing and riparian vegetation, and intrusion of saline groundwater into fresher groundwater lenses.	Preparation of Dewatering Management Plan prior to construction.	No temporary or long term impacts on groundwater. No disturbance to existing and future groundwater uses.

Factor	Site Specific Factor	EPA Objective	Potential Impacts	Environmental Management	Predicted Outcome
Land	Landform	Establish stable, sustainable landform consistent with surroundings in order to control erosion.	The construction of pipelines on hillsides and through steep sided creek and river channels may increase the risk of erosion by increasing soil disturbance. This may lead to exposure of the pipeline, long-term loss of spoil and associated vegetation and the creation of erosion gullies.	Reinstatement and rehabilitation of pipeline corridor will stabilise disturbed areas, thereby reducing erosion potential.	No or minimal long-term erosion.
	Topsoil	Ensure that the construction of the pipeline does not result in short or long term depletion of quantity or quality of topsoil.	Topsoil stripping can lead to the destruction of soil structure, mineralisation of organic matter and displacement of nutrients. Topsoil stockpiles may also be prone to erosion during the construction period.	Topsoil removed only immediately above the trench line. Stockpiles hydromulched or covered to stabilise them and prevent erosion.	No long term impacts on quality of topsoil. No loss of topsoil during or after construction .
Rehabilitation	Rehabilitation Programme	Ensure that the areas affected by the proposed development are satisfactorily rehabilitated.	Construction of a pipeline will result in intense disturbance over a very restricted width. Incorrect rehabilitation can lead to poor regeneration of vegetation, loss of soil stability leading to erosion on side slopes and watercourses and introduction of weeds and disease.	Preparation of Rehabilitation Plan prior to construction.	Successful regeneration of native vegetation. Stable side slopes and watercourses with no erosion problems. Successful return of farm land to its former use for grazing and cropping in agricultural areas without significant loss of productivity.

Factor	Site Specific Factor	EPA Objective	Potential Impacts	Environmental Management	Predicted Outcome
POLLUTION MANAGEMENT					
Water Quality	Surface Water Quality	Maintain the quality of surface water so that existing and potential uses, including ecosystem maintenance, are protected.	Increased risk of contamination through spillage of fuels and oils into or adjacent to watercourses. Direct and indirect release of suspended solids, with potential for high levels of suspended sediments to impact on the integrity and functions of watercourse systems.	Measures to minimise sediment release and risk of fuel and oil contamination to be developed and detailed in the EMP.	No release of suspended sediments into watercourses. No contamination with fuels & oils.
Waste Disposal	Liquid and solid waste disposal	Ensure disposal of liquid and solid waste is consistent with Shire requirements.	Inappropriate waste disposal can lead to soil, surface water or groundwater contamination, impacts on post-construction land use and loss of visual amenity.	Preparation of Waste Management Plan prior to construction.	All waste generated during construction regularly collected and disposed of appropriately.
Air Quality	Dust	Protect surrounding land users such that dust emissions will not adversely impact upon their welfare and amenity, or cause health problems by meeting the Guidelines for the Prevention of Dust and Smoke Pollution from Land Development Sites in WA.	Dust emissions may be produced from construction activities including vegetation clearance and removal, topsoil removal and storage, trenchline excavation, movement of construction machinery along the pipeline spread and rehabilitation activities. Fugitive dust may also be generated by the action of wind on exposed soil surfaces when no site works are occurring.	Preparation of a Dust Management Plan prior to construction.	Minimal dust generation from construction activities and exposed soil surfaces.
Noise &	Noise	Ensure that noise levels meet	Construction activities will cause	Detail expected noise levels	Minimal noise impacts on

Factor	Site Specific Factor	EPA Objective	Potential Impacts	Environmental Management	Predicted Outcome
Vibration		statutory requirements and acceptable standards.	short-lived increases in local noise levels. Noise will be generated during construction by earthmoving equipment, blasting operations and the movement of trucks and small vehicles.	from operations, and management measures as applicable in the EMP.	residents in the vicinity of the corridor.
	Vibration	Ensure that the vibration levels meet statutory requirements (including DME requirements) and acceptable standards.	Vibration may be generated from blasting, rock breaking or compaction activities. Vibration can also affect adjacent residences, farm structures or historical sites and also any adjacent pipelines within the corridor.	Identify potential vibration sources along the route and determine proximity of vibration sources to sensitive premises in the EMP.	No vibration impacts on structures or other services.
SOCIAL SURROUNDINGS					
Public Health and Safety	Risk and Hazards	Ensure that risk is managed to meet the EPA's criteria for individual fatality risk offsite and the DME's requirements in relation to worker and public safety near natural gas pipelines. Ensure blasting is managed to meet DME requirements.	Five residences located within 300m of the corridor – closest is 105m from corridor. Presence of pipeline may restrict future proposed land uses in its immediate vicinity.	Individual off-site risk assessments to be determined following completion of the initial design phase.	Pipeline construction and operation to occur in accordance with all relevant criteria and standards so as to ensure that individual fatality risk criteria are not affected.

Factor	Site Specific Factor	EPA Objective	Potential Impacts	Environmental Management	Predicted Outcome
Culture and Heritage	Aboriginal culture and heritage	Ensure that the strategic plan complies with the requirements of the *Aboriginal Heritage Act 1972*. Ensure that changes to the biological and physical environment resulting from the proposed development do not adversely affect cultural associations of the areas along and adjacent to the pipeline corridor.	Removal or destruction of known or unknown sites within the working width.	Apply for clearance under Section 18 of the Act to disturb known sites. Maintain an Aboriginal monitor during all site works to monitor for unknown sites.	No unauthorised removal or destruction of Aboriginal sites.
	European heritage	Ensure that changes to the biological and physical environment resulting from the proposed development do not adversely affect European heritage values of the areas along and adjacent to the pipeline corridor.	One heritage building has the potential to be impacted via vibration generated from blasting activities, should these be required in its vicinity.	Identify blasting requirements and management strategies (if required) in the EMP.	No impact on the heritage building.

Factor	Site Specific Factor	EPA Objective	Potential Impacts	Environmental Management	Predicted Outcome
Visual Amenity	Above ground structures.	Visual amenity of the area adjacent to the project should not be unduly affected by the proposal.	All pipelines within the corridor will be buried, and no long-term visual impacts will be evident once the area has been rehabilitated. Above ground structures will be established at the off-take and end points of the pipeline. There are no residences in the vicinity of the off-take, and the end point will be within the Oakajee Industrial Estate. No visual impact will occur.	No management strategy required.	No long-term visual impact associated with future pipeline construction.
OTHER					
Public Consultation	Consultation with affected landowners and local government authorities.	Ensure that affected landowners and local government authorities are consulted.	Temporary disturbance to landowners through changes to access, severance of paddocks, restrictions on land use etc. during the construction period.	Continued consultation with landowners throughout the construction period to address concerns as they arise.	Minimal disturbance to landowners by immediately addressing issues.

Appendix 4

Vegetation community types along the proposed Corridor

Table 2
Vegetation Community Types Along the Proposed Corridor (Mattiske, 2000).

Vegetation Community Type 1 - Eucalyptus Woodlands	
1a	Woodland of *Eucalyptus obtusa* (ms) and *Melaleuca rhaphiophylla* with *Cyperus* sp.
1b	Woodland of *Eucalyptus loxophleba* subsp. *loxophleba* over *Acacia acuminata, Rhagodia drummondii* and mixed shrubs in clay *soils.*
1c	Open Woodland of *Eucalyptus arachnaea* over a Shrubland of *Acacia* spp., *Dodonaea adenophora, Lepidosperma tenue,* mixed shrubs and grasses in association with breakaways and laterite slopes.
1d	Very Open Woodland of *Eucalyptus ebbanoensis* over *Dryandra fraseri, Ecdeiocolea monostachya, Rhagodia drummondii* and *Lepidosperma tenue* in sand.
Vegetation Community Type 2 - Banksia Woodlands	
2a	Very Open Woodland of *Banksia menziesii* over an Open Shrubland of *Conospermum stoechadis, Hibbertia furfuracea* and *Casuarina obesa* on sand in association with road verge.
2b	Low Open Woodland of *Banksia sceptrum* over *Allocasuarina campestris, Grevillea candelabroides, Actinostrobus acuminatus* and *Calothamnus blepharospermus* in sand with emergent *Eucalyptus jucunda, E. oldfieldii, E. ebbanoensis and E. pyriformis.*
Vegetation Community Type 3 - Casuarina Woodlands	
3a	Woodland *of Casuarina obesa* over *Gahnia trifida, Baumea juncea* and *Xanthorrhoea preissii* in sandy creekline.
Vegetation Community Type 4 - Acacia Shrublands	
4a	Shrubland of *Acacia* saligna over *Eragrostis curvula, Hakea trifurcata, Scholtzia parviflora* and mixed shrubs and grasses on sand in association with road verges.
4b	Tall Shrubland of *Acacia saligna* over *Lepidosperma tenue* and pastoral grasses with emergent *Eucalyptus pluricaulis* subsp. *pluricaulis* in sandy-clay creekline.
4c[1]	Shrubland of *Acacia tetragonophylla, Hakea recurva* and *Hakea preissii* over mixed shrubs and grasses with emergent *Eucalyptus loxophleba* on rocky hill slopes.[1]
4d	Shrubland of *Acacia tetragonophylla, Hakea recurva* and *Hakea preissii* over mixed shrubs and grasses with emergent *Eucalyptus loxophleba* in sandy-clay drainage lines.

Vegetation Community Type 5 - Dryandra Shrublands	
5a	Shrubland of *Dryandra sessilis* and *Acacia saligna* over *Poaceae* spp. (pastoral) in sand over clay.
Vegetation Community Type 6 – Melaleuca Shrublands	
6a	Tall Shrubland of *Melaleuca ?preissiana* and *M. uncinata* in depression with emergent *Eucalyptus arachnaea.*

1. Community does not fall within the corridor.

Appendix 5

Proposed management measures

Table 3
Summary of Proposed Management Measures

	Management Measure (Who/What)	Objective (Why)	Action (How/Where/When)	Whose Advice	Measurement/Compliance Criteria
1	Future Proponent(s)and/or the GPSSC will implement appropriate actions to compensate for impacts on vegetation communities and flora to ensure an overall environmental benefit as a result of the proposal.	Protect Declared Rare and Priority Flora, consistent with the provisions of the Wildlife Conservation Act 1950. Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities Maintain biodiversity of ecosystem	Implement appropriate mechanism to compensate for impacts to vegetation. Appropriate mechanisms may be, for example (but not limited to): 1. Conservation of additional area with similar environmental values in secure reserve. 2. Assist with further vegetation surveys in area so that vegetation data from the pipeline survey can be placed in a regional context. 3. Assist private landowners to protect remnant vegetation or rehabilitate land.	1. DEP 2. CALM	To be addressed in future pipeline proposal to the requirements of the EPA.
2	Future Proponent(s) will implement appropriate actions to minimise construction impacts on vegetation communities and flora	Protect Declared Rare and Priority Flora, consistent with the provisions of the Wildlife Conservation Act 1950. Maintain the abundance, species diversity, geographic distribution and productivity of vegetation communities	1. Further vegetation surveys will be undertaken, if additional endangered species or communities are identified under legislation , by the time of pipeline proposal. 2. Restricted working widths will be maintained through areas of native vegetation to limit impacts on vegetation. 3. Development of bushfire prevention measures to minimise risk of bushfires. 4. Detailed management strategies for vegetation protection will be developed.	1. DEP 2. CALM/Bushfire Board /Shires of Mullewa & Chapman Valley 3. DEP	1. Working widths to be implemented in sensitive areas specified in the EMP. 2. Preparation of Bushfire Management Plan (in EMP). 3. Management strategies detailed in EMP.

	Management Measure (Who/What)	Objective (Why)	Action (How/Where/When)	Whose Advice	Measurement/Compliance Criteria
3	Future Proponent(s) will develop and implement management measures to minimise the spread of weeds along the working width.	Minimise the potential for the spread of weeds.	1. A weed survey will be conducted prior to construction. 2. Weed infested areas will be marked and delineated on construction plans and in the field. 3. Weed control measures will be developed prior to construction to prevent weed species being introduced or spread.	1. AgWA 2. AgWA 3. AgWA/DEP	1. Results of weed surveys reported to AgWA 2. Maps showing areas of infestation submitted to AgWA and flagging of areas with yellow tape in the field. 3. Preparation of a Weed Control Programme as part of the Environmental Management Plan.
4	Future Proponent(s) will develop and implement management measures to minimise the spread of dieback along the working width.	Minimise the potential for the spread of dieback.	1. Undertake dieback surveys prior to construction. Surveys will be undertaken in appropriate seasonal conditions to ensure that the identification of infected areas is maximised. 2. The boundaries of dieback-infected and uninfected areas will be mapped and accurately delineated in the field. 3. Develop and implement appropriate hygiene measures to minimise the potential for the spread of disease.	1. CALM/DEP 2. CALM 3. CALM/DEP	1. Results of dieback surveys reported to CALM. 2. Maps showing areas of infestation submitted to CALM and flagging of areas with yellow tape in the field. 3. Preparation of Dieback Control Programme as part of the EMP.

	Management Measure (Who/What)	Objective (Why)	Action (How/Where/When)	Whose Advice	Measurement/Compliance Criteria
5	Future Proponent(s) will develop and implement management measures to minimise construction impacts on fauna.	Protect Specially Protected (Threatened) Fauna, consistent with the provisions of the *Wildlife Conservation Act 1950.*	1. Prior to construction develop management strategies to minimise and manage short and long-term impacts on fauna. 2 Undertake detailed fauna survey, if necessary. 3. Undertake specific search for the Western Spiny-tailed skink, if necessary.	DEP/CALM	Preparation of a Fauna Management Plan as part of the EMP.
6	Future Proponent(s) will develop and implement management measures to minimise the impacts of construction activities on watercourses and ensure the long-term stability of the systems.	Maintain the integrity, functions and environmental values of rivers and ephemeral streams.	1. Provide details of construction methods and environmental management procedures for each watercourse crossing. 2. Detail measures to be implemented to minimise damage and weakening of watercourse banks and to prevent physical degradation of watercourses.	1. DEP/Water & Rivers Commission 2. DEP/Water & Rivers Commission	1 & 2: Details provided in the EMP.
7	Future Proponent(s) will develop and implement management measures to minimise impacts on groundwater aquifers.	Maintain the quantity and distribution of groundwater so that existing and potential uses are protected.	Develop measures to ensure that activities associated with dewatering and hydrostatic testing do not impact on existing and future beneficial uses of aquifers.	DEP/Water & Rivers Commission	Dewatering Management Plan will be prepared as part of the EMP.

	Management Measure (Who/What)	Objective (Why)	Action (How/Where/When)	Whose Advice	Measurement/Compliance Criteria
8	Future Proponent(s) will develop and implement management measures to prevent contamination of surface and groundwater during construction.	Maintain the quality of surface water so that existing and potential uses, including ecosystem maintenance, are protected.	1. Prior to construction, develop specific measures to minimise sediment release to watercourses. 2. Prior to construction, develop specific measures to minimise surface water contamination from fuels and oils	1. DEP/Water & Rivers Commission 2. DEP/DME	1. Measures to minimise sediment release to watercourses detailed within the EMP. 2. Specific measures relating to the use and storage of fuels and oils within the construction area detailed within the EMP. Spill Management and Contingency Plan developed as part of the EMP.
9	Future Proponent(s) will develop and implement management measures to minimise impacts and ensure the stability of the landscape following construction and to prevent erosion.	Establish stable, sustainable landform consistent with surroundings in order to control erosion	Develop and implement measures to prevent erosion during and following construction to maintain the operating integrity of the pipeline(s) and the overall stability of the surrounding landscape	DEP	Measures to minimise erosion both during and after construction detailed in the EMP.
10	Future Proponent(s) will develop and implement site specific management measures to prevent short-term and long-term depletion of topsoil.	Ensure that the construction of the pipeline does not impact in short or long term depletion of quantity or quality of topsoil.	Prior to construction, specific management measures will be developed to prevent the loss of topsoil during storage and to ensure that topsoil stockpiles are successfully reinstated.	DEP/AgWA	Measures to prevent topsoil loss and ensure successful reinstatement detailed within the EMP.
11	Future Proponent(s) will develop and implement measures to ensure that the working width and associated construction areas are successfully rehabilitated.	Ensure that the areas affected by the proposed development are satisfactorily rehabilitated.	Develop specific measures prior to construction to assist in the successful reinstatement and regeneration of construction areas.	DEP/CALM/AgWA and affected landowners	Rehabilitation Plan prepared as part of the EMP.

	Management Measure (Who/What)	Objective (Why)	Action (How/Where/When)	Whose Advice	Measurement/Compliance Criteria
12	Future Proponent(s) will develop and implement management measures to address the disposal of liquid and solid wastes from the construction area.	Ensure disposal of liquid and solid waste is consistent with the local Shire requirements.	Prior to construction, identify likely wastes arising from construction activities and develop appropriate handling and disposal methods.	DEP/Shires of Mullewa and Chapman Valley.	Waste Management Plan prepared for inclusion within the EMP.
13	Future Proponent(s) will develop and implement measures to prevent excessive dust lift off from the working width and associated stored material.	Protect surrounding land users such that dust emissions will not adversely impact upon their welfare and amenity or cause health problems.	Prior to construction, develop strategies to minimise dust generation from the spread. These may include visual monitoring during construction activities, application of water or dust stabilisers to exposed areas as required and temporary cessation of construction activities.	DEP	Dust Management Plan prepared as part of the overall EMP.
14	Future Proponent(s) will develop and implement measures to identify and attenuate noise emissions from construction activities.	Ensure that noise levels meet statutory requirements and acceptable standards.	Prior to construction, identify expected noise levels from construction activities and also from associated plant and equipment.	DEP	Expected noise levels from construction activities and measures required to control noise emissions detailed in the EMP.
15	Future Proponent(s) will identify activities associated with high vibration levels and develop measures to attenuate vibration impacts as applicable.	Ensure that the vibration levels meet statutory requirements and acceptable standards.	Prior to construction, identify potential vibration sources along the pipeline route and determine the proximity of vibration sources to sensitive premises. Develop measures to attenuate vibration impacts as applicable.	DEP/DME	Potential vibration sources to sensitive premises and applicable attenuation measures identified in the EMP.

	Management Measure (Who/What)	Objective (Why)	Action (How/Where/When)	Whose Advice	Measurement/Compliance Criteria
16	Future Proponent(s) will design proposed pipeline(s) to minimise risk to workers and the general public.	Ensure that risk is managed to meet the EPA's criteria for individual fatality risk offsite and the DME's requirements in relation to worker and public safety near natural gas pipelines.	1. Following completion of the initial design phase, identify proximity of the pipeline, proposed MAOP and safety features to be incorporated to minimise risk to sensitive premises. 2. Complete Risk Assessment in accordance with AS2885.1:1997 to ensure that risk levels meet DME and EPA criteria	1. DEP/DME 2. DME/EPA	Risks posed by future proposed pipeline(s) will be assessed and submitted to DME/EPA for consideration. Measures to minimise risk detailed in the EMP.
17	Future Proponent(s) will gain clearance to disturb existing Aboriginal Heritage sites along the proposed corridor. Future Proponent(s) will develop and implement management measures to identify and protect any new sites located during construction.	1. Ensure that the proposal complies with the requirements of the *Aboriginal Heritage Act 1972*. 2. Ensure that changes to the biological and physical environment do not adversely affect cultural associations of the areas along and adjacent to the pipeline corridor.	1. Prior to construction, apply for clearance under Section 18 of the Act to remove known sites located within the proposed working width. 2. Prior to construction, develop strategies to ensure that any new sites located during construction are protected until assessed. 3. During construction, ensure that an Aboriginal Heritage Officer is present during all construction activities.	1, 2 & 3: DEP/ Aboriginal Affairs Department	1. Clearance for disturbance of sites provided under Section 18. 2. Strategies for the location and handling of new sites located during construction works detailed in the EMP. 3. Suitable monitors from representative groups detailed in the EMP.
18	Future Proponent(s) will ensure that existing European Heritage sites along the route are not impacted by construction activities	Ensure that changes to the biological and physical environment resulting from the proposed development do not adversely affect European heritage values of the areas along and adjacent to the pipeline corridor.	Prior to construction, identify any requirement for blasting in the vicinity of historic buildings, particularly on Murphy-Yetna Road. Should hard rock be encountered in this area, alternative trenching methods will be considered.	DEP/Shire of Chapman Valley	Requirements for blasting detailed in the EMP.

Abbreviations: EPA - Environmental Protection Authority *DEP - Department of Environmental Protection* *CALM - Department of Conservation and Land Management*
AgWA – Agriculture Western Australia *DME – Department of Minerals and Energy* *EMP – Environmental Management Plan*

Appendix 6

Summary of submissions and

Proponent's response to submissions

OAKAJEE GAS LATERAL CORRIDOR

Section 16(e) Strategic Environmental Review
Responses to Public Submissions

1. *Survey for Priority Species*

For priority species within the corridor, a comprehensive pre-survey is required before construction to ameliorate impacts.

A comprehensive Environmental Management Plan (EMP) will be prepared prior to any construction within the corridor. It is recognised as that there may be a necessity to conduct additional vegetation surveys as part of the works for the EMP and any supplementary surveys will include the identification of priority flora. The need for additional surveys will be determined in consultation with the Department of Environmental Protection (DEP) at the appropriate time. Any surveys would be conducted following accurate delineation of the proposed pipeline route to enable construction impacts to be correctly identified.

2. *Weed Management*

Weed management needs to be addressed where native vegetation abuts.

A Weed Control Programme will be prepared prior to construction on the advice of AgWA and DEP and will be included within the EMP.

3. *Fuel and Chemical Storage*

Fuel and chemical storages, latrines and generators should be 100m away from waterways that have standing water.

All fuel and chemical storage, toilets and generators will be located at least 100m from waterways with standing water.

4. *Rehabilitation*

(1) Rehabilitation should be better than the DBNGP line, both pipeline and borrow pits. Landowners should be consulted in rehabilitation.

The DBNGP was constructed in 1983 and rehabilitation techniques have significantly advanced since this time. The current practice of separating topsoil from subsoil during initial stripping and ensuring that soil horizons are reinstated in the correct sequence will assist in successful rehabilitation of the pipeline corridor. Measures to prevent the short and long term depletion of topsoil during, and following, construction will be detailed in the EMP. A Rehabilitation Plan will also be prepared as part of the EMP that will detail specific measures to be implemented to assist in the successful reinstatement and regeneration of construction areas.

DOLA, in the role of the pipeline corridor manager, consults affected landowners on a regular basis and it is the intention to maintain this contact beyond pipeline construction.

(2) Cleared area will never return to original condition. Rehabilitation techniques need to be investigated further.

The most current rehabilitation techniques will be taken into consideration in the preparation of the Rehabilitation Management Plan to ensure that rehabilitation of the pipeline corridor is as successful as possible.

5. Protection from Incompatible Developments

Discussions with the Shire of Chapman Valley Council are needed for protecting the corridor from incompatible adjacent development.

The Oakajee pipeline corridor is a major State project and as such any plan before the Shire of Chapman Valley Council within the vicinity of the corridor should be required to acknowledge the required separation distances. Council should liaise with the DEP with respect to land uses in the vicinity of the corridor prior to approval being given for any projects. In particular, notification needs to be provided of any proposed development within 300m of a high pressure gas pipeline or of a corridor for such a pipeline.

The Gas Pipeline Working Group (GPWG) is happy to arrange discussions with Council, Ministry for Planning and the DEP in regard to requirements for new proposed uses in the vicinity of the pipeline.

6. Risk Assessment

Two residences were missed in the Oakajee buffer for the 300m pipeline buffer.

A detailed Risk Assessment in accordance with AS2885.1:1997 and HB105 will be conducted prior to pipeline construction. Risks to all residences within the vicinity of the corridor will be included as part of this assessment.

7. Vegetation Disturbance

(1) More assessment on the disturbance of vegetation communities 2b, 6a and 7c is required, particularly for the Moresby Range.

Disturbance of communities 2b and 6a is further considered in Point 9. There is no vegetation community 7c along the proposed corridor.

(2) Consult Moresby Range Management Committee for final pipeline route

The pipeline corridor detailed in the Section 16(e) document is the final proposed route. The Gas Pipeline Working Group is willing to hold discussions with the Moresby Range Management Committee regarding construction management issues to ensure that impacts through the Moresby Range are minimised.

8. Multiple Use Corridors

The pipeline is not using the rail alignment, therefore twice the disturbance.

Whilst it is possible to construct the pipeline and the railway line within the same easement, significant consideration has to be given to the risks associated with multiple services in the same corridor. To construct the pipeline within the railway easement would incur significant construction costs as it would be necessary to increase the depth of cover over the pipeline to protect it from damage during potential accidents such as train derailment. A significant separation distance would also be required between the railway and the proposed pipeline(s) to further reduce risk of damage from railway operations. This increased separation distance has the potential to increase vegetation removal in the corridor.

Consideration also needs to be given to gradient requirements during the construction of infrastructure. Railway routes are influenced by acceptable gradients in that construction cannot occur over steep slopes and must be constructed on relatively level ground or ground with a shallow gradient. Gas pipelines are able to traverse more undulating terrain, which results in a more direct route, lower construction costs and minimal vegetation clearance.

9. Impacts on vegetation

(1) *Comments on flora, other than DRF and priority species, need to be made. There are likely to be taxa which are hard to identify, or range-end, or subspecies, with significance that is not officially recognised but are relevant to the conservation value of the area. For example (on the basis of Brooker & Kleinig, 1990):*

Eucalyptus ebbanoensis is at the west and northwest extremes of its range (which is along the 30th parallel)

E. oldfieldii is at the western extreme of its distribution.

E. pyriformis is at the northern and western extremes of its distribution.

E. pluricaulis spp. Pluricaulis at Oakajee is a range extension of 180km to the north of Mt. Lesueur.

E. zopherophloia is a range extension by 70km and may be a niche extension because it prefers calcareous sands.

All eucalypt species as listed in Comment 1 are within their natural range according to Florabase (WA Herbarium, 2000[1]).

It should be recognised that the pipeline corridor was selected to coincide with largely cleared land and therefore the impact on all native flora and vegetation has been minimised.

The absence of comment on other flora species or communities is not intended to minimise the relevance of these species within a community. At the time of writing, the impact of the proposal on rare and priority flora, and the identification of such flora within the area, was considered to be the most relevant issue.

(2) *Vegetation significance other than diversity should be mentioned. For example although E. loxophleba is widespread in the wheatbelt, it is also one of the most cleared alliances and particularly as an association with Acacia acuminata. The minority E. loxophleba admixtures then also take on more importance.*

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1 Western Australian Herbarium (2000). *Florabase – Information on the Western Australia Flora.* Department of Conservation and Land Management. http://www.calm.wa.gov.au/science/florabase.html

There is no proposal to clear the *E. loxophleba – Acacia acuminata* association (community 1b) during pipeline construction and this association was deliberately avoided during the route selection process.

(3) *Disturbance of vegetation within communities 2b, 6a within the Moresby Ranges, as to regional significance, needs to be assessed. No impact assessment of the Beard communities provided (see attached table). No impact assessment to private land with remnant vegetation and protected under the Vegetation Protection Scheme is provided.*

It is commented in the flora and vegetation assessment that the area of vegetation in the Moresby Ranges (Community 6a) should be considered regionally significant. Community 2b occurs at the eastern end of the pipeline route and there is no occurrence of this community along the proposed pipeline corridor within the Moresby Range.

The vegetation was surveyed on foot and consideration was given to impacts of the proposed pipeline alignment. As a result of this, numerous pipeline alignments were considered to directly reduce the amount and impact of disturbance in the area. It is impossible to avoid all impacts on vegetation without abandoning the pipeline proposal.

The vegetation surveys completed for the study occurred at a more detailed level than the information required for distinguishing Beard communities and therefore it was considered unnecessary to map vegetation communities at such a general level.

Impact assessment on remnant vegetation protected under the Vegetation Protection Scheme is detailed in Section 3.6.2 of the Section 16(e) document.

(4) *There is no attempt to address the EPA's requirement as to clearing of native vegetation as stated in Position Statement #2 "The Environmental Protection of Native Vegetation in Western Australia" and as to the discussion of possible offsets.*

Position Statement No. 2 postdates completion of the Section 16(e) document and therefore it was difficult to address the requirements of the Position Statement in the report. Irrespective of this, selection of the corridor alignment and preparation of the Section 16(e) report took the intent of the Position Statement into account given that the corridor was selected to minimise vegetation clearance wherever possible.

Position Statement specifically relates to the clearance of land within the agricultural area other than relatively small areas. It is proposed to clear approximately three hectares of native vegetation from within a proposed 270ha development (1.1% of the development area). It should also be noted that the area cleared will be rehabilitated following construction and therefore vegetation removal will not be permanent.

In addition, EPA advice on the Geraldton Regional Plan was also utilised during corridor selection (Environmental Protection Authority, 1998[2]). This included statements and recommendations to the Western Australian Planning Commission on regional environmental matters.

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2 Environmental Protection Authority (1998). Geraldton Regional Plan. Bulletin 891. Environmental Protection Authority, 1998.

It is considered therefore that whilst Position Statement No. 2 was not specifically referred to in the preparation of the Section 16(e) document that the intent of the Statement has been incorporated into the proposal.

(5) *The corridor cuts through one of the larger areas of remnant vegetation as identified in the CALM Conservation assessment of the Moresby Ranges (CALM, 1998) and also as mapped in CALM's Threatened Ecological Community Dataset. More assessment of these aspects is required.*

It is agreed that the Moresby Ranges is regionally sensitive and further assessment of these ranges is necessary. The proposed pipeline alignment follows an existing limestone track that fractures the area and will involve the clearance of 0.03ha (0.03%) of vegetation through the Moresby Ranges. Any other feasible route through the Ranges would involve the clearance of significantly more vegetation than along the preferred route. The preferred route will therefore have minimal impact on the native vegetation in the area compared to other potential alignments.

(6) *The State Weed Plan or Environmental Weed Strategy for WA is not referred to.*

The State Weed Plan and the Environmental Weed Strategy for WA are generic policy documents that simply seek to bring about weed management of the kind proposed by the Section 16(e) document. The Section 16(e) commits to the preparation of a detailed Weed Management Plan to the satisfaction of the DEP, CALM and AgWA. Therefore reference to generic policy documents within the Section 16(e) report is considered unnecessary.

10. Fauna

(1) *There should have been some attempt to assess fauna habitat values of vegetation.*

Section 5.2 of the vertebrate fauna report (Appendix D of the Section 16(e)) discussed significant fauna habitats. As no field inspection was conducted it was difficult to assess habitat values of specific localities along the proposed corridor. However, the report does state that:

"In areas such as the Geraldton region where much of the native vegetation has been cleared for agriculture, all remaining vegetation communities regardless of condition, are of significance to fauna."

The report also highlighted three areas of particular importance which, considering the level of clearing within the Geraldton region, were considered to possibly have regional as well as local significance.

(2) *The selection of species in Table 3.3 is not comprehensive. The Western Spiny-tailed Skink, Egernia stokesii badia, which is currently listed in Schedule 1 of the Wildlife Conservation Act, is not considered. Another species that should have been included is the skink lizard Lerista axillaris that is only known from one locality south of Kalbarri. If species that previously occurred in the region, but have become regionally extinct as part of major range reductions, were also considered, as in the case of the Southern Brown Bandicoot, then the list would include the Chuditch, Numbat, Bilby, Black-flanked Rock Wallaby, Stick-nest Rat as well as a number of other species.*

Egernia stokesii badia was not listed in CALM'S rare fauna search results for the general area and was also overlooked during the literature review. Given the small area of native vegetation within the pipeline corridor it is considered that the likelihood of this species being found within the corridor is low. However, consideration may be given to conducting a specific search for this species by a competent reptile specialist prior to any ground disturbance for pipeline construction. The necessity of such a search will be determined in consultation with CALM and the DEP during preparation of the detailed Fauna Management Plan.

The only known locality of *Lerista axillaris* is over 100 kilometres north of the proposed gas pipeline corridor. The preferred habitat of this species (leaf litter under *Acacia rostellifera* thickets) also does not occur along the proposed route and therefore this species was not included in the fauna report. None of the *Acacia* species listed in the vegetation report form the very dense leaf litter known to occur under *Acacia rostellifera*, therefore it is considered most unlikely that *Lerista axillaris* could occur in any of the shrublands along the proposed corridor.

With respect to regional extinctions, the Southern Brown Bandicoot was specifically included in the potential rare or priority species list as in many areas it is very common whilst in other areas populations appear to be recovering (Jan Henry, *pers. comm.*). Sampling in other areas within the state has also shown that this animal can find both food and shelter in highly degraded habitats such as rail and road verges, with their food supplies mainly consisting of introduced weeds and grasses. Therefore it was considered prudent to include this species as it is able to coexist with relatively high levels of disturbance and/or development. The five other species listed do not have this ability and require specific management techniques even in relatively pristine environments. Therefore they were not considered as part of the fauna report. In addition, the Lesser Stick Nest Rat (*Leparillus apicalis*) is considered extinct.

(3) Relevant fauna databases were not consulted. (See attached list)

The fauna report did not attempt to produce the results of a comprehensive literature review. The results from early surveys such as those listed, particularly mammals, frogs and reptiles, would be included in the reference books used for the report as they resulted in specimens lodged in the Western Australian Museum (WAM). In addition, approximately 63 species of skink alone have been described in WAM publications since 1981, therefore it was considered appropriate to use the most recent WAM publications such as the 1999 edition of *Lizards of Western Australia. 1 Skinks*. For birds, where few specimens are taken for museum collections, Johnstone and Storr's (1998). *Handbook of Western Australian Birds Volume 1 - Non-passerines (Emu to Dollarbird),* Storr's *Birds of the South-West Division of Western Australia* (1991) and Blaker's *The Atlas of Australian Birds* (1984), all of which are compilations of data from many sources, were considered the most appropriate for the assessment of the potential presence of rare or priority birds.

(4) No field surveys done for fauna.

It is the intention to prepare a detailed Fauna Management Plan prior to construction of any future pipeline(s) within the corridor. As part of the Plan, the Proponent(s) will determine the need for detailed fauna surveys in consultation with the DEP.

11. Environmental Management Plan

EMP should be publicly available.

The EMP will be available for viewing at the offices of the DEP.

12. Aboriginal and European Heritage

Approximately 500m at the western end of the proposed corridor alignment was realigned following completion of the initial Aboriginal archaeological and ethnographical surveys. It is understood that this realignment was not surveyed.

The western end of the pipeline was realigned following completion of the Aboriginal Heritage surveys. This realignment occurred within the Oakajee Industrial Estate to cater for the needs of Kingstream. The point at which the corridor crossed the North West Highway and entered the Estate remained unchanged from the alignment surveyed by Baseline Resources. It was considered unnecessary to resurvey the change to the alignment within the Industrial Estate as the Estate itself had previously been the subject of a number of Aboriginal Heritage studies, the latest being undertaken by McDonald Hales and Associates[3] for another division of the Department of Resources development in March 2000.

It is understood that a final meeting planned with the Aboriginal people did not occur.

Correspondence received from Baseline Resources indicates that all consultations with the necessary groups had been completed and that all relevant parties had accepted the reports.

The alignment crosses and runs parallel for some distance to the first railway ever built in Western Australia.

The proposed pipeline corridor crosses two narrow discontinued railway reserves and runs parallel to one of the rail reserves over a very short distance. The tracks and sleepers from this railway were removed long ago and there is no evidence of European Heritage that warrants a further study of the area. The Heritage Council of Western Australia have had an opportunity to comment on the Section 16(e) report and have not raised any concerns in relation to this issue.

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3 McDonald Hales and Associates. 2000. Heritage Management Plans. Oakajee Industrial Estate, Port Facility and Buffer Zone. Geraldton, Western Australia. March 2000. Unpublished report prepared for the Department of Resources Development.