



Environmental Protection Authority

Referral of a Proposal by the Proponent to the Environmental Protection Authority under Section 38(1) of the *Environmental Protection Act 1986*.

EPA REFERRAL
FORM
PROPONENT

PURPOSE OF THIS FORM

Section 38(1) of the *Environmental Protection Act 1986* (EP Act) provides that where a development proposal is likely to have a significant effect on the environment, a proponent may refer the proposal to the Environmental Protection Authority (EPA) for a decision on whether or not it requires assessment under the EP Act. This form sets out the information requirements for the referral of a proposal by a proponent.

Proponents are encouraged to familiarise themselves with the EPA's *General Guide on Referral of Proposals* [see Environmental Impact Assessment/Referral of Proposals and Schemes] before completing this form.

A referral under section 38(1) of the EP Act by a proponent to the EPA must be made on this form. A request to the EPA for a declaration under section 39B (derived proposal) must be made on this form. This form will be treated as a referral provided all information required by Part A has been included and all information requested by Part B has been provided to the extent that it is pertinent to the proposal being referred. Referral documents are to be submitted in two formats – hard copy and electronic copy. The electronic copy of the referral will be provided for public comment for a period of 7 days, prior to the EPA making its decision on whether or not to assess the proposal.

CHECKLIST

Before you submit this form, please check that you have:

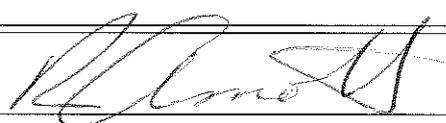
	Yes	No
Completed all the questions in Part A (essential).	X	
Completed all applicable questions in Part B.	X	
Included Attachment 1 – location maps.	X	
Included Attachment 2 – additional document(s) the proponent wishes to provide (if applicable).	X	
Included Attachment 3 – confidential information (if applicable).	X	
Enclosed an electronic copy of all referral information, including spatial data and contextual mapping but excluding confidential information.	X	

Following a review of the information presented in this form, please consider the following question (a response is optional).

Do you consider the proposal requires formal environmental impact assessment?	
<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No <input type="checkbox"/> Not sure
If yes, what level of assessment?	
<input type="checkbox"/> Assessment on Proponent Information	<input checked="" type="checkbox"/> Public Environmental Review

PROPONENT DECLARATION (to be completed by the proponent)

I, Robert Arnott..... (full name) declare that I am authorised on behalf of... Main Roads WA (being the person responsible for the proposal) to submit this form and further declare that the information contained in this form is true and not misleading.

Signature	Name (print) Robert Arnott
Project Director	Main Roads Western Australia
Date <u>25/10/2013</u>	

PART A - PROPONENT AND PROPOSAL INFORMATION

(All fields of Part A must be completed for this document to be treated as a referral)

1 PROPONENT AND PROPOSAL INFORMATION

1.1 Proponent

Name	Main Roads Western Australia
Joint Venture parties (if applicable)	
Australian Company Number (if applicable)	
Postal Address (where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State)	Head Office (Don Aitken Centre) PO Box 6202 East Perth WA 6892
Key proponent contact for the proposal: <ul style="list-style-type: none"> • name • address • phone • email 	Robert Arnott Project Director Infrastructure Delivery Directorate (IDD) Main Roads Western Australia (MRWA) PO Box 6202 East Perth WA 6892 (08) 9323 4225 rob.arnott@mainroads.wa.gov.au
Consultant for the proposal (if applicable): <ul style="list-style-type: none"> • name • address • phone • email 	Michelle Rhodes, Director PO Box 14 West Perth WA 6872 (08) 9388 8360 michellerhodes@360environmental.com.au

1.2 Proposal

Title	Perth Darwin National Highway (PDNH) (Swan Valley Section)
Description	<p>The PDNH is an important link in the state and national road network, enhancing transport efficiencies between the Perth metropolitan area, the north west of Western Australia and the Northern Territory. The national highway currently follows the Great Northern Highway alignment starting at Roe Highway in Midland as a two lane road designed to peri-urban standards, with limited opportunities for future upgrading to national highway standards.</p> <p>In the coming years, development in the north east of the Perth Metropolitan area and beyond is anticipated. This, together with the recent growth of the resources sector, is likely to cause increased traffic congestion and reduced amenity on the existing national highway route, reducing freight efficiency. Detailed planning studies have resulted in the identification of an alternative route from the junction of Reid Highway and Tonkin Highway, connecting with Great Northern Highway and Brand Highway at Muchea (MRWA,</p>

	<p>Government of Western Australia and Department for Planning and Infrastructure (WA) 2004, 2005, 2006, 2007, 2008).</p> <p>The ultimate design concept is a freeway standard dual carriageway with a total of 8 lanes between Reid Highway and a proposed Y – junction with a future East Wanneroo Road (the Y junction being located south of Gnangara Road), then a total of four lanes northwards to Muchea. A freeway to freeway interchange is proposed at the Reid Highway and Tonkin Highway interchange with additional interchanges at Hepburn Avenue, Gnangara Road, Ellenbrook, Stock Road, Neaves Road and Great Northern Highway and Brand Highway at Muchea.</p> <p>In addition to improving freight efficiency, the proposed Swan Valley Section offers opportunities to improve travel wellbeing, promote cost savings through procurement methodologies, initiate community and stakeholder engagement and achieve excellent environmental outcomes.</p> <p>The objectives of the proposal are to:</p> <ul style="list-style-type: none"> • Improve freight capacity, efficiency and productivity; • Reduce urban congestion now and into the future; • Improve road safety in line with the State “Towards Zero” policy; • Maximise sustainability through economic, social and environmental responsibility; and • Improve amenity for the community, tourists and road users. <p>The location of the alignment is shown in Figure 1 (Attachment 1).</p>
<p>Extent (area) of proposed ground disturbance.</p>	<p>During an Alignment Selection Study an initial corridor of 500 metres was identified. A preferred alignment of approximately 100 metres wide has now been selected within this Corridor. The preferred alignment follows the general direction of existing/proposed Metropolitan Region Scheme (MRS) road reservations. The precise length of the main alignment and intersecting roads will be confirmed as the project design and impact assessment progresses.</p> <p>Additional width has been incorporated into the area covered by this referral to allow for refinement of the alignment as the design stage of the project progresses. The area covered by this referral is 963 ha, which is larger than the proposed clearing area for the road. The disturbance area within the ultimate design concept is expected to be 678 ha within the 963 ha referral area. Approximately 43% (292 ha) of the expected disturbance area (within the ultimate design) will require minimal clearing as it occurs within cleared pastoral land.</p> <p>The conservative estimate of area to be disturbed for development of the preferred alignment is shown in Figures 2a and 2b (Attachment 1).</p>

Timeframe in which the activity or development is proposed to occur (including start and finish dates where applicable).	Construction is timetabled to commence in the third quarter of 2016 and complete in late 2019.
Details of any staging of the proposal.	The referral footprint is for the ultimate design concept which includes dual carriageways, grade separated interchanges and a reservation in the median to protect land for any future rail project. The State and Commonwealth funding allocated for the project is for a first stage which will not see all traffic lanes and grade separated interchanges being provided in the first stage of construction. In addition, the ultimate design concept will be refined to include consideration of the location of the rail reservation. This has the potential to reduce the clearing footprint for the first stage project.
Is the proposal a strategic proposal?	No
Is the proponent requesting a declaration that the proposal is a derived proposal? If so, provide the following information on the strategic assessment within which the referred proposal was identified: <ul style="list-style-type: none"> • title of the strategic assessment; and • Ministerial Statement number. 	No
Please indicate whether, and in what way, the proposal is related to other proposals in the region.	The proposal is related to the following other proposals: <ul style="list-style-type: none"> • Lord Street road improvements (potential local government project by City of Swan that would improve access to Ellenbrook); • Tonkin Highway grade separations at Benara Road, Morley Drive and Collier Road, immediately south of the proposal and in the same corridor; and • Malaga Drive / Reid Highway grade separated interchange (an adjacent junction on Reid Highway to the west of the proposal).
Does the proponent own the land on which the proposal is to be established? If not, what other arrangements have been established to access the land?	No. The land on which the proposal is to be established includes State, Commonwealth and privately owned land. The various processes required to resume State and privately owned land have commenced, and negotiations have commenced for the Commonwealth land.
What is the current land use on the property, and the extent (area in hectares) of the property?	The corridor for the proposal is subject to a range of land uses that will be directly or indirectly affected by the highway. The majority of the private properties in the alignment area are used for agriculture, primarily for cattle grazing and hay production. There are some horticultural properties, including a strawberry farm and two nurseries. A few landowners utilise their properties solely as residences and there are vacant (unused) properties. The preferred alignment crosses through pine plantation (Department of Parks and Wildlife (DPaW) State Forest), Department of Defence tenure and a Public Drinking Water Source Area (PDWSA). Where possible the alignment has

been designed to avoid directly intersecting conservation areas. The alignment indirectly intersects the catchment of two 'A' Class conservation areas including:

- Ellen Brook Nature Reserve: A 27620 – ten kilometres south of Bullsbrook (~5.3 km to the south east of the corridor); and
- Twin Swamps Wildlife Sanctuary: A 27621 – six kilometres south of Bullsbrook (2.6 km east of the corridor).

1.3 Location

Name of the Shire in which the proposal is located.	City of Swan Shire of Chittering
For urban areas: <ul style="list-style-type: none"> •street address; •lot number; •suburb; and •nearest road intersection. 	The proposal extends from the junction of Tonkin Highway with Reid Highway, to the Great Northern Highway in Muchea, and is approximately 40 km in length. The precise length of the main alignment and intersecting areas will be confirmed as the project design and impact assessment progresses.
For remote localities: <ul style="list-style-type: none"> •nearest town; and • distance and direction from that town to the proposal site. 	The northern end of the proposed alignment is approximately 1.25 km north of Muchea town centre.
Electronic copy of spatial data - GIS or CAD, geo-referenced and conforming to the following parameters: <ul style="list-style-type: none"> • GIS: polygons representing all activities and named; • CAD: simple closed polygons representing all activities and named; • datum: GDA94; • projection: Geographic (latitude/longitude) or Map Grid of Australia (MGA); • format: Arcview shapefile, Arcinfo coverages, Microstation or AutoCAD. 	Enclosed: GIS polygon of proposal area in Arcview shapefile format

1.4 Confidential Information

Does the proponent wish to request the EPA to allow any part of the referral information to be treated as confidential?	Yes
If yes, is confidential information attached as a separate document in hard copy?	Yes

1.5 Government Approvals

Is rezoning of any land required before the proposal can be implemented? If yes, please provide details.	Two Metropolitan Regional Scheme Amendments are in progress that will complete the road reservation for the part of the proposal that is within the Metropolitan Area. The first amendment is from Maralla Road, Bullsbrook northwards to the Metropolitan area boundary and the second amendment for the length between Hepburn Avenue and Ellenbrook. Both amendments are expected to be completed in 2014. The Western Australian Planning Commission (WAPC) supports the alignment.
Is approval required from any Commonwealth or State Government agency or Local Authority for any part of the proposal? If yes, please complete the table below.	Yes

Agency/Authority	Approval required	Application lodged Yes / No	Agency/Local Authority contact(s) for proposal
Department of Planning	Metropolitan Regional Scheme Amendment	Yes	Mark O'Brien Level 6, Gordon Stephenson House, 140 William Street, Perth WA 6000 T: (08) 6551 9751 E:mark.o'brien@planning.wa.gov.au
Department of Environment	<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Yes	Refer to stakeholder contacts in consultation reports (Attachment 2c and 2d).
Department of Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i>	No	Cesar Rodriguez E:Cesar.Rodriguez@daa.wa.gov.au
Department of Defence	Service and local roads for access to defence land is subject to ongoing negotiation	N/A	Details provided in Attachment 3.
Local government approvals	Development approvals where applicable	N/A	
Department of Water	<i>Country Areas Water Supply Act (CAWS) 1947</i> <i>Rights in Water and Irrigation Act 1914 (RIWI Act).</i>	In preparation	Refer to stakeholder contacts in consultation reports (Attachment 2c and 2d).
Minister for the Environment	Ministerial Statement - That a Proposal may be Implemented pursuant to the Provisions of the <i>Environmental Protection Act 1986</i>	Yes Ministerial Statement 376	Office of the EPA

PART B - ENVIRONMENTAL IMPACTS AND PROPOSED MANAGEMENT

2. ENVIRONMENTAL IMPACTS

Describe the impacts of the proposal on the following elements of the environment, by answering the questions contained in Sections 2.1-2.11:

- 2.1 flora and vegetation;
- 2.2 fauna;
- 2.3 rivers, creeks, wetlands and estuaries;
- 2.4 significant areas and/ or land features;
- 2.5 coastal zone areas;
- 2.6 marine areas and biota;
- 2.7 water supply and drainage catchments;
- 2.8 pollution;
- 2.9 greenhouse gas emissions;
- 2.10 contamination; and
- 2.11 social surroundings.

These features should be shown on the site plan, where appropriate.

For all information, please indicate:

- (a) the source of the information; and
- (b) the currency of the information.

2.1 Flora and Vegetation

2.1.1 Do you propose to clear any native flora and vegetation as a part of this proposal?

[A proposal to clear native vegetation may require a clearing permit under Part V of the EP Act (Environmental Protection (Clearing of Native Vegetation) Regulations 2004)]. Please contact the Department of Environment and Conservation (DEC) for more information.

(please tick) Yes **If yes**, complete the rest of this section.

No **If no**, go to the next section

2.1.2 How much vegetation are you proposing to clear (in hectares)?

The area covered by this referral is 963 ha, which is anticipated to be larger than the proposed clearing area for the road. The area of vegetation to be cleared in the ultimate design concept is expected to be 678 ha within the 963 ha referral area. However approximately 43% (292 ha) of the ultimate design will require minimal clearing as it occurs within land that has previously been cleared for pastoral use.

The conservative estimate of vegetation to be cleared for the road is shown in Figure 1 (Attachment 1).

2.1.3 Have you submitted an application to clear native vegetation to the DEC (unless you are exempt from such a requirement)?

Yes

No

If yes, on what date and to which office was the application submitted of the DEC?

It is expected that this project will be assessed as PER under Part IV of the EP Act, therefore a Clearing Permit is not anticipated to be required.

2.1.4 Are you aware of any recent flora surveys carried out over the area to be disturbed by this proposal?

Yes

No

If yes, please attach a copy of any related survey reports and provide the date and name of persons / companies involved in the survey(s).

If no, please do not arrange to have any biological surveys conducted prior to consulting with the DEC.

Level 1 Flora Surveys were undertaken by GHD in 2009 for the Muchea Link (Maralla Road to Great Northern Highway) and in 2012 for the Tonkin Highway Link (Tonkin/Reid Highway to Maralla Road) (Attachments 2a and 2b).

2.1.5 Has a search of DEC records for known occurrences of rare or priority flora or threatened ecological communities been conducted for the site?

Yes

No

If you are proposing to clear native vegetation for any part of your proposal, a search of DEC records of known occurrences of rare or priority flora and threatened ecological communities will be required. Please contact DEC for more information.

2.1.6 Are there any known occurrences of rare or priority flora or threatened ecological communities on the site?

Yes

No

If yes, please indicate which species or communities are involved and provide copies of any correspondence with DEC regarding these matters.

Declared Rare and Priority Flora

DPaW databases and the Western Australian Herbarium (WAHERB) were searched and returned 18 conservation significant flora species that are known to occur or potentially occur within a 5 km radius of the Muchea Link of the preferred alignment (Table 1). The spring field survey for the Muchea Link included a search for Declared Rare and Priority Flora within the corridor of the alignment at the locations recorded on DPaWs databases. It also included searches for these species in other habitats where they may have been growing.

The DRF flora species, *Grevillea curviloba* subsp. *incurva* has been previously recorded within the corridor near the connection of the Swan Valley Section and the Brand Highway (Attachment 2a). *Grevillea curviloba* subsp. *incurva* was recorded in vegetation surveys as a common species with a distribution limited to the highly

disturbed vegetation in the railway corridor and Brand Highway reserve to the north of Muchea (Attachment 2a).

Based on desktop surveys and vegetation surveys carried out by GHD (2009) it is likely that the flora species *Grevillea curviloba* subsp. *incurva* will be impacted by the proposal. Since the distribution of this species is limited to one area, the impact to this species is likely to be significant.

Desktop queries of DPaW Databases and Western Australian Herbarium (WAHERB) were searched and returned 31 conservation significant species known to occur or potentially occur within a 5km radius of the Tonkin Highway Link of the preferred alignment.

Of these, two plant taxa have been previously recorded within the study area. There is one record of the listed Threatened species *Caladenia huegelii* and one record of a Priority 4 listed species, *Verticordia lindleyi* subsp. *lindleyi*, both on the eastern side of Beechboro Road, within Whiteman Park.

The spring survey included a targeted search for Threatened and Priority flora within the Study Area at the locations recorded on DPaWs database and in areas considered to contain suitable habitat for these species. No Threatened flora species listed under the EPBC Act or WC Act were recorded in the Tonkin Highway Link study area. Two Priority plant species were recorded from the Study Area (Attachment 2b):

- *Eucalyptus caesia* (Priority 4); and
- *Verticordia lindleyi* subsp. *lindleyi* (Priority 4).

The locations of conservation significant flora are shown in Table 1 and Figure 3 (Attachment 1).

Table 1: Conservation Significant Flora Species Known to Occur or Potentially Occur Along the Muchea and Tonkin Highway Link Sections Within a 5km Radius

Species	Common Name	Commonwealth	State	
		EPBC Act	WC Act	DPaW
Muchea Link				
<i>Darwinia foetida</i>	Muchea Bell	Critically Endangered	DRF	Threatened
<i>Grevillea curviloba</i> ssp. <i>curviloba</i>	Curved-leaf Grevillea	Endangered	DRF	Threatened
<i>Grevillea curviloba</i> ssp. <i>incurva</i>	Narrow curved-leaf Grevillea	Endangered	DRF	Threatened
<i>Thelymitra stellata</i>		Endangered	DRF	Threatened
<i>Acacia anomala</i>		Vulnerable	DRF	Threatened
<i>Eleocharis keigheryi</i>	Keighery's Eleocharis	Vulnerable	DRF	Threatened
<i>Calectasia</i> sp. <i>Pinjar</i> (C. Tauss 557)				Priority 1
<i>Schoenus</i> sp. <i>Bullsbrook</i> (J.J. Alford 915)				Priority 2
<i>Cyathochaeta teretifolia</i>				Priority 3
<i>Acacia drummondii</i> subsp. <i>affinis</i>				Priority 3

Species	Common Name	Commonwealth	State	
		EPBC Act	WC Act	DPaW
<i>Verticordia serrate</i> var. <i>linearis</i>				Priority 3
<i>Adenanthos cygnorum</i> subsp. <i>chamaephyton</i>				Priority 3
<i>Platysace ramosissima</i>				Priority 3
<i>Eryngium pinnatifidum</i> subsp. <i>Palustre</i>				Priority 3
<i>Persoonia rudis</i>				Priority 3
<i>Stylidium longitubum</i>				Priority 3
<i>Synaphea grandis</i>				Priority 4
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>				Priority 4
<i>Tonkin Highway Link</i>				
<i>Andersonia gracilis</i>	Slender Andersonia	Endangered	DRF	Threatened
<i>Caladenia huegelii</i>	King Spider-orchid	Critically Endangered	DRF	Threatened
<i>Calectasia cyanea</i>	Blue Tinsel Lily	Critically Endangered	DRF	Threatened
<i>Calytrix breviseta</i> subsp. <i>brevisetata</i>	Swamp Starflower	Endangered	DRF	Threatened
<i>Centrolepis caespitosa</i>		Endangered		Priority 4
<i>Chamelaucium</i> sp. <i>Gingin</i> (N.G. Marchant 6)	Gingin Wax	Endangered	DRF	Threatened
<i>Darwinia foetida</i>	Muchea Bell	Critically Endangered	DRF	Threatened
<i>Eleocharis keigheryi</i>	Keighery's Eleocharis	Vulnerable	DRF	Threatened
<i>Epiblema grandiflorum</i> var. <i>cyaneum</i>	Baby Blue Orchid	Endangered		
<i>Eucalyptus balanites</i>	Cadda Road Mallee	Endangered	DRF	Threatened
<i>Grevillea curviloba</i> subsp. <i>curviloba</i>	Curved-leaf Grevillea	Critically Endangered	DRF	Threatened
<i>Grevillea curviloba</i> subsp. <i>incurva</i>	Narrow curved-leaf Grevillea	Endangered	DRF	Threatened
<i>Hydatella dioica</i>		Endangered	DRF	Threatened
<i>Lepidosperma rostratum</i>	Beaked Lepidosperma	Endangered	DRF	Threatened
<i>Thelymitra dedmaniarum</i> (was <i>Thelymitra manginiorum</i>)	Cinnamon Sun Orchid	Endangered	DRF	Threatened
<i>Thelymitra stellata</i>	Star Sun-orchid	Endangered	DRF	Threatened
<i>Trithuria occidentalis</i> (was <i>Hydatella dioica</i>)	Swan Hydatella	Endangered	DRF	Threatened
<i>Ornduffia calthifolia</i> (was <i>Villarsia calthifolia</i>)	Mountain Villarsia	Endangered	DRF	Threatened
<i>Stchystemon</i> sp. Keysbrook (R.Archer 17/11/99)				Priority 1

Species	Common Name	Commonwealth	State	
		EPBC Act	WC Act	DPaW
<i>Carex tereticaulis</i>				Priority 1
<i>Poranthera moorokatta</i>				Priority 2
<i>Acacia benthamii</i>				Priority 2
<i>Stylidium trudgenii</i>				Priority 3
<i>Stylidium longitubum</i>				Priority 3
<i>Cyathochaeta teretifolia</i>				Priority 3
<i>Meionectes tenuifolia</i>				Priority 3
<i>Hypoclaena robusta</i>				Priority 4
<i>Jacksonia sericea</i>				Priority 4
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>				Priority 4
<i>Darwinia pimelioides</i>				Priority 4
<i>Drosera occidentalis</i> subsp. <i>occidentalis</i>				Priority 4

Threatened Ecological Communities

A search of DPaWs Threatened Ecological Communities database confirmed the buffers of two TECs occurring within the Muchea Link.

- Gaston Road and EG01: Mound Springs SCP – Critically Endangered; and
- Muchea01 and VINESSE: Muchea Limestone – Endangered.

Two additional TECs listed as “not evaluated” were also found to potentially occur within the Muchea Link:

- *Banksia ilicifolia* woodlands (listed as “Not evaluated”). Other common trees in this woodland are *B. attenuata* and *Melaleuca preissiana*. It is found on soils of the Bassendean dunes in low-lying areas or on lower slopes, and is likely to be seasonally waterlogged; and
- Northern *Banksia attenuata* – *Banksia menziesii* woodlands (listed as “Not evaluated”). *Corymbia calophylla* and *Eucalyptus marginata* are rarely found in this community, which is found on soils of the Bassendean dune system.

The buffer of one PEC was also identified to be within the Muchea Link:

- SCP23b: Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands – Priority 3.

Following the 2004 field survey in the Muchea Link, and discussion with DPaW, it was considered that no Threatened Ecological Communities were present within the corridor in the study area, however, in mid-2007 WWF (World Wide Fund for Nature) Wetland Watch discovered a series of tumulus springs on Lots 88 and 89 Bingham Road, Bullsbrook, adjacent to the proposed preferred alignment. However, during the alignment definition stage (2003-2005) for the proposed Swan Valley Section the alignment was designed to avoid direct impact on the springs (as they contained wetland vegetation) (Attachment 2a).

A search of DPaW's Threatened Ecological Communities database identified no TECs or their buffers to occur within the Tonkin Highway Link however the buffers of three PECs were found to occur within the preferred alignment:

- SCP23b: Swan Coastal Plain *Banksia attenuata* - *Banksia menziesii* woodlands – Priority 3;
- SCP21c: Low lying *Banksia attenuata* woodlands or Shrublands – Priority 3; and
- SPC22: *Banksia ilicifolia* woodlands, southern Swan Coastal Plain – Priority 3.

For the Tonkin Highway Link of the preferred alignment, GHD ecologists completed a spring vegetation and flora survey of the area in 2012 (Attachment 2b). This assessment involved mapping of vegetation communities present within the area. The GHD vegetation communities were compared to EPBC Act TECs and none of the vegetation communities are considered to be EPBC Act TECs. The locations of TEC and PEC buffers are shown in Figure 8 (Attachment 1).

2.1.7 If located within the Perth Metropolitan Region, is the proposed development within or adjacent to a listed Bush Forever Site? (You will need to contact the Bush Forever Office, at the Department for Planning and Infrastructure)

Yes

No

If **yes**, please indicate which Bush Forever Site is affected (site number and name of site where appropriate).

Two Bush Forever sites were identified as intersecting the Muchea Link:

- **Site 100: Neaves Road Creek, Bullsbrook:** The preferred alignment crosses the Neaves Road Creek just north of Neaves Road. Other tributaries of Neaves Road Creek are also crossed by the preferred alignment, although these are not considered in the Bush Forever plan; and
- **Site 97: Kirby Road Bushland, Bullsbrook:** The preferred alignment crosses the Kirby Road Bushland site where it juts out eastwards into location 1662. This site is subject to protection under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and contains a Threatened Ecological Community. The Preferred Alignment has been shifted to the east of the TEC, therefore reducing impacts on Bush Forever Site 97.

One Bush Forever sites was identified as being adjacent the Muchea Link:

- **Site 13: Sawpit Road Bushland, Bullsbrook (adjacent):** The preferred alignment has been shifted to the west of on Bush Forever Site 97, therefore reducing impacts on the site.

Seven Bush Forever sites were identified as intersecting the Tonkin Highway Link:

- **Site 399:** Melaleuca Park and Adjacent Bushland, Bullsbrook/Lexia;
- **Sites 192 and 195:** Wetherell Road Bushland, Lexia/Ellenbrook;
- **Site 299:** Yellagonga Regional Park, Wanneroo/Woodvale/Kingsley;
- **Site 307:** Lightning Swamp and Adjacent Bushland, Noranda;
- **Site 304:** Parts A and B – Whiteman Park, Whiteman/West Swan; and

- **Site 198:** Beechboro Road Bushland, Cullacabardee/Ballajura.

One Bush Forever site occurs adjacent to the Tonkin Highway Link:

- **Site 300:** Marralla Road Bushland, Ellenbrook/Upper Swan.

The location of Bush Forever sites is shown in Figures 4a and 4b (Attachment 1).

2.1.8 What is the condition of the vegetation at the site?

The majority of vegetation in the Muchea Link contains a significant number of introduced and weed species. Much of the area has been cleared for farming purposes and pasture plants dominate the ground layer. These farming practices have resulted in the spread of Declared Plants and other nuisance plants. The condition of vegetation in the Muchea Link varies between Pristine to Completely Degraded based on the Keighery (1994) condition rating scale (Attachment 2a).

Based on the Keighery (1994) condition rating scale the vegetation condition of the Tonkin Highway Link ranged from Excellent to Completely Degraded. A large proportion of the Tonkin Highway Link occurs on predominantly cleared or highly altered land such as roads, grazed farmland, powerline easements, sand mine, building infrastructure, access tracks and plantations. These areas are generally considered to be in Degraded to Completely Degraded condition with little to no native vegetation remaining. Where vegetation is present in these areas, it generally comprises of common weed or crop species, with isolated native trees or shrubs. Vegetation adjacent to cleared or disturbed areas are subject to weed edge effects.

In areas where remnant patches of relatively intact vegetation remains, the vegetation is considered to range from Excellent to Good condition. The vegetation structure in these areas is generally intact, with some obvious signs of anthropogenic disturbance, including weeds, adjacent clearing, fire, historical logging and/or grazing.

2.2 Fauna

2.2.1 Do you expect that any fauna or fauna habitat will be impacted by the proposal?

- (please tick) Yes **If yes,** complete the rest of this section.
 No **If no,** go to the next section.

2.2.2 Describe the nature and extent of the expected impact.

A number of issues in relation to the proposed development are risks to fauna and its habitat:

- Potential loss of fauna habitat in wetlands;
- There will be loss of remnant native vegetation in areas already substantially cleared, particularly in the south of the preferred alignment. This could be significant as single large trees can provide nesting hollows and act as stepping stones for birds moving across paddocks; and
- There is likely to be disruption of movement of fauna across the preferred alignment, especially for terrestrial species such as small mammals and reptiles.

2.2.3 Are you aware of any recent fauna surveys carried out over the area to be disturbed by this proposal?

Yes

No

If **yes**, please attach a copy of any related survey reports and provide the date and name of persons / companies involved in the survey(s).

If **no**, please do not arrange to have any biological surveys conducted prior to consulting with the DEC.

A Level 1 Fauna Survey was undertaken by Bamford Consulting Ecologists at 110 Gaston Road in 2005 for the Muehea Link (Attachment 2a). A Level 1 Fauna Survey was undertaken by GHD in 2012 for the Tonkin Highway Link (Attachment 2b). The study area included a corridor from south of the planned Hepburn Avenue interchange on Tonkin Highway to north of Gngangara Road and a corridor along the future Swan Valley Section – Tonkin Link alignment (Attachment 2b).

2.2.4 Has a search of DEC records for known occurrences of Specially Protected (threatened) fauna been conducted for the site?

Yes

No (please tick)

2.2.5 Are there any known occurrences of Specially Protected (threatened) fauna on the site?

Yes

No

If **yes**, please indicate which species or communities are involved and provide copies of any correspondence with DEC regarding these matters.

A search of DPaW's Threatened Fauna database and Naturemap identified several fauna species that are known to occur or potentially occur within five kilometres of the Muehea and Tonkin Highway Links (Table 2). The locations of Threatened and Priority fauna are shown in Figure 9 (Attachment 1).

Table 2. Specially Protected Species Known to Occur or Potentially Occur Along the Muehea and Tonkin Highway Links

Species	Common Name	Commonwealth	State	
		EPBC Act	WC Act	DPaW
Invertebrates				
<i>Leioproctus douglasiellus</i>	Bee	Critically Endangered	Schedule 1	Threatened
<i>Leioproctus contrarius</i>	Bee			Priority 3
<i>Westralunio carteri</i>	South-West Freshwater Mussel			Priority 4
<i>Synemon gratiosa</i>	Graceful Sunmoth			Priority 4
Freshwater Fish				
<i>Geotria australis</i>	Pouched Lamprey			Priority 1
<i>Galaxiella nigrostriata</i>	Black-striped Minnow			Priority 3
<i>Galaxiella munda</i>	Mud Minnow		Schedule 1	

Species	Common Name	Commonwealth	State	
		EPBC Act	WC Act	DPaW
Reptiles				
<i>Pseudoemys umbrina</i>	Short-necked or Western Swamp Tortoise	Critically Endangered		
<i>Morelia spilota imbricata</i>	South-West Carpet Python		Schedule 4	
<i>Neelaps calonotos</i>	Black-striped Snake			Priority 3
Birds				
<i>Calyptorhynchus latirostris</i>	Carnaby's Cockatoo	Endangered	Schedule 1	
<i>Calyptorhynchus baudinii</i>	Baudin's Cockatoo	Vulnerable	Schedule 1	
<i>Anous tenuirostris subsp. melanops</i>	Australian Lesser Noddy	Vulnerable	Schedule 1	Threatened
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered	Schedule 1	
<i>Falco peregrinus</i>	Peregrine Falcon	Migratory	Schedule 4	
<i>Apus pacificus</i>	Fork-tailed Swift	Marine, Migratory	Schedule 3	
<i>Merops ornatus</i>	Rainbow Bee-eater	Marine, Migratory	Schedule 3	
<i>Calidris ferruginea</i>	Curlew Sandpiper	Marine, Migratory	Schedule 1	Threatened
<i>Actitis hypoleucos</i>	Common Sandpiper	Marine, Migratory		
<i>Ardea ibis</i>	Cattle Egret	Marine, Migratory		
<i>Ardea modesta</i>	Eastern Great Egret	Marine, Migratory		
<i>Calidris ruficollis</i>	Red-necked Stint	Marine, Migratory		
<i>Glareola maldivarum</i>	Oriental Pratincole	Marine, Migratory		
<i>Limosa lapponica</i>	Bar-tailed Godwit	Marine, Migratory		
<i>Plegadis falcinellus</i>	Glossy Ibis	Marine, Migratory		
<i>Pluvialis squatarola</i>	Grey Plover	Marine, Migratory		
<i>Tringa glareola</i>	Wood Sandpiper	Marine, Migratory		
<i>Tringa nebularia</i>	Common Greenshank	Marine, Migratory		
<i>Xenus cinereus</i>	Terek Sandpiper	Marine, Migratory		
<i>Tyto novaehollandiae novae-hollandiae</i>	Masked Owl			Priority 1
<i>Ninox connivens connivens</i>	Barking Owl			Priority 2

Species	Common Name	Commonwealth	State	
		EPBC Act	WC Act	DPaW
<i>Oreoica gutturalis gutturalis</i>	Crested Bellbird			Priority 4
<i>Ixobrychus minutus</i>	Little Bittern			Priority 4
<i>Dupetor flavicollis</i>	Black Bittern			Priority 3
<i>Ardeotis australis</i>	Australian Bustard			Priority 4
<i>Burhinus grallarius</i>	Bush Stone-curlew			Priority 4
Mammals				
<i>Dasyurus geoffroii</i>	Chuditch	Vulnerable	Schedule 1	
<i>Macrotis lagotis</i>	Bilby		Schedule 1	Threatened
<i>Phascogale tapoatafa tapoatafa</i>	Brush-tailed Phascogale		Schedule 1	
<i>Macropus irma</i>	Kwoora or Brush Wallaby			Priority 4
<i>Hydromys chrysogaster</i>	Water-rat			Priority 4
<i>Isoodon obesulus fusciventer</i>	Quenda or Southern Brown Bandicoot			Priority 5

The Level 1 Fauna Survey completed by Bamford Consulting Ecologists in 2005 recorded one species listed under Schedule 1 of the WC Act and one species listed as Migratory including:

- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) - Threatened; and
- Rainbow Bee-eater (*Merops ornatus*) - Migratory.

No Priority species were recorded in the survey.

The Level 1 Fauna Survey completed by GHD in 2012 for the Tonkin Highway Link recorded one species listed as Threatened under the WC Act, two species listed Priority by DPaW and one species listed Migratory including:

- Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) - Threatened;
- Western Brush Wallaby (*Macropus irma*) – Priority 4;
- Quenda/Southern Brown Bandicoot (*Isoodon obesulus fusciventer*) – Priority 5;
- Rainbow Bee-eater (*Merops ornatus*) - Migratory.

2.3 Rivers, Creeks, Wetlands and Estuaries

2.3.1 Will the development occur within 200 metres of a river, creek, wetland or estuary?

- (please tick) Yes **If yes**, complete the rest of this section.
- No **If no**, go to the next section.

In the Muchea Link, wetlands and watercourses intersected or adjacent to the preferred alignment are:

- One EPP Lake just north of Maralla Road at Ch 15 000 is intersected by the western boundary of the road reservation;

- Two Conservation Category wetlands (including wetland 668) are intersected by the road reservation in the vicinity of the Neaves Road Interchange;
- One EPP Lake (associated with Sumpland 221) is intersected by the western side of the road reservation north of the Stock Road Interchange;
- One Resource Enhancement Category wetland is intersected by the preferred alignment at approximate Ch 27 100; and
- The alignment crosses Ellen Brook at approximately Ch 31 200 and along the tie-in to the Brand Highway, as well as a number of minor tributaries.

In the Tonkin Highway Link section, the following wetlands and watercourses have been identified:

- One significant stream named Bennett Brook. Bennett Brook originates in Whiteman Park as a superficial aquifer. Rain fills the aquifer, causing it to rise and fill the wetlands during the winter months. The Brook flows through Mussel Pool and runs south to join the Swan River at Bassendean;
- Two types of geomorphic wetlands have been identified, palusplain (seasonally waterlogged flats) and damplands (seasonally waterlogged basin); and
- There are four Conservation Category Wetlands, eight Multiple Use Wetlands and two Resource Enhancement Wetland intersected by the preferred alignment.

The locations of wetlands within the preferred alignment are shown in Figures 6a and 6b (Attachment 1).

2.3.2 Will the development result in the clearing of vegetation within the 200 metre zone?

- Yes No **If yes**, please describe the extent of the expected impact.

More information will be available as detailed design progresses and will be discussed in the impact assessment document.

2.3.3 Will the development result in the filling or excavation of a river, creek, wetland or estuary?

- Yes No **If yes**, please describe the extent of the expected impact.

More information will be available as detailed design progresses and will be discussed in the impact assessment document.

2.3.4 Will the development result in the impoundment of a river, creek, wetland or estuary?

- Yes No **If yes**, please describe the extent of the expected impact.

More information will be available as detailed design progresses and will be discussed in the impact assessment document.

2.3.5 Will the development result in draining to a river, creek, wetland or estuary?

- Yes No **If yes,** please describe the extent of the expected impact.

Best practice measures will be incorporated into the detailed design of the proposed Swan Valley Section to mitigate potential impacts of surface water runoff to wetlands and waterways. Measures may include a combination of culverts, raised roadway, drainage design and pollutant traps. The proponent will liaise the Department of Water on the selection of mitigation measures.

2.3.6 Are you aware if the proposal will impact on a river, creek, wetland or estuary (or its buffer) within one of the following categories? (please tick)

Conservation Category Wetland	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unsure
Environmental Protection (South West Agricultural Zone Wetlands) Policy 1998	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unsure
Perth's Bush Forever site	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unsure
Environmental Protection (Swan & Canning Rivers) Policy 1998	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Unsure
The management area as defined in s4(1) of the <i>Swan River Trust Act 1988</i>	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unsure
Which is subject to an international agreement, because of the importance of the wetland for waterbirds and waterbird habitats (e.g. Ramsar, JAMBA, CAMBA)	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> Unsure

2.4 Significant Areas and/ or Land Features

2.4.1 Is the proposed development located within or adjacent to an existing or proposed National Park or Nature Reserve?

- Yes No **If yes,** please provide details.

A large proportion of the Tonkin Highway Link of Gngangara Road is within DPaW estate classified as the Gngangara-Moore River State Forest.

In the Muchea Link, the corridor does not intersect any System 6 Reserves. It may, however, indirectly affect reserves via catchment disturbance. The corridor will intersect the catchment of two 'A' Class conservation areas:

- Ellen Brook Nature Reserve: A 27620 – ten kilometres south of Bullsbrook (~5.3 km to the south east of the corridor); and
- Twin Swamps Wildlife Sanctuary: A 27621 – six kilometres south of Bullsbrook (2.6 km east of the corridor).

These two Reserves are known to harbour the Western Swamp (Short-Necked) Tortoise, *Pseudemydura umbrina*, one of Australia's most endangered reptiles, protected under the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999*.

Locations of conservation reserves adjacent to, or within, the alignment are shown in Figures 4a and 4b (Attachment 1).

2.4.2 Are you aware of any Environmentally Sensitive Areas (as declared by the Minister under section 51B of the EP Act) that will be impacted by the proposed development?

Yes No **If yes**, please provide details.

The entire Tonkin Highway Link is located within an Environmentally Sensitive Area (ESA). This is due to the alignment being within:

- Wetlands;
- The proximity of DRF including:
 - *Caladenia huegelii*;
 - *Grevillea curviloba ssp. curviloba*; and
 - *Grevillea curviloba ssp. incurva*.
- An area covered by a TEC;
- An area classified as 'Bush Forever' site; and
- The areas covered by the following policies —
 - The *Environmental Protection (Gnangara Mound Crown Land) Policy 1992*; and
 - The *Environmental Protection (Western Swamp Tortoise) Policy 2002*.

2.4.3 Are you aware of any significant natural land features (e.g. caves, ranges etc) that will be impacted by the proposed development?

Yes No **If yes**, please provide details.

2.5 Coastal Zone Areas (Coastal Dunes and Beaches)

2.5.1 Will the development occur within 300metres of a coastal area?

(please tick) Yes **If yes**, complete the rest of this section.
 No **If no**, go to the next section.

2.5.2 What is the expected setback of the development from the high tide level and from the primary dune?

2.5.3 Will the development impact on coastal areas with significant landforms including beach ridge plain, cusped headland, coastal dunes or karst?

Yes No **If yes**, please describe the extent of the expected impact.

2.5.4 Is the development likely to impact on mangroves?

Yes No **If yes**, please describe the extent of the expected impact.

2.6 Marine Areas and Biota

2.6.1 Is the development likely to impact on an area of sensitive benthic communities, such as seagrasses, coral reefs or mangroves?

Yes No **If yes**, please describe the extent of the expected impact.

2.6.2 Is the development likely to impact on marine conservation reserves or areas recommended for reservation (as described in *A Representative Marine Reserve System for Western Australia*, CALM, 1994)?

Yes No **If yes**, please describe the extent of the expected impact.

2.6.3 Is the development likely to impact on marine areas used extensively for recreation or for commercial fishing activities?

Yes No **If yes**, please describe the extent of the expected impact, and provide any written advice from relevant agencies (e.g. Fisheries WA).

2.7 Water Supply and Drainage Catchments

2.7.1 Are you in a proclaimed or proposed groundwater or surface water protection area?

(You may need to contact the Department of Water (DoW) for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

Yes No **If yes**, please describe what category of area.

The Tonkin Highway Link is located within two *Rights in Water and Irrigation Act 1914* (RIWI Act) groundwater areas and a RIWI Act surface water area. The groundwater areas comprise the Gnangara and Mirrabooka and the surface water area of the Swan River System.

2.7.2 Are you in an existing or proposed Underground Water Supply and Pollution Control area?

(You may need to contact the DoW for more information on the requirements for your location, including the requirement for licences for water abstraction. Also, refer to the DoW website)

Yes No **If yes**, please describe what category of area.

The Tonkin Highway Link is located within a Public Drinking Water Source Area (PDWSA) which is the Gnangara Underground Water Pollution Control Area (P1).

2.7.3 Are you in a Public Drinking Water Supply Area (PDWSA)?

(You may need to contact the DoW for more information or refer to the DoW website. A proposal to clear vegetation within a PDWSA requires approval from DoW.)

Yes No **If yes**, please describe what category of area.

The Tonkin Highway Link is located within a PDWSA which is the Gnangara Underground Water Pollution Control Area (P1).

The Muchea Link is not within any PDWSAs. The nearest is approximately one kilometre to the east of the Marbellup Brook Catchment Area which is a protected PDWSA under the *Country Areas Water Supply Act (CAWS) 1947* and *Rights in Water and Irrigation Act 1914* (RIWI Act). Due to the nature of the proposal and the site construction activities required for the installation of the infrastructure the impacts to the nearby PDWSA through run-off, changes to existing hydrological regimes, or use of water from the local aquifer are considered manageable.

2.7.4 Is there sufficient water available for the proposal?

(Please consult with the DoW as to whether approvals are required to source water as you propose. Where necessary, please provide a letter of intent from the DoW)

Yes No (please tick)

Suitable water sources will be located as the project progresses. It is known that water sources exist in the area and abstraction of available water will be undertaken in consultation with DoW.

2.7.5 Will the proposal require drainage of the land?

Yes No **If yes**, how is the site to be drained and will the drainage be connected to an existing Local Authority or Water Corporation drainage system? Please provide details.

2.7.6 Is there a water requirement for the construction and/or operation of this proposal?

(please tick) Yes **If yes**, complete the rest of this section.
 No **If no**, go to the next section.

2.7.7 What is the water requirement for the construction and operation of this proposal, in kilolitres per year?

More information will be available as detailed design progresses and will be discussed in the impact assessment document.

2.7.8 What is the proposed source of water for the proposal? (e.g. dam, bore, surface water etc.)

More information will be available as detailed design progresses and will be discussed in the impact assessment document.

2.8 Pollution

2.8.1 Is there likely to be any discharge of pollutants from this development, such as noise, vibration, gaseous emissions, dust, liquid effluent, solid waste or other pollutants?

(please tick) Yes **If yes**, complete the rest of this section.

No **If no, go to the next section.**

2.8.2 Is the proposal a prescribed premise, under the Environmental Protection Regulations 1987?

(Refer to the EPA's *General Guide for Referral of Proposals to the EPA under section 38(1) of the EP Act 1986* for more information)

Yes No **If yes,** please describe what category of prescribed premise.

2.8.3 Will the proposal result in gaseous emissions to air?

Yes No **If yes,** please briefly describe.

For the Muchea Link, a model was run for carbon monoxide, oxides of nitrogen and particulate matter. Particulate matter models were run with the emissions multiplied by 10 in order to increase model sensitivity to meet National Environmental Protection Measure (NEPM) levels.

The screening model has a number of inadequacies relating to the lack of reliable local data for motor vehicles emissions. However the application of emission factors (derived in a conservative manner) to a conservative model set up produces modelled concentrations that are considerably below NEPM standards. It is concluded that the relatively small amounts of traffic projected for this road will not impact local air quality to an extent warranting further assessment.

2.8.4 Have you done any modelling or analysis to demonstrate that air quality standards will be met, including consideration of cumulative impacts from other emission sources?

Yes No **If yes,** please briefly describe.

See above.

2.8.5 Will the proposal result in liquid effluent discharge?

Yes No **If yes,** please briefly describe the nature, concentrations and receiving environment.

New roads have the potential to create surface water runoff issues in relation to adjacent watercourses and wetlands. Surface water runoff can potentially carry pollutants such as hydrocarbons, fertilisers and chemicals. If left unmitigated, these pollutants can enter waterways and wetlands and conflict with the management requirements for listed and protected wetlands.

Best practice measures will be incorporated into the detailed design of the Swan Valley Section that will mitigate potential impacts of surface water runoff to wetlands and waterways. Measures may include a combination of culverts, raised roadway, drainage design and pollutant traps. The proponent will liaise the DoW on the selection of mitigation measures.

2.8.6 If there is likely to be discharges to a watercourse or marine environment, has any analysis been done to demonstrate that the State Water Quality Management Strategy or other appropriate standards will be able to be met?

Yes No **If yes**, please describe.

2.8.7 Will the proposal produce or result in solid wastes?

Yes No **If yes**, please briefly describe the nature, concentrations and disposal location/ method.

2.8.8 Will the proposal result in significant off-site noise emissions?

Yes No **If yes**, please briefly describe.

For the Muchea Link, a preliminary desktop noise assessment of the receiving environment and a background noise monitoring assessment was carried out by Herring Storer Acoustics (2005). Of the 46 buildings that were assumed to be noise sensitive premises, all are considered to be in low ambient areas. Of these 46 residences, 12 are calculated to exceed the 63 dB(A) L10(18hour) base objective. Further studies will be undertaken and results will be discussed in the impact assessment document.

2.8.9 Will the development be subject to the Environmental Protection (Noise) Regulations 1997?

Yes No **If yes**, has any analysis been carried out to demonstrate that the proposal will comply with the Regulations?

Please attach the analysis.

2.8.10 Does the proposal have the potential to generate off-site, air quality impacts, dust, odour or another pollutant that may affect the amenity of residents and other "sensitive premises" such as schools and hospitals (proposals in this category may include intensive agriculture, aquaculture, marinas, mines and quarries etc.)?

Yes No **If yes**, please describe and provide the distance to residences and other "sensitive premises".

Air Quality

For the Muchea Link, a model was run for carbon monoxide, oxides of nitrogen and particulate matter. Particulate matter models were run with emissions multiplied by 10 in order to increase model sensitivity to meet National Environmental Protection Measure (NEPM) levels.

The screening model has a number of inadequacies relating to the lack of reliable local data for motor vehicles emissions. However, the application of emission factors (derived in a conservative manner) to a conservative model set up produces modelled concentrations that are considerably below NEPM standards. It is concluded that the relatively small amounts of traffic projected for this road will not impact local air quality to an extent warranting further assessment. For the Tonkin Highway Link no air quality monitoring has been carried out as part of the referral given that at present there is

minimal air pollution within the study area as the majority of the area consists of bushland or semi-rural land.

Dust

The construction of the proposed Swan Valley Section has the potential to produce dust lift which may be a nuisance to nearby residents and which may also impact adjacent wetlands and vegetation if unmitigated. Some of the soil types in the area include loose sand with fine organic matter, which has potential for movement in strong breezes. A Dust Management Plan will be produced prior to construction in order to assess and manage risks to sensitive areas.

2.8.11 If the proposal has a residential component or involves “sensitive premises”, is it located near a land use that may discharge a pollutant?

Yes No Not Applicable

If yes, please describe and provide the distance to the potential pollution source

2.9 Greenhouse Gas Emissions

2.9.1 Is this proposal likely to result in substantial greenhouse gas emissions (greater than 100 000 tonnes per annum of carbon dioxide equivalent emissions)?

Yes No **If yes**, please provide an estimate of the annual gross emissions in absolute and in carbon dioxide equivalent figures.

No assessment of potential Greenhouse Gas Emissions has been undertaken to date. However it is considered unlikely that the construction of the project will result in more than 100 000 tonnes CO₂ per annum (expected construction period three years) given that the construction of a project of similar nature (New Perth Bunbury Highway) produced emissions of 122,630 CO₂ per annum over a three year construction period whilst being approximately twice the length of this proposal.

2.9.2 Further, if yes, please describe proposed measures to minimise emissions, and any sink enhancement actions proposed to offset emissions.

N/A.

2.10 Contamination

2.10.1 Has the property on which the proposal is to be located been used in the past for activities which may have caused soil or groundwater contamination?

Yes No Unsure **If yes**, please describe.

A search of the DER's (formally the DEC) Contaminated Sites Database in February 2009 identified three registered sites within the Muchea Link.

Contamination at these three adjacent sites relate to hydrocarbons present in the groundwater and soil resulting from a fuel dispensing facility on Lots 8 and 9 Brand Highway, Muchea. Various restrictions apply to the access of soil and abstraction of

groundwater at these sites. Given the distance of the preferred alignment from these sites, it is unlikely that contamination at this site will present a risk to the highway. In 2004, the Department of Environment and Conservation's 'LEGACI' database was accessed to ascertain potentially contaminated sites within the corridor (database no longer available/in use):

Location Number	Site ID	Activity	Category	Activity Detail
105	21002479	Piggery	Animal Based Wastes	Up to 150 Pigs
4103	21002481	Piggery	Animal Based Wastes	Up to 150 Pigs
4319	21002483	Piggery	Animal Based Wastes	Up to 150 Pigs

Possible contaminated sites that have not been recorded by the former Department of Environment and Conservation were also identified during the field surveys.

Location Number	Activity	Possible Contaminant
105	Turf farm	Pesticides
4043	Strawberry farm	Pesticides

No contaminated sites have been identified in the Tonkin Highway Link section.

2.10.2 Has any assessment been done for soil or groundwater contamination on the site?

Yes No **If yes, please describe.**

See above.

2.10.3 Has the site been registered as a contaminated site under the *Contaminated Sites Act 2003*? (on finalisation of the CS Regulations and proclamation of the CS Act)

Yes No **If yes, please describe.**

See above.

2.11 Social Surroundings

2.11.1 Is the proposal on a property which contains or is near a site of Aboriginal ethnographic or archaeological significance that may be disturbed?

Yes No Unsure **If yes, please describe.**

The following Aboriginal heritage site numbers intersect the Muchea Link:

- 20749 – “Moore River Waugal”;
- 21620 – “Chandala Brook”;
- 20008 – “Gingin Brook Waggy Site”;
- 21994 – “Neaves Road Creek Field Site 01”;
- 21619 – “Breera Brook”;
- 21618 – “Nullilla Brook”; and
- 3525 – “Ellenbrook Upper Swan”.

An ethnographic survey it still to be conducted in the Muchea Link to determine the level of impact the alignment will have on the Aboriginal values of the sites.

The following Aboriginal heritage site numbers intersect the Tonkin Highway Link:

- 3692 - “Bennett Brook In Toto”;
- 3619 – “Whiteman’s Quarry”;
- 3180 – “Marshall Beechborro”;
- 20058 – “Temporary Camp”;
- 21393 – “NOR/02 Lightening Swamp”;
- 3840 – “Bennett Brook Camp Area”;
- 22643 - “West Swan Isolated Artefacts”; and
- Other Heritage Place Listing Number 3618 - “Whitemans Cutting”.

The location of Aboriginal heritage sites is shown in Figures 5a and 5b (Attachment 1).

An ethnographic survey identified that the preferred alignment will impact indirectly upon one Aboriginal site, namely Site Number 3692, “Bennett Brook In Toto”. The impact will be indirect, in that the project crosses a small seasonal drain which, when flowing, carries run-off into the headwaters of Bennett Brook in Whiteman Park. That impact has the potential to be damaging to the Aboriginal values of the site, as noted by four of the Aboriginal groups, as there is a possibility of pollutants from road construction entering the waters of the Bennett Brook system (Attachment 2b).

If strict control over run-off is enforced, then the risk of impact on the site can be reduced. It is noted that three of the Aboriginal groups recommended that monitors from their community should be appointed to observe and oversee those controls (Attachment 2b).

Other Heritage Place Listing Number 3618, “Whitemans Cutting”, an artefact scatter site held under Open Access without gender restrictions, is also intersects the preferred alignment. However, the Site File in this case records that the artefacts have been collected from the site in the past. The proposed Swan Valley Section cannot therefore impact upon those artefacts, as they are no longer in place (Attachment 2b).

This will be further investigated and discussed in assessment documentation.

2.11.2 Is the proposal on a property which contains or is near a site of high public interest (e.g. a major recreation area or natural scenic feature)?

Yes No **If yes, please describe.**

2.11.3 Will the proposal result in or require substantial transport of goods, which may affect the amenity of the local area?

Yes No **If yes, please describe.**

Infrastructure Australia has given priority to the proposed Swan Valley Section as the development will provide an alternative freight route to northern Australia, and will relieve pressure on the Great Northern Highway. The project will improve freight efficiency and increase freight network capacity, reduce vehicle operating costs and time savings for both freight and passenger vehicles. In doing this the project will

improve the amenity on the main highway between Perth and the north-west of Western Australia by delivering a new road bypassing the Swan Valley and outer eastern suburbs of Perth.

3. PROPOSED MANAGEMENT

3.1 Principles of Environmental Protection

3.1.1 Have you considered how your project gives attention to the following Principles, as set out in section 4A of the EP Act? (For information on the Principles of Environmental Protection, please see EPA Position Statement No. 7, available on the EPA website)

- | | | |
|--|---|-----------------------------|
| 1. The precautionary principle. | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 2. The principle of intergenerational equity. | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 3. The principle of the conservation of biological diversity and ecological integrity. | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 4. Principles relating to improved valuation, pricing and incentive mechanisms. | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |
| 5. The principle of waste minimisation. | <input checked="" type="checkbox"/> Yes | <input type="checkbox"/> No |

3.1.2 Is the proposal consistent with the EPA's Environmental Protection Bulletins/Position Statements and Environmental Assessment Guidelines/Guidance Statements (available on the EPA website)?

- Yes No

3.2 Consultation

3.2.1 Has public consultation taken place (such as with other government agencies, community groups or neighbours), or is it intended that consultation shall take place?

- Yes No **If yes**, please list those consulted and attach comments or summarise response on a separate sheet.

There has been ongoing public and landholder consultation since the corridor alignment studies which began in 1997. A range of methods of consultation have been undertaken including letter box drops, public notices, public meetings, direct mail-outs, Community Liaison Group establishment and meetings, and public displays. Full details of the most recent landholder responses to the location of the Swan Valley Section within their properties are available in the Community Consultation Report (Carolyn Walker Public Relations, December 2008, Attachment 2c) and Community Consultation Report (Carolyn Walker Public Relations, August 2013, Attachment 2d).

As part of this work, landholders who are directly affected by the location of the corridor and who have bushland or other environmental features on their property have been consulted. This consultation has included phone discussions, mail-outs and, in a

number of cases visits to the property and site investigation with the landholder. In this way, landholders who have specific knowledge about environmental aspects on their property have passed this information onto the field investigation personnel. This consultation process will continue as the assessment progresses.

Attachment 1.

Figures

Attachment 2a.

GHD 2013a. Perth Darwin National Highway Alignment Definition Study Maralla Road, Bullsbrook to Great Northern Highway, Muchea. *Environmental Impact Assessment and Environmental Management Plan*. Prepared for Main Roads Western Australia.

Attachment 2b.

GHD 2013b. Perth-Darwin National Highway - Tonkin Highway Link *Environmental Impact Assessment and Biological Survey*. Prepared for Main Roads Western Australia.

Attachment 2c.

Carolyn Walker Public Relations, December 2008. *Perth Darwin National Highway Alignment definition study Southern section (Maralla road to Muchea) Community Consultation Report*, (not published).

Attachment 2d.

Carolyn Walker Public Relations, August 2013. *Perth Darwin National Highway/ Tonkin Link Alignment Definition Planning Study Community Consultation Report*, (not published).