DESIGN PACKAGE 7 ENVIRONMENTAL IMPACT ASSESSMENT

GREAT NORTHERN HIGHWAY SLK 117.36 TO 126.40

REVISION NO. 1

DATE 3 JULY 2008

QUALITY INFORMATION

Document	Design Package 7 Environmental Impact Assessment
Ref	E&H-08-0011
Date	3rd July 2008
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Reviewed by	Troy Collie

Revision History

Revision	Revision Date	Details	Authorised	
			Name/Position	Signature
0	29/01/2008	Submit to MRWAEB	T Collie	
1	03/07/08	Submit to Alliance Manager	A. Batty	*A. Batty*

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1. INTRODUCTION

The Great Northern Highway (H006) links the north of Western Australia with Perth and is the main land transport route between Perth and Darwin. It also forms part of the infrastructure that links the Murchison, Pilbara and Kimberley regions to Perth. The highway carries significant volumes of freight, including high/wide loads transported by road trains and serves a number of user groups including agricultural, pastoral, mining and tourism. The road also carries significant tourist traffic and all year round local traffic for business and recreational trips. It commences at Midland and terminates at Wyndam in the Kimberley.

Main Roads Western Australia (Main Roads) is planning to upgrade sections of the highway by means of reconstruction, widening and overlaying various sections of the carriageway between Muchea and Bindi Bindi with this philosophy carrying over into the design of the section from Bindi Bindi to Pithara.

Information in this report comes from a desktop assessment based on existing database records, information provided by Main Roads Western Australia (MRWA), previous field assessments by various environmental consultancies and literature available in the public domain.

1.1 Background

In order to gain an understanding of potential environmental impacts associated with the proposed works, a Preliminary Environmental Impact Assessments (PEIA) was undertaken in 2004 by Sinclair Knight Merz (SKM) for Work Packages 2 – 8 and in 2005 by KBR for all 10 work packages. The PEIAs were undertaken as a desktop exercise and identified the need for additional environmental studies, such as field surveys, to be undertaken to further define the potential environmental impacts.

Subsequent to the PEIAs, various environmental studies were undertaken focusing on issues such as drainage and salinity, flora, fauna, potential contaminated sites, vegetation clearing analysis and Aboriginal heritage. The findings of the environmental surveys were compiled into summary reports and recommendations were made regarding the requirements for environmental approvals (SKM, 2004; SKM, 2005b).

Upon completion of the field assessments, summary reports were compiled with the primary objectives of determining the environmental constraints associated with the proposed works, establish a preliminary level of assessment that is required for approvals at a state and federal level and establish regulatory expectations for approvals.

1.2 Location

The project is located on Great Northern Highway (GNH) north of New Norcia between **SLK 117.36 to SLK 126.40.** The total length of this package is 9.04 km (Figure 1). It is located within the Shire of Victoria Plains.

1.3 Scope of report

This Environmental Impact Assessment has been prepared to determine areas of environmental sensitivity along GNH within Design Package 7. This report will be utilised as a tool to determine whether the package will need to be referred to the EPA under the *Environmental Protection Act, 1986* and the *Environment Protection and Biodiversity Conservation Act, 1999,* along with submission to Main Roads Environment Branch.

Significant environmental aspects identified in this document will be addressed in Environmental Management Plans used during the construction phase to minimise and manage impacts on the environment.

Figure 1 Extent of Design Package 7

2. DESCRIPTION OF THE PROPOSAL

2.1 Proponent Information

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2.4 Summary of Significant Environmental Issues

The following environmental issues have been identified for Design Package 7:

- Along with other types, vegetation type 7 being 'Medium Woodland York Gum and Wandoo' will need to be cleared. Currently, Type 7 is 12.7% pre-European extent;
- Carnaby's Black Cockatoo nesting hollows and feeding habitat will be impacted (loss of 1 known and 2 potential breeding hollows);
- Aboriginal heritage in the form of a scarred tree occurs in the vicinity of the works (but is outside of the cleared zone); and
- The sections from SLK 115.00 to 120.00 plus SLK 121.80 to 124.07 is currently described as a Dieback Area in the Road Management Prescriptions.

Generally the condition of vegetation between SLK 117.36 to SLK 126.40 was poor to good with limited to no native understorey. Notably, type 7 Vegetation Association (medium woodland york gum and wandoo) - of which 12.7% pre European extent remains in the State - is in poor to moderate condition so it can be justifiably cleared using Main Roads existing vegetation clearing Purpose Permit.

With regards to impacting on Carnaby's nesting hollows, there are 2 confirmed Carnaby's Cockatoo nests recorded within the road reserve and 5 potential nesting hollows (i.e. hollows that were suitable size for Carnaby's Cockatoo). Some of these hollows were being used by other species including Australian ringnecks (*Platycercus zonarius*), galah (*Cacatua roseicapilla*) and corella (*Cacatua pasinator*) (ATA Environmental, 2006). Of these recorded sites the clearing for proposed works will impact one confirmed nesting hollow and two potential nesting hollows. Additionally Ron Johnstone, who is the head of the ornithology department at the WA Museum and considered an expert on Carnaby's Cockatoo, has suggested that some Carnaby's Cockatoo's shift their nests among a number of trees in areas adjacent to known breeding sites. Therefore a reconnaissance survey of any potential nests to be impacted should be conducted prior to any proposed works to ensure that potential nesting hollows are not being utilised by Carnaby's Cockatoo. Where sites are to be impacted Ron Johnstone has indicated that for every nest to be removed five artificial nesting boxes should be established as a mitigation.

There will be no impacts on the Aboriginal scarred tree as it occurs outside the road alignment. However, to ensure that no accidental damage occurs to the tree it will be highlighted to site personnel and clearly identified during the works as a 'no go' area.

Dieback (*Phytophthora cinnamomi*) affected areas in two sections of the package (from SLK 115.00 to 120.00 and 121.80 to 124.07) will be managed during the project in accordance with the Department of Environment and Conservations (DEC) Policy Statement No. 3 *Threat Abatement for Phytophthora cinnamomi* (CALM, 2004). This will ensure that uninfected areas remain Dieback free during and after construction phases.

The proposal to conduct road construction works for Design Package 7 will not be referred to the WA Environment Protection Authority nor the Commonwealth Department of the Environment, Water, Heritage and the Arts (DEWHA).

2.5 Justification and Objectives

The Great Northern Highway forms part of the Auslink National Network, previously known as the National Highway, which is an integrated network of land transport linkages of national importance. The Auslink network is based on national and inter-regional transport corridors including transport links to urban areas, ports, airports, rail road and other areas of critical importance to national and regional economic growth and development (DTRS, 2004). Therefore, any road improvements undertaken on this road must conform to minimum design standards.

The primary objective for the proposed works is to improve the level of safety for all road users. The sealed shoulders and passing lanes will allow for safer overtaking. Improved vertical and horizontal geometry and sight distances will allow for a safer journey, particularly in wet conditions and at night time. The increased passing opportunities will result in a reduction in the conflict between vehicle types such as trucks and cars, and a reduction in the fatigue and frustration of drivers (MRWA, 2007).

Other project benefits have also been identified. These include:

- Decreased travel time and cost, particularly for road trains;
- Environmental improvements, such as enhancement of degraded road reserves through revegetation; and
- Reduction in maintenance.

Within Design Package 7, the proposed improvements to the existing highway includes general widening and reconstruction of the existing pavement with localised realignment of existing horizontal and vertical curves work will include the construction of a north bound passing lane.

2.6 Alternative Designs

A number of variations to designs have been considered for this package to minimise environmental impacts and improve road design for increased safety of road users. Design considerations have attempted to eliminate or minimise impacts to:

- Type 7 vegetation association recognised as vulnerable (EPA 2000);
- Loss of Carnaby's Cockatoo nesting and feeding sites;
- disturbance to watercourse; and
- Aboriginal heritage values.

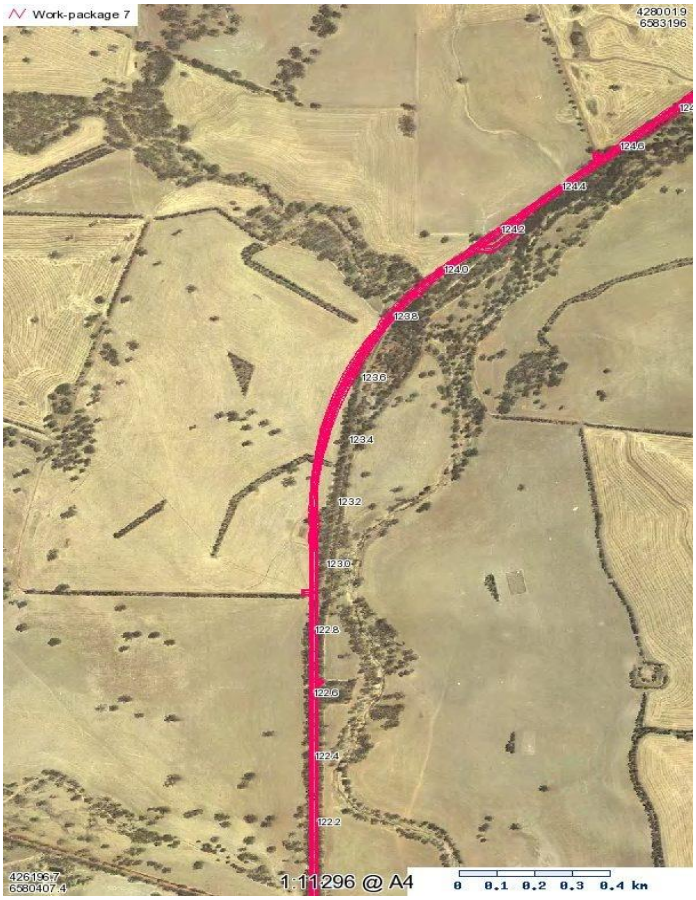
2.6.1 Current Design

Design Package 7 involves the following upgrades to the section of the Great Northern Highway between SLK 117.36 to 126.4 including to the deck of the Capapora Bridge:

- Widening and upgrade of the existing alignment between SLK 117.36 to122.78;
- Realignment of the road westward into cleared pasture and upgrade of the existing Capapora Bridge from SLK 122.78 to 124.1; and
- Widening, upgrade and creation of a north bound overtaking lane from SLK 124.1 to 126.4

One major realignment in DP07 occurs between SLK 122.78 to 123.8 where the proposed design deviates into the paddock to the west of the existing road (Figure 2). Direct upgrading on the existing road alignment in this section would result in significant impacts to Type 7 vegetation association, Carnaby's Cockatoo nesting sites and result in substandard design on approach to Capapora Bridge. The on-alignment upgrade was rejected. The preferred realignment of the road into the paddock (subject to land acquisition) will allow the current alignment between SLK 122.78 to 124.1 to be revegetated with local species resulting in a larger and intact area of remnant vegetation and also allow approximately 1.1 ha of farming land to be added to the road reserve, part of which can be re-vegetated.

Figure 2 Realignment of road section into newly acquired* farming land generally between SLK 122.78 to 123.8



*** negotiations and agreement pending**

2.7 Key Project Characteristics

Table 1: Key Characteristics of Design Package 7

Element	Description
Road works length	9.04 km
Clearing area	6.9 ha
Road pavement and surface	Asphalt with base course laterite/gravel, 360mm deep
Road description	Single carriageway with one passing lane and modifications to bridge and realignment of a section.
Drainage features	No change
Waterway	No impact to water course; Bridge structure retained.
Intersections	Two
Pedestrian underpass	N/A. However does include two stock underpasses
Lights	N/A
Signs	Capaporra Bridge
Dual use paths	N/A
Construction	Bitumen
Staging	Summer 2007/2008 – Commencing February 2008
Operation	After construction of each stage is complete

3. ENVIRONMENTAL ASPECTS AND CONSTRAINTS

A preliminary assessment of the study area, its aspects and potential constraints was undertaken by compiling information from the numerous environmental reports which have been completed for Design Package 7 (Table 2).

3.1 Environmental Aspects

Table 2: Environmental Aspects for Design Package 7.

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
BIOPHYSICAL						
Vegetation	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	• EPA (2004b) Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia; • Environmental Impact Assessment in Western Australia; • Environment Protection and Biodiversity Conservation Act 1999; • Wildlife Conservation act 1950; • Commonwealth of Australia (2001) National Targets and Objectives for Biodiversity Conservation 2001-2005;	• Sections of remnant vegetation are described as vegetation association 7 (Medium woodland: York Gum and Wandoo) and is recognised as having approximately 12.7% of the pre-European extent remaining. It is therefore considered vulnerable as outlined in the EPA Position Statement 2 (EPA 2000). However, the majority of the vegetation is described as	• Loss of abundance of this vegetation type as a result of clearing activities	• Avoid if not reduce the amount of clearing required for vegetation association 7. • Improve condition of remaining remnant vegetation by weed control and revegetation plans. • Revegetation of an additional 1.1 ha with local plant species.	• Vegetation will be managed so as not to be in variance with clearing principals. • Overall improvement of vegetation rating. • No net reduction in the extent of Vegetation association 7.

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
		• Commonwealth of Australia (1996) National Strategy for the Conservation of Australia's Biological Diversity.	being in poor condition with little to no intact understorey and high weed levels.			
Flora – Significant Flora/Threatened Ecological Communities	*To protect Declared Rare Flora and Priority Flora consistent with the provisions of the Wildlife Conservation Act 1950 and the Environment Protection and Biodiversity Act, 1999. Protect other flora of conservation significance.*	• EPA (2004b) Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia; • Environmental Impact Assessment in Western Australia; • Environment Protection and Biodiversity Conservation Act 1999; • Wildlife Conservation act 1950.	• One priority 4 species, *Stenanthemum tridentatum*, was recorded in the study during previous surveys (SKM 2006). However, this species is no longer listed as threatened.	• No impact on significant flora species or ecological communities.	• Minimise clearing foot print in all remnant vegetation	• Project will not impact EPA objectives in relation to flora.
Fauna	*To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.*	• Wildlife Conservation Act 1950; • Environment Protection and Biodiversity Conservation Act 1999; • EPA (2004a) Guidance No.56: Terrestrial Fauna Surveys for	• Confirmed and potential nesting sites are present in the study area.	• Loss of potential or confirmed nesting sites.	• Vegetation clearing lines will be clearly marked and checked prior to the commencement of clearing operations by the Construction Contractor. Clearing should	• Minimal impact on Carnaby's Cockatoo and other fauna. Fauna can be managed to meet EPA objective.

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
		Environmental Impact Assessment in Western Australia.			not occur outside the marked clearing lines. • Revegetate disturbed areas with Carnaby's Cockatoo feed species. • Install artificial nesting hollows to off-set impacts of clearing.	
Creeks /Watercourses	*To improve the integrity, ecological functions and environmental values of watercourses.*	• Department of Environment guidelines for protecting waterways (including River Restoration Series, Water Notes, State-wide policies); • Government of Western Australia (2003) *Hope for the Future: The Western Australian State Sustainability Strategy*; • Department of Water (2006) State-Wide Waterways Strategy: Strategic Actions for the Future; • Environmental Protection Authority	• Capapora Brook	• Contamination from runoff, spills, equipment servicing and refuelling causing pollution and/or vegetation clearing adjacent to Capapora Brook	• Only fill used in low lying areas, no excavation; • Minimise or avoid where possible clearing of all vegetation adjacent to Capapora Brook; • Equipment maintenance and refuelling, hazardous chemicals and hydrocarbons storage to be at least 100m from any watercourse and suitable hydrocarbon cleanup kits be present and staff	• No significant impact on creeks / watercourses / wetlands; • Aspect managed to meet EPA objective.

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
		(2005) Draft EPA Guidance Statement No. 33: Environmental Guidance for Planning and Development;			suitably trained in its use. • As a minimum spill kits should be provided and readily available for all equipment/machinery used in the study area; • Chemicals/fuels stored correctly, including used storage containers stored in bunded areas.	
Wetlands	*To maintain the integrity, ecological functions and environmental values of wetlands.*	• Water and Rivers Commission (2001) Position Statement: Wetlands, Water and Rivers Commission, Western Australia; • Government of Western Australia (1997) Wetlands Conservation Policy for Western Australia; • Environmental Protection Authority (2004) Position Statement No. 4: Environmental Protection of Wetlands;	• No wetlands present	• The current alignment will not impact on any wetlands in this section of works.	• None required.	• No impact on wetlands.

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
Water (Surface and Ground)	*To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.*	• Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy, October 2000, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (2000a) • Australian Guidelines for Water Quality Monitoring and Reporting, National Water Quality Management Strategy, October 2000, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (2000b);	• Capapora Brook (small watercourse crossing GNH at SLK 123.4 to 124.	• Contamination from run-off, equipment, spills and refuelling causing pollution of Capapora Brook; • Project not to directly impact water course as works in the area consist of an upgrade to the bridge surface.	• Equipment maintenance and refuelling, hazardous chemicals and hydrocarbons storage to be at least 100m from any watercourse.	• No impact on surface or ground water anticipated. Aspect managed to meet EPA objective.
Land (Terrestrial)	*To maintain the integrity, ecological functions and environmental values of the soil and landform.*	Department of Agriculture	• Most of the soils and some landforms in the study area are	• Disturbance of landforms and soils as part of the proposed	• Minimise disturbance as far as practicable. • Stockpile and	• There will be some disturbance to soils and

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
			modified due to agricultural, residential and transport land uses.	works.	return topsoils where practicable. • Revegetate disturbances using local provenance seeds.	landforms. • Satisfactorily managed by relevant management commitments.
Conservation Areas	*To protect and enhance the environmental values of areas identified as having environmental attributes.*	• *Environment Protection and Biodiversity Conservation Act 1999;* • *Wildlife Conservation Act 1950.*	• No Conservation estate or reserves in the vicinity of the proposed works.	• No Impact.	• N/A	• N/A
Acid Sulphate Soils (Land, Terrestrial)	*Plan and manage development that may potentially impact on ASS/Potential ASS to avoid diverse effects on the natural and built environment and human activities and health.*	• WAPC Planning Bulletin (2003) *Acid Sulfate Soils;* • Department of Environmental Protection/Water and Rivers Commission (2003-2004) – Acid Sulfate Soils Guideline Series – Identification and investigation of acid sulfate soils and groundwater.	• The Western Australian Planning Commission Bulletin No. 64 indicates that there is low to no risk of Actual Acid Sulfate Soils (AASS) or Potential Acid sulphate Soils (PASS) occurring within the study area.	• No impacts resulting from ASS/PASS in the study area.	• If suspected ASS/PASS encountered during works stop and investigate.	• No Impact of ASS/PASS
POLLUTION MANAGEMENT						
Water Quality (surface or	*To ensure that emissions do not adversely affect*	• Australian and New Zealand Guidelines	• Increasing salinity in the area	• Only impact on surface water	• Contractors to undertake	• Project can be managed

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
ground)	*environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.*	for Fresh and Marine Water Quality, National Water Quality Management Strategy, October 2000, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand (2000a)	overtime;	quality is if sediment leaves project footprint during construction.	minimum clearing necessary.	to prevent adverse impacts on water quality.
Air Quality (dust and particulates)	*To ensure that emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting accepted guidelines, standards and criteria.*	• Environmental Protection Authority (2000) *Prevention of Air Quality Impacts from Land Development Sites*. Guidance Statement No. 18, Environmental Protection Authority, Perth; • Environmental Protection Act 1986; • National Environment Protection (Ambient Air Quality) Measure;	• The surrounding land use consists of commercial farming, rural residential and Crown Land.	• Adverse air emissions are not expected to occur as a result of proposed works.	Minimise air emission by ensuring equipment is well maintained and serviced regularly.	Air emissions can be managed to meet EPA's objective.
Noise and Vibration	*To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise levels meet statutory*	• Environmental Protection Authority (1997) *Environmental Protection (Noise) Regulations 1997*: Regulation 13	• The surrounding land use consists of commercial farming, rural residential and	• Noise levels and vibration is expected to increase during construction of works are	Implement noise and vibration minimisation techniques during construction. Carry out works in	Noise and vibration can be managed to meet EPA's objective.

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
	requirements and acceptable standards.	"Construction Sites"; • Department of Environmental Protection (2000) *Road and Rail Transport Noise* Draft Guidance No. 14 (Version 3);	crown land.	unlikely to be a nuisance to nearby residents given their distance from the works. • Noise may temporarily affect fauna within the study area.	normal working hours	
Dust	*Ensure that dust levels generated by the proposal do not adversely impact upon welfare and amenity or cause health problems by meeting statutory requirements and acceptable standards.*	• Environmental Protection Authority (2000b) *Prevention of Air Quality Impacts from Land Development Sites*. Guidance Statement No. 18, Environmental Protection Authority, Perth;	• The surrounding land use consists of commercial farming, rural residential, local reserves and nature reserves.	• Dust mitigation practices should be used to minimise the amount of dust generated during construction phases.	• Implement dust minimisation techniques; • Soil stockpiles created during construction should be kept to a maximum of 2 metres to prevent dust issues;	• Dust can be managed to meet EPA's objective.
SOCIAL SURROUNDINGS						
Aboriginal and European Heritage	*To ensure changes to the biophysical environments resulting from the proposal do not affect historical and cultural associations within the area and comply with the requirements of relevant Aboriginal and heritage legislation.*	• Aboriginal Heritage Act 1972; • Native Title Act 1993; • Aboriginal and Torres Strait Islander Heritage Protection Act 1984; • Environmental Protection Authority (2004c) Assessment of Aboriginal	• No European Heritage sites have been identified in the study area. • A scarred tree of low archaeological significance is located at 118.79, approximately 12	• Damage to the tree during clearing and construction works.	• The tree should be clearly tagged for protection and its significance be communicated to all project personnel; • Management options outlined in the EMP.	• Registered and unregistered Native Title Claims can be managed to meet EPA's objective.

Environmental Factor	EPA Objective	Applicable Legislation, Criterion or Guidance	Existing Environment	Potential Impacts	Environmental Management Strategies	Predicted Outcomes
		Heritage, Guidance Statement No. 41; • Heritage of Western Australia Act 1990.	m from the road centreline on the east side of the road (Quartermaine 2004).			
Visual amenity	*To ensure that values are considered and measures are adopted to reduce visual impacts on the landscape as low as reasonably practicable.*		• The surrounding land use consists of commercial farming, rural residential, local reserves and nature reserves.	• Loss of vegetation will cause temporary impact.	• Revegetate disturbed areas on completion of project.	• Visual amenity will not be impacted by proposed works.

4. EXISTING ENVIRONMENT

4.1 Climate

The proposed road works extend north from the town of New Norcia and is characterised as warm Mediterranean with winter precipitation of 600 – 1000mm and 5-6 dry months per year (Beard, 1990). The temperature ranges from an average of 33°C in the hottest months on January and February to an average of 17.7°C in the colder month of July (Bureau of Meteorology, 2007).

The Mediterranean climate does not typically have extreme weather events, with annual rainfall generally recorded across a series of rainfall events in the winter period. Summer rain is usually minimal. The section of GNH with the proposed works is not generally subject to inundation.

4.1.1 Bioregions

Western Australia supports 53 biogeographical subregions. The study area (DP07) is located in the Avon Wheatbelt Bioregion of South-West Western Australia which has 16% of pre-European vegetation remaining (Table 3). The Avon Wheatbelt Bioregion is described by the Australian National Resources Atlas (Commonwealth of Australia, 2001) as:

"….consisting of undulating landscape of low relief with a semi-arid dry and warm Mediterranean climate. The bioregion has been all but completely cleared of its native vegetation and is a fragmented landscape. Remnants include a diverse range of vegetation types of Eucalypt woodlands, acacia shrublands, chenopod and samphire shrublands, casuarina forests and woodlands, low closed forests and closed shrublands, other shrublands, heath, mallee woodlands and shrublands and Eucalypt open woodlands. Major land uses are cropping (cereal), grazing of native and modified pastures, nature conservation and use (vacant crown land, other reserved crown land)."

Table 3 Vegetation coverage in comparison to IBRA for Design Package 7

IBRA Region	Total area of Region (ha)	Area of vegetation remaining (ha)	% vegetation remaining
Avon Wheatbelt	9,578,995	1,536,296	16.0%

Source: Native Vegetation in Western Australia, Extent, Type and Status (Shepherd *et. al*. 2002).

4.1.2 Vegetation

The major Vegetation Type that occurs in the project area at a regional scale was identified as Medium woodland York Gum and Wandoo (Shepherd *et al*. 2001) (Table 4).

Table 4: Regional Vegetation Coverage in Design Package 7

Vegetation Type	Description	Extent (ha)	% Remaining Compared to Pre-European Extent
7	Medium woodland York Gum and Wandoo	28,838	12.7%

Vegetation types located within Design Package 7 during the field surveys conducted by Western Botanical (2006) have been grouped under five broad habitat types (as listed in Australian Native Vegetation Assessment, 2001) and are as follows:

1. Eucalyptus woodlands;
2. Casuarina forest and woodland;
3. Mallee woodland and shrubland;
4. Other shrubland; and
5. Chenopod shrub, samphire shrub and forblands.

Currently, there is very little native understorey within the Eucalyptus woodlands and these were dominated by grasses and weeds with the Mallee woodland and shrubland also having some weed invasion. The samphire shrublands had a high level of weed invasion and the area within the road reserve is very degraded (Table 5).

Table 5 Dominant local Vegetation Associations identified within bounds of Design Package 7 road reserve

Habitat Type	Vegetation Type	Description
Eucalyptus Woodlands	7	York Gum and Wandoo medium woodland
	352	York Gum medium woodland
	946	Medium woodland Wandoo
	1046	York Gum and samphire succulent steppe with woodland
	936	Salmon Gum medium woodland
	142	York Gum and Salmon Gum medium woodland
	1040	York gum and Casuarina obesa medium woodland
	1023	Wandoo and Salmon Gum medium woodland
	13	Medium Open woodland Wandoo
Other Forest and Woodland	1036	*Banksia prionotes* low woodland
Other Shrubland	48	Scrub-heath shrubland dominated by Allocasuarina campestris
Chenopod Shrub, Samphire Shrub and Forbland	676	Samphire succulent steppe

The vegetation complexes have been recorded by SLK and GPS coordinates for DP07 along with the condition of the vegetation (Table 6).

Table 6: Vegetation type, condition and Pre European % Remaining for DP07 (Western Botanical, 2006)

SLK	EASTING	NORTHING	SIDE	CONDITION	VEG TYPE	Pre European % Remaining
118.73	426953	6577204	E	excellent	13	53.4
118.75	426946	6577224	W	moderate	7	12.7
118.83	426953	6577301	E	excellent	13	53.4
118.90	426957	6577368	E	good	13	53.4
118.90	426942	6577371	W	fair	676	94.9
118.93	426956	6577401	E	good	13	53.4
119.20	426945	6577674	E	moderate	7	12.7
119.21	426932	6577680	W	moderate	1046	6.1
119.26	426946	6577734	E	moderate	352	16.6
119.26	426937	6577731	W	moderate	1046	6.1
119.34	426936	6577812	W	fair	1046	6.1
119.35	426943	6577817	E	fair	676	94.9
119.42	426932	6577890	W	poor	1046	6.1
119.46	426939	6577936	W	moderate	7	12.7
119.50	426944	6577971	W	fair	7	12.7
119.66	426987	6578124	E	moderate	7	12.7
119.66	426977	6578132	W	fair	1046	6.1
119.73	426991	6578193	W	fair	1046	6.1
119.73	427003	6578198	E	moderate	1046	6.1
119.85	427028	6578316	E	moderate	676	94.9
119.85	427023	6578314	W	fair	950	38.3
119.92	427042	6578379	E	fair	676	94.9
119.97	427045	6578436	W	moderate	352	16.6
120.01	427064	6578473	E	moderate	1046	6.1
120.06	427068	6578517	W	good	13	53.4
120.10	427077	6578555	E	moderate	7	12.7
120.12	427055	6578584	W	good	48	28.5
120.13	427073	6578592	E	moderate	7	12.7
124.10	427393	6582416	W	fair	352	16.6
124.10	427391	6582413	W	fair	352	16.6
124.20	427471	6582468	W	moderate	352	16.6
124.41	427626	6582609	W	good	950	38.3
124.61	427772	6582739	W	moderate	7	12.7
124.88	427986	6582902	W	moderate	352	16.6
125.06	428130	6582995	E	moderate	352	16.6
125.10	428155	6583030	W	moderate	352	16.6
125.11	428161	6583045	W	moderate	352	16.6

SLK	EASTING	NORTHING	SIDE	CONDITION	VEG TYPE	Pre European % Remaining
125.13	428179	6583050	W	moderate	352	16.6
125.13	428189	6583044	E	moderate	352	16.6
125.25	428260	6583138	W	moderate	352	16.6
125.28	428294	6583146	E	moderate	7	12.7
125.38	428355	6583225	E	moderate	7	12.7
125.41	428355	6583263	W	moderate	352	16.6
125.47	428382	6583314	W	moderate	7	12.7
125.56	428430	6583387	W	moderate	7	12.7
125.70	428473	6583516	W	moderate	7	12.7
125.71	428493	6583523	E	moderate	13	53.4
125.78	428494	6583596	W	moderate	13	53.4
125.79	428520	6583597	E	moderate	352	16.6
125.85	428541	6583648	E	poor	352	16.6
125.86	428547	6583662	E	moderate	352	16.6
125.87	428549	6583666	E	moderate	352	16.6
125.90	428560	6583699	E	moderate	7	12.7
126.02	428586	6583813	W	poor	35	10.5
126.12	428631	6583900	W	good	13	53.4
126.15	428643	6583932	E	good	13	53.4
126.15	428633	6583935	W	fair	13	53.4
126.40	428645	6583973	W	fair	7	12.7

4.2 Impact on Flora and Vegetation

4.2.1 Survey Results

Remnant vegetation consisting of vegetation association type 7 (Medium woodland: York Gum and Wandoo) as described by Shepherd *et al* (2002) when compared to its pre-European extent, has approximately 12.7% of this vegetation association remaining in the region. Generally the vegetation condition rating for this section was poor to moderate with little understorey and high levels of weed invasion (Western Botanical 2006). Vegetation type 7 is the main underrepresented vegetation association to be impacted by this project. However, vegetation type 1046 (York Gum and samphire succulent steppe with woodland; 6.1% remaining) will also require clearing as a result of road widening. These impacts are not considered to be at variance given the general poor-moderate condition of that vegetation. Similarly vegetation type 13 (with 53.4% remaining) rated as being in good/excellent condition but was only recorded in a small area between SLK 118.73 to 118.90. Given that there is greater than 50% of pre European extent remaining and the small area to be cleared this is not considered to be at variance.

4.2.2 Declared Rare Flora (DRF) and Priority Species

One species (*Stenanthemum tridentatum*) was recognised as priority (P4) by Western Botanical (2004; 2005) but this species has since been removed from the DEC priority list and is now classified as not threatened.

4.2.3 Threatened Ecological Communities

Searches of DEC's Threatened Ecological Communities (TEC's) database was conducted for the study area. This search identified no TEC's within Design Package 7.

4.2.4 Introduced Flora and Management

No declared weed species, as identified under the *Agriculture and Related Resource Protection Act, 1976,* were recorded in the study area.

Nuisance weeds, generally consisting of introduced grass species, dominated the understorey in DP07. A weed control program will be implemented as an opportunity to improve vegetation and flora condition in the road reserve. In areas with a heavy weed load a targeted herbicide program will be undertaken prior to planting of native species. The existing road payment to be revegetated will provide a weed-free area and as such will be targeted in the first season following the completion of the road. Additionally disturbance to soils and its movement during construction phase will be carefully managed in order to reduce and/or avoid the spread of weeds. Appropriate management strategies will be included in the EMP. These will include the sending of weed-infested topsoil to spoil or, where it suits, buried in areas that require fill.

4.2.5 Vegetation Clearing

Clearing of remnant vegetation will be required for the new road alignment within the study area. The total area to be cleared consists of 6.9 ha of native vegetation generally in poor-to-moderate condition (refer Table 6) plus 16.2 ha of road reserve (grassed or cleared), agricultural land and existing road pavement for a total footprint of 23.1 ha for construction within the package. Furthermore the native vegetation to be cleared generally has poor condition because of limited native understorey and high weed load consisting of introduced grass species.

Vegetation clearing presents the main environmental impact associated with the proposal resulting in the loss of vegetation complexes and of fauna habitat (Carnaby's Black Cockatoo nesting sites).

Clearing has been avoided between SLK 122.9 and 123.7 due to an opportunity to realign the GNH into cleared pasture to the west of the existing alignment. This not only reduces the impact on remnant roadside vegetation (approximately 1.8 ha of roadside vegetation) and Carnaby's Black Cockatoo nesting sites, but also provides an opportunity to rehabilitate the current road carriageway (0.9ha) and extend remnant vegetation by revegetation into the new road reserve (1.1ha).

The main impact on vegetation will be clearing of Vegetation Type 7 (Shepherd *et al* 2002). However, it has been rated as being in poor to moderate condition given and given the lack of intact understorey does not represent significant remnant vegetation. Therefore the proposed work is not considered to be at variance to the clearing principles. Approximately 1 ha of Type 7 vegetation will be cleared as part of this project.

Weeds are prevalent in the road reserve for this package. The presence of weeds reduces the existing value of vegetation complexes. Also, clearing of vegetation by works has the potential to promote weed invasion and spread. Weed species are known to be effective in colonising areas and can rapidly invade natural sites where the soil has been disturbed where there has been clearing. Activities associated with construction such as disturbance, excavation and movement of machinery and personnel can provide ideal conditions for the spread and colonisation of weed species, and this must be managed during works.

4.2.6 Offsets and Mitigation Measures

Environmental offsets aim to ensure that significant and unavoidable adverse environmental impacts are counterbalanced by a positive environmental gain, with an inspirational goal of achieving a 'net environmental benefit' (EPA, 2006a).

Environmental assets are classified as either critical, high value or low to medium value depending on the environmental value associated with each asset. Type 7 Vegetation Association, if in better than "good" condition, may be classified as a 'critical' asset requiring on-site mitigation. However, the vegetation in DP7 is generally rated as "poor-moderate" therefore it is not believed to be a critical asset nor at variance with the clearing principles.

Where possible, on completion of the works, the impacted areas will be rectified via revegetation of disturbed areas according to Main Roads standards based on recommendations made in previous flora and vegetation surveys. This will be achieved as follows:

- The establishment of artificial nesting hollows; and,
- revegetation of approximately 2 ha of new road reserve and rehabilitated old road pavement as a result of the road realignment between SLK 122.9 to 123.7.

These sections will be added to the existing 6 ha of road reserve from SLK 122.9 to 124.0.

Areas to be revegetated, such as agricultural land and the section of the existing road (where realignment is proposed between SLK 122.9 and 123.7) will be revegetated with local native species and Carnaby's Cockatoo feed species. Revegetation of the road reserve will also occur in areas where the existing vegetation is degraded. It is expected that approximately 10 ha of revegetation will occur over the length of the project. A specific revegetation plan will be developed for this project in consultation with DEC (as a requirement of the Purpose Permit), Roadside Conservation Committee and the Conservation Council.

4.2.7 Clearing Permit

The proposed works will be developed under a State-wide vegetation clearing permit ("Purpose Permit") as it is not considered to be in variance to the 10 clearing principles. The Purpose Permit was issued to Main Roads by the DEC on 1 February 2006 under the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004.*

4.2.8 Dieback

Within the study area, the section from SLK 115.00 to 120.00 and 121.80 to 124.07 is currently described as a Dieback Area in the Road Management Prescriptions (SKM, 2006a). Construction in this area will require adherence to the Department of Environment and Conservation's Policy Statement No. 3 *Threat Abatement for Phytophthora cinnamomi* (CALM, 2004). This will ensure that uninfected areas remain Dieback free during and after construction phases. Management recommendations will be included in the Construction EMP and, given these are adhered to, the spread of dieback should be effectively managed according to the EPA objectives.

4.3 Impacts on Fauna

A search a "Faunabase" identified several species of Threatened Fauna (as listed under the Wildlife Protection Act 1950) have historically occurred in the project are:

- *Falco peregrinus* (Peregrine Falcon)
- *Calyptorhynchus latirostris* (Carnaby's Black Cockatoo);
- *Dasyurus geoffroii* (Chuditch or Western Quoll);
- *Macrotis lagotis* (Balgyte or Bilby or Ninu);
- *Ergenia spilotat imbricata* (Carpet Python); and Psudemydura umbrina (Western Swamp Tortoise).

Of the species listed to potentially occur in the project area, Carnaby's Black Cockatoo is thought to be the main species to be directly impacted by the project. The other species identified will not be impacted (SKM May 2005).

4.3.1 Survey Results

As part of the Preliminary Environmental Review R.E Johnstone was commissioned by Biota (refer SKM, 2004) to conduct a desktop review of roadside vegetation and known records of Carnaby's Cockatoo. The aim of this study was to identify the extent of distribution, preferred habitat and know nesting areas. Additionally, a desktop fauna review was conducted by KBR in 2005.

The potential impacts on significant fauna species was assessed during environmental inspections, as well as desktop studies which determined that:

- There would be no significant impact on the Peregrine Falcon as a result of its wide-ranging habits and the retention of tall trees in the area;
- There may be indirect impacts on Carnaby's Cockatoo, as clearing required for the proposed road alignment requires clearing of a small amount of foraging habitat. Previous surveys have identified two confirmed and five potential nesting hollows (i.e. hollows that were suitable size for Carnaby's Cockatoo) which were recorded in the road reserve;
- There would be no significant impacts on the Chuditch, the range of which has contracted such that it has not recently been sighted in the area;
- There would be no significant impacts on the Western Brush Wallaby as this species favours seasonally wet flats with low grasses and open scrubby thickets. The habitat in the study area is unsuitable and this species is therefore unlikely to be present.

4.3.2 Carnaby's Black Cockatoo and Potential Impacts

Carnaby's Black Cockatoo (*Calyptorhynchus latirostris*) is protected at both State (*Wildlife Conservation (Specially Protected Fauna) Notice 2003*) and Federal (*Environment Protection and Biodiversity Conservation Act 1999*) levels.

Previous surveys have identified two confirmed and five potential nesting hollows within the study area, of which one confirmed and two potential hollows will be removed by the proposed works. For each Carnaby's Cockatoo nest site to be removed, at least five artificial nesting boxes will be established as nearby as practicable in suitably cryptic locations. A minimum of 5 artifical boxes will be installed in this section.

Sufficient mitigation of any impacts will be provided through the establishment of artificial nesting hollows through consultation with Carnaby's Black Cockatoo expert Ron Johnstone and selection of appropriate feed species in the associated revegetation programs (to increase the viability of bird breeding attempts in the area).

4.4 Reserves and Conservation Areas

The EPA's objective for reserves and conservation areas is "*To protect the environmental values of areas identified as having significant environmental attributes*" (EPA, 2004).

There are no reserves or conservation areas adjacent to Design Package 7.

4.5 Surface hydrology and Wetlands

The EPA's objective for wetlands is "*To maintain the integrity, ecological functions and environmental values of wetlands"* (EPA, 2004).

Interrogation of the DEC's *Geomorphic Wetlands of the Swan Coastal Plain* dataset and including previous surveys did not identify any recognised wetlands in the proposed works area.

4.6 Creeks/Watercourses

The EPA's objective for watercourses is "*To improve the integrity, ecological functions and environmental values of watercourses"* (EPA, 2004).

Capapora Brook does cross beneath the current alignment but will not be impacted by the proposed works as only minor upgrades of Capapora Bridge deck are planned. All proposed works are to the surface of the bridge and no works will be carried out within the confines of the bed or banks of the brook itself.

Additionally any contamination from runoff, spills, servicing and refuelling of equipment used during the construction phase may result in pollution of the watercourse. Appropriate management actions will be included in Environmental Management Plans.

4.7 Groundwater

The EPA's objective for water (surface or ground) is "*To maintain the quantity of water so that existing and potential environmental values, including ecosystem maintenance, are protected".* And for water quality (surface marine or ground) is "*To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards"* (EPA, 2004).

Groundwater within the study area is unlikely to be impacted by the proposed works as there is no abstraction of groundwater or dewatering within the scope of the project.

4.8 Public Water Source Area

The EPA's objective for water (surface or ground) is "T*o maintain the quantity of water so that existing and potential environmental values, including ecosystem maintenance, are protected"* and for water quality (surface, ground or marine) is "*To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards"* (EPA, 2004).

There will be no impact on ground or surface water.

4.9 Acid Sulfate Soils

The EPA's objective for Acid Sulfate Soils is *"To plan and manage development that may potentially impact on ASS/Potential ASS to avoid diverse effects on the natural and built environment and human activities and health"* (EPA, 2004).

The project will not impact any Acid Sulfate Soils.

If during the preliminary assessment ASS are found, then management actions will be undertaken as described by DEC in their "*Treatment and management of disturbed acid sulphate soils".*

4.10 Salinity

The EPA's objective for water (surface or ground) is *"To maintain quantity of water so that existing and potential environmental values, including ecosystem maintenance, are protected"* and for water quality is "*To ensure that emissions do not adversely affect the environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards"* (EPA, 2004).

The study area is located within the Avon Wheat-belt catchment that has areas of land subject to rising watertables resulting in saline areas. A small area of salinity occurs between SLK119 to120 (SKM Summary of Environmental Surveys May 2005) but as the proposed upgrade in this section is overlay and widen no significant impacts are anticipated. Suitable salt tolerant species will be included in revegetation in this section of the works package.

It is unlikely that proposed works will impact the salinity of the land and waters in surrounding areas, therefore no management commitments are required.

4.11 Aboriginal Heritage

4.11.1 Indigenous Heritage and Native Title Claims

The EPA's objective for heritage is "*To ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation"* (EPA, 2004).

Ethnographic and archaeological surveys as well as various searches of Commonwealth, State and Local Government Heritage databases identified that Design Package 7 contains a scarred tree within 12 m of the centreline of the existing road. There are no anticipated impacts on the scarred tree and management commitments, such as a "no go" zone, will minimise accidental damage to the tree during works. Suitable management options will be included in the EMP and site staff made aware of the possible impact to the tree during site inductions. Environmental and construction management staff will be on site during the clearing of the vegetation within the vicinity of the tree to ensure its longevity.

4.12 European Heritage

The EPA's objective for Heritage is *"To ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation"* (EPA, 2004).

Heritage places are defined by the heritage values that people recognise in them (EPA, 2007). They are important as they provide a shared history for many communities around the state and are therefore protected by the *Heritage of Western Australia Act 1990*.

A search of the Australian Heritage Council and the Heritage Council of Western Australia databases did not identify the presence of any Non-Indigenous Heritage Site within the immediate vicinity of the study area.

As there are no European Heritage sites within the study area no management recommendations are required.

4.13 Noise, Vibration, Dust and Air Emissions

The EPA's objective for noise is "*To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring the noise level meet statutory requirements and acceptable standards*". The EPA objective for air quality is "*To ensure emissions do not adversely affect environment values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards"* (EPA, 2004).

4.13.1 Noise and Vibration

There are no major sensitive local receivers. Construction isn't expected to significantly contribute to noise levels in the area provided works are limited to normal working hours. Traffic management will be exercised according to usual practices for rural roads.

Fauna in close proximity to the study area may be affected by noise. However, it is likely that due to habitats being in close proximity to GNH, fauna has become accustomed to noise in the area and can therefore differentiate between background noise, which includes GNH and predator noises. Long term noise impacts are not anticipated as a result of proposed works and therefore impacts on fauna as a result of noise is not expected. In any case actions should be taken to minimise noise wherever possible.

It is expected that noise and vibration will be managed in accordance with EPA's objectives.

4.13.2 Dust and Air Emissions

The sources of dust present in the atmosphere are numerous and range from point sources such as industrial activities, to rural activities or natural sources.

The proposed works within the study area have the potential to locally reduce air quality during the construction phase from increased dust levels and exhaust from machinery. However, these impacts will be localised and of short duration and can therefore be ameliorated with appropriate controls. The impact of air emissions from traffic within the study area following construction is predicted to be minimal.

Dust and air emissions are expected to be managed within the EPA's objectives.

4.14 Visual Amenity

The EPA's objective for visual amenity is *"To ensure that aesthetic values are considered and measures are adopted to reduce visual impacts on the on the landscape as low as reasonably practicable".*

The proposed works involve re-alignments and widening of the road within the study area.

The proposed works will require removal of some remnant vegetation which will impact on visual amenity within the study area. However, long term effects will be minimal and in accordance with EPA's objective for visual amenity. Vegetation losses in the project will be offset with revegetation where practicable and therefore the overall impact on visual amenity of the project upon completion will be minimal.

4.15 Public Safety and Risk

The proposed works will improve the level of safety for all road users. The proposed sealed shoulders and passing lanes will allow for safer overtaking. Improved vertical and horizontal geometry and sight distances will allow for a safer journey, particularly in wet conditions and at night time. The increased passing opportunities will result in a reduction in the conflict between vehicle types such as trucks and cars, and a reduction in the fatigue and frustration of drivers (MRWA, 2007). However, a risk to the public may occur during construction activities from vehicle movement and machinery, dust generation and traffic disruption. Main Roads standards for signage and traffic movement should be used during the construction phase to reduce significant hazards to the public and increase public safety during all aspects of the project.

4.16 Contaminated Sites

Land contamination is defined as land that has pollutant (or pollutants) at above background concentrations causing, or with the potential to cause, adverse impacts to human health, the environment or any environmental value. The toxicity and persistence of pollutants in soils, as well as their direct uptake by people, plants and animals, is the major concern with land contamination (EPA, 2007).

No contaminated sites are known to have been reported to occur within the road reserve study area.

4.17 Social Impact

During the construction phase there will be some expected delays as a result of proposed works. This includes slowing down or sometimes stopping traffic to allow the works to be undertaken. Main Roads traffic management control techniques will minimise this impact.

No significant adverse social impacts are expected to occur as a result of this project.

Liaison with private land owners and Council will be exercised by Alliance personnel. The Alliance's Community & Land Manager will lead contact with community stakeholders and report their interests and requests into Alliance design and construction processes.

5. CLEARING OF NATIVE VEGETATION

5.1 Assessment against Clearing Principles

DEC issued Main Roads WA with a state-wide vegetation clearing permit ("Purpose Permit" CPS 818/3) - granted under section 51E of the *Environmental Protection Act 1986* - on the 1 February 2006. The purpose permit allows Main Roads to clear native vegetation for project activities. Any clearing of native vegetation must be assessed against the ten clearing principles outlined in the permit.

This project has been assessed against the ten clearing principles and results are provided in Appendix A.

The project has been assessed as not being at variance to these clearing principles.

5.2 Environmentally Sensitive Area (ESA)

No clearing will be undertaken within a Environmentally Sensitive Area.

6. STAKEHOLDER CONSULTATION

- DEC Threatened Species and Community Branch re listing of priority flora;
- Roadside Conservation Committee members (site visit Muchea-Walebing 19 January 2008) in relation to planned upgrade works location and timeframes for Access Alliance program.

7. REQUIREMENT FOR REFERRAL

7.1 Commonwealth Referral

A review of the Department of Environment and Water Resources online database was conducted as part of preparing this EIA. There are no environmental impacts or issues considered as having a significant impact on matters of national environmental significance, which would render the project as a "Controlled Action" or invoke the Commonwealth *EPBC Act 1999.*

Formal referral of this project to the Commonwealth Minister for the Environment is not considered to be warranted.

7.2 Western Australian Government

7.2.1 Environmental Protection Authority

The Main Roads Purpose Permit (CPS 818/3) which has been granted to Main Roads under section 51E of the *Environmental Protection Act 1986*, allows the clearance of native vegetation for this project activity. However, this permit does not authorise the clearance of native vegetation for project activities where:

- The clearing may be seriously at variance with the clearing principle; or
- Those project activities are incorporated in any proposal that is referred to and assessed under Part IV of the EP Act by the EPA.

An assessment of proposed works was completed and the project was found not to be at variance with these principles. It is anticipated that this project will not require formal referral to the Environmental Protection Authority under the *WA Environmental Protection Act 1986.*

7.2.2 Department of Environment and Conservation

The proposed works have been assessed to not be at variance with the ten clearing principles. However, a number of management measures have been outlined to minimise any potential environmental impacts from this proposal.

The Main Roads Purpose Permit (CPS 818/3) will be used for clearing activates associated with this project. It is noted that the maximum annual clearing limit for the Wheatbelt North region is 100 hectares.

7.2.3 Other agency approvals required

A scarred tree was located in the road reserve. However, it is not anticipated that this will be impacted by the proposed works. Suitable management options will be outlined in the EMP and will include specific training to project staff, will be implemented to minimise this risk. Therefore as a result there is no need to obtain an approval under section 18 Aboriginal Heritage Act.

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APPENDIX A

Main Roads Vegetation Clearing Assessment Report

Assessment of Clearing Impacts" under Clearing Permit CPS 818/3

Main Roads Vegetation Clearing Assessment Report

This report has been prepared to assist Main Roads in addressing condition 7 "Assessment of Clearing Impacts" under Clearing Permit CPS 818/3.

For guidance on how to complete the form, refer to DEC completed reports (active permits) at http://203.20.251.100/cps_reports/.

AREA UNDER ASSESSMENT DETAILS

Proponent details

Proponent's name:	**Access Alliance**
Contacts:	Name: Troy Collie Phone: 62187003 Fax: 62187099 Email: troy.collie@accessalliance.com.au

Property details

Property:	Great Northern Highway SLK 117.36 to 126.4
Colloquial name:	

Area under assessment

Clearing Area (ha)	No. Trees	Method of Clearing	For the purpose of:	Site Plan Attached
6.9 ha	n/a	Machine	Road Improvements and realignment	☐ No

Avoidance/Minimise clearing

How have the clearing impacts been minimised?
Works have been reduced in size and designed to avoid large trees where possible. The section from SLK 122.9 and 123.7, the southern approach to Capapora Brook crossing, has been realigned into cleared farmland increasing the current road reserve by 1.1 ha with the old alignment (0.9ha) to be rehabilitated. There will be approximately 10 ha of road reserve to be revegetated in this project. Because of tree removal, impacts to Carnaby's Black Cockatoo nesting hollows to be mitigated by 5 artificial nesting hollows established for every active hollow to be taken. Significant revegetation with local native species and weed control to be undertaken to mitigate the impacts of cleared vegetation.

BACKGROUND

Existing environment and information

Description of the native vegetation under application

(suggestion: To determine Vegetation Condition use - Keighery, B.J. (1994) Bushland Plant Survey: A Guide to Plant Community Survey for the Community. Wildflower Society of WA (Inc). Nedlands, Western Australia.)

Site Visit Undertaken	✔ Yes	☐ No	**Fauna / Flora Survey Undertaken**	✔ Yes	☐ No
Site Report Attached	☐ Yes	✔ No	**Fauna / Flora Survey Report Attached**	☐ Yes	✔ No
Site Photos Attached	✔ Yes	☐ No	**Other Relevant References Attached**	☐ Yes	✔ No

Vegetation Complex	Clearing Description	Vegetation Condition	Comment
7	Machine clearing for road improvements	Poor to moderate	No understorey present

ASSESSMENT OF APPLICATION AGAINST CLEARING PRINCIPLES

7.2.3.1 (a) Native vegetation should not be cleared if it comprises a high level of biological diversity.

Comments **Proposal is not at variance to this Principle**

Methodology The study area contains vegetation which is in generally poor-fair condition. Previous flora and vegetation surveys within the study area have identified that remaining vegetation as having limited native understorey with a high level of weed invasion. The extent of clearing from these complexes is less than 0.5ha which is considered not significant with a total of 6.9 ha of native vegetation being cleared. Therefore this proposal is not at variance with this principle.

(b) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna indigenous to Western Australia.

Comments **Proposal is not at variance to this Principle**

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Methodology The proposed works will require the removal of a confirmed Carnaby's Nesting Hollow and two potential hollows. Artifical nesting hollows will be established as a ratio of 5:1 to offset this impact.

The area is considered to be of moderate value in terms of general fauna habitat due to the medium to dense tree stands within the road reserve. Any long term impact to vegetation will be mittigated through the realignment of DP07 into the cleared paddock and the revegetion of the current road alignment thus creating a larger continuous area of native vegetation. The works are therefore not at variance to this principle.

7.2.3.2 (c) Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, rare flora.

Comments **Proposal is not at variance to this Principle**

Methodology Previous flora survey found no rare flora within study area. One species (*Stenanthemum tridentatum*) was recognised as priority (P4) by Western Botanical (2004; 2005) but has since been removed from the DEC priority list and is now classified as not threatened. Therefore the propsed works is not at variance.

7.2.3.3 (d) Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a threatened ecological community.

Comments **Proposal is not at variance to this Principle**

Methodology Previous flora and vegetation surveys and desktop studies found no TEC's in the study area. Therefore the proposed work is not at variance.

7.2.3.4 (e) Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.

Comments **Proposal is not at variance to this Principle**

Methodology According to Shepherd et al. (2002) the project area, at a regional scale, contains vegetation association 7 (Medium woodland: York Gum and Wandoo) which has 12.7% pre European extent remaining. The condition of the vegetation within the study area was considered to range from poor (mostly) to moderate. Due to the degraded nature of the vegetation and small amount of clearing, the proposal is determined to be not at variance. Vegetation type 7 is the main underrepresented vegetation association to be impacted by this project. However, at a local scale vegetation type 1046 (York Gum and samphire succulent steppe with woodland) will also require minimal clearing as a result of road widening activities. These impacts are not considered to be at variance given the general poor condition of the vegetation. Similarly Vegetation type 13 (with 53.4% remaining) rated as being in good/excellent condition was recorded between SLK 118.73 to 118.90 (East side of road). Given that there is greater than 50% of pre European extent remaining and the small area to be cleared this is not considered to be at variance.

7.2.3.5 (f) Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.

Comments **Proposal is not at variance to this Principle**

Methodology There are no significant rivers, creeks, wetlands or estuaries to be impacted within the proposed study area. However, a small creek runs parallel to the GNH between SLK 118.60 to 120.10. The creek lies between 100 to 250 m east of the road. Minor works to the bridge at Capapora Brook will not impact vegetation within the watercourse.

Therefore the proposal is determined to be not at variance.

7.2.3.6 (g) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.

Comments **Proposal is not at variance to this Principle**

Methodology The amount of vegetation required to be cleared is minimal and this clearing will not expected to cause 'appreciable land degradation'. Appropiate management plans and revegetation will be required to mitigate potential impacts. Clearing is unlikely to be at variance with this principle.

7.2.3.7 (h) Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.

Comments **Proposal is not at variance to this Principle**

Methodology No clearing will impact on environmental values of any adjacent conservation areas. Clearing is therefore unlikely to be at variance with this principle.

7.2.3.8 (i) Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.

Comments **Proposal is not at variance to this Principle**

Methodology The potential clearing of remnant native vegetation is not likely to cause deterioration in the quality of surface or underground waters. Proposed works will therefore not impact any surface water areas and as there is no dewatering, underground water won't be affected.

Clearing is unlilelky to be at variance with this principle.

7.2.3.9 (j) Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.

Comments **Proposal is not at variance to this Principle**

Methodology The amount of clearing of native remnant vegetation required for this project is low and is not considered to be likely to cause, exarcebate the incidence or intensity of flooding events.

Clearing is not at variance with this principle.

7.2.3.10 Planning instrument, Native Title, RIWI Act Licence, EP Act Licence, Works Approval, Previous EPA decision or other matter.

Comments

Methodology

SUBMISSIONS

If required have submissions been requested and addressed

Submission Requested from	Request Sent (Date)	Submission Received (Date)	I F C M

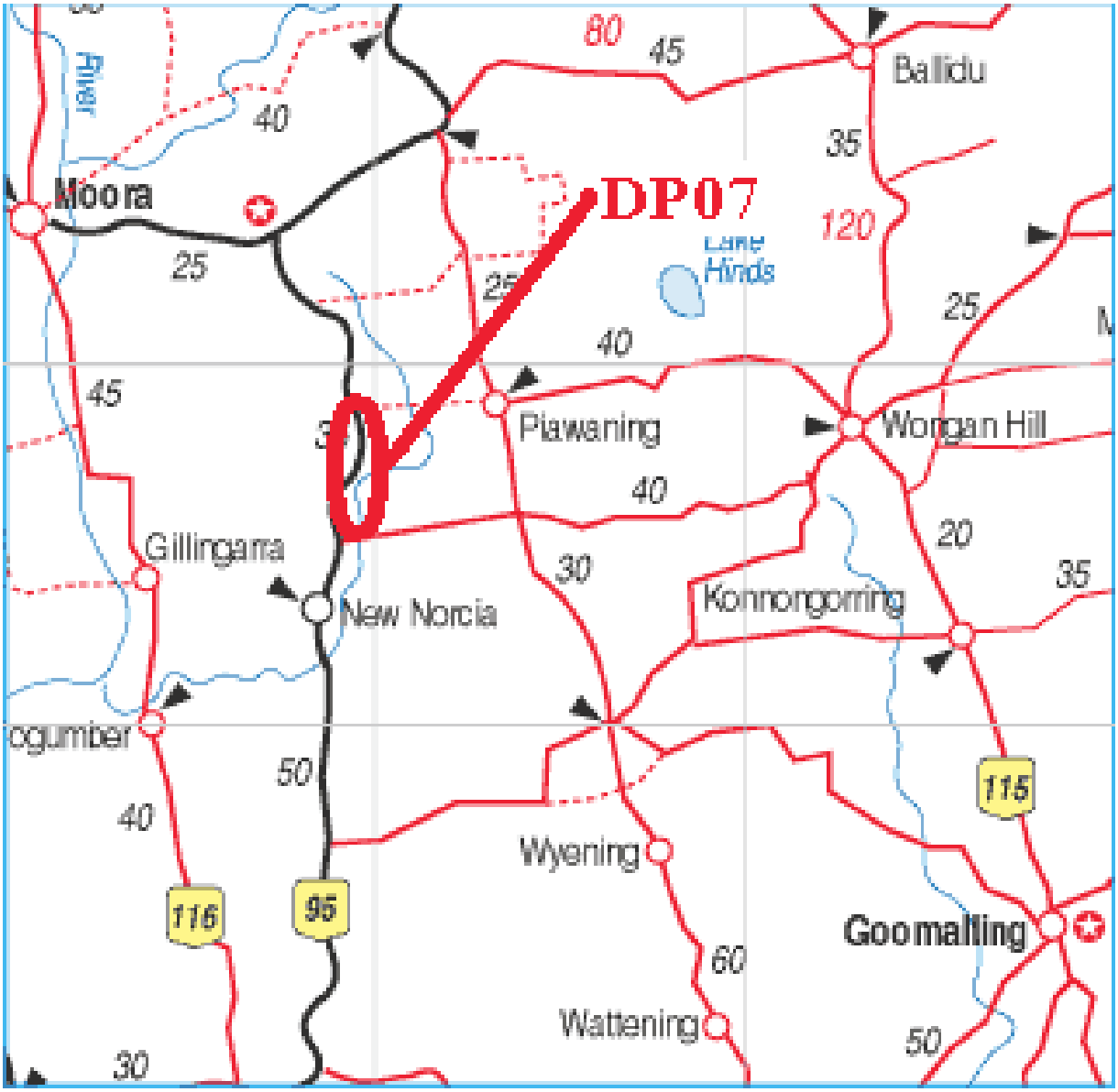
ASSESSOR'S RECOMMENDATIONS

List of Principles seriously at variance, at variance or maybe at variance

Recommendation **Revegetation Management Plan / and Construction Environmental Management Plan under CPS 818/2**

References

Location map of Design Package 7



Site Photographs of Design Package 7

GNH – 124.2 SLK East side of road

GNH – 123.1 SLK East side of road

GNH – 122.1 SLK Facing south showing degraded understorey.

GNH – 120.1 SLK looking south.

GNH – 119.8 SLK looking south. Area affected by salinity.

GNH – 118.79 SLK. Aboriginal scarred tree adjacent to proposed