# Environmental Assessment of Roadworks

# Guidelines for Local Authorities

Department of Conservation and Environment
Perth Western Australia

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# ENVIRONMENTAL ASSESSMENT OF ROADWORKS

## GUIDELINES FOR LOCAL AUTHORITIES

Prepared by Department of Conservation and Environment, Western Australia in conjunction with Main Roads Department, Western Australia.

Department of Conservation and Environment, Western Australia.

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## 1. INTRODUCTION

Environment refers to the physical, biological and social surroundings of all living species including interactions between all of these.

When designing or building a project the effect on the environment should be assessed at the same time as technical and financial aspects.

The objectives of these guidelines are to:-

- Create an awareness of the effects that road projects may have on the environment.
- Enable Local Authority (LA) officers to assess the effects of individual projects.
- Enable the negative effects to be minimised and the positive effects to be maximised.

Road reserves in this State contain a valuable store of plants and wildlife. This particularly applies to the less developed roads under the control of rural LAs. It is, therefore, important for the effect on the enviroment to be assessed for smaller roadworks, as well as for major projects.

## 2. ENVIRONMENTAL ASSESSMENT

### 2.1 Need for Assessment

In addition to the genuine desire of most Councils to show care for the environment, there are certain legal and administrative requirements.

The Environmental Protection Act 1971-80 Section 55 indicates that, where it comes to the notice of a Minister (such as Minister for Local Government or Transport) that a proposed development may have a detrimental effect, that Minister shall advise the Minister for Environment and provide information to enable the Environmental Protection Authority (EPA) to report. Under Section 56 the LA itself, or any other person or body, can refer any proposal which might have environmental implications to the EPA. In practice the Department of Conservation and Environment (DCE) is an agent for EPA and organisations can contact DCE officers and may get resolution within guidelines already established by EPA.

Legislation covering road funding also makes reference to the need to check the effect of projects on the environment. Prior to the release of funds for specific LA projects the Main Roads Department (MRD) will expect an environmental assessment to be provided in accordance with these Guidelines. Such assessments are already carried out by the MRD for their projects.

## 2.2 Environmental Effects of Roads

Environmental effects may be caused by:

- Road related effects - from road locations, designs, construction and maintenance, ie. from the physical presence and management of the road and exploitation of road building materials.

- Traffic related effects - from the road traffic including noise, air pollution, vibrations and safety.

- Procedural and administrative effects - from planning, compensation, relocation and road inspired development.

## 2.3 Projects of Concern

The types of projects, involving either construction or maintenance, that are of particular concern are those having any of the following characteristics:

- likely to be environmentally controversial
- adjacent to or could interfere with either wetlands, lakes, rivers, estuaries, areas of sheet flow, or areas prone to flooding
- within 1 km of the coast
- change peoples' enjoyment of an area
- adjacent to, or could interfere with areas of conservation value, including national parks, state forest or nature reserves
- could interfere with historical, archaeological, anthropological, scenic, scientific or educational sites
- could affect habitats of species known to be endangered or threatened
- could affect thin strips of vegetation or vegetation clumps that are locally important for animals and birds
- could introduce deseases, for example dieback.

Measures to minimise the negative effects of roads in such areas are given in Appendix 1.

## 2.4 Assessment Categories

The assessment of the whole project, including borrow and gravel pits, is really a judgement based on a knowledge of the individual effects of the project and whether workable solutions are possible. This judgement can be assisted by the assessing officer completing an environmental assessment form (see pages 3 and 4 ). The project should be judged to fall into one of the following four categories:-

(A) For straightforward works, such as sealing or resealing, the assessment may be simply that the work is environmentally insignificant. This is known as an A assessment.

(B) Projects with small environmental effects, or where simple solutions can be provided, should be given a B assessment. An example could be a road reconstruction with improvements to profile and/or alignment.

# LOCAL AUTHORITY
# ENVIRONMENTAL ASSESSMENT

M.R.D. 1250

SHIRE/TOWN/CITY OF: _____ M.R.D. DIVISION: _____ YEAR: _____

ROAD: _____ M.R.D. PROG. No.: _____

SECTION: _____ WORK: _____

Project assessed as category

| | | |
|---|---|---|
| | A | No further action required |
| | B | Statement attached |
| | C | Report attached/being prepared |
| | D | Notice of intent |

Has this project been discussed with:-

DCE Officer Yes/No

MRD Officer Yes/No

If yes give name

Assessing Officer: _____ Shire/Town Clerk or Engineer _____ Date: _____

## ROAD WIDENING

For projects involving clearing of vegetation fill in the table below. Only approximate, or typical, dimensions are required. Note that vegetation within the road reserve may be very important for wildlife, and that strips of vegetation need to be reasonably wide to survive in the long term. Consider widening only on one side and/or aquiring 10m to 20m of land to allow a wider vegetation strip.

| SLK | | WIDTH AND TYPE OF VEGETATION | | | | REMARKS |
|---|---|---|---|---|---|---|
| | | BEFORE | | AFTER | | |
| FROM | TO | LHS | RHS | LHS | RHS | |
| | | | | | | |
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# ENVIRONMENTAL CHECKLIST

For projects likely to have any environmental significance complete this checklist before making the environmental assessment (in Effect column show beneficial effects + and negative effects-). Consider sources of road making materials as well as the effect of the road itself. Consider the on-going effects of traffic and maintenance as well as the initial effect of the road.

| Part of the Environment affected by Project | | | Effect | | | Specialist advice has been obtained from: | Remarks | Reminders |
|---|---|---|---|---|---|---|---|---|
| | | | Nil | Minor | Major | | | |
| Natural | Water/Earth | Drainage: Surface | | | | | | Pollution, backwater, deprivation |
| | | Drainage: Underground | | | | | | Pollution, watertable |
| | | Drinking | | | | | | Catchment, bores, contamination |
| | | Irrigation | | | | | | " " " |
| | | Wetlands | | | | | | Avoid if possible |
| | | Erosion/Sedimentation | | | | | | Concentration of flow, soil type, veg. cover, wind |
| | | | | | | | | |
| | | | | | | | | |
| | Atmosphere | Dust | | | | | | Construction, unsealed road, wind |
| | | Fumes | | | | | | Traffic, wind |
| | | | | | | | | |
| | | | | | | | | |
| | Plants | Native | | | | | | Habitat, visual effects |
| | | Crops/Plantations | | | | | | Ecology, dust, visual effects |
| | | Rare Flora | | | | | | To be avoided |
| | | Weeds | | | | | | Take-over of native plants, herbicides |
| | | Dieback | | | | | | Quarantine, hygiene |
| | | Significant stands | | | | | | Aesthetics, wildlife |
| | Animals | Native | | | | | | Habitat, accidents, migration |
| | | Rare/Endangered | | | | | | e.g. Short necked tortoise, noisy scrub bird |
| | | Wildlife survival | | | | | | Habitat disruption, thin strips |
| | | | | | | | | |
| Social | Land Use | Forests | | | | | | Plantations, timber resources, severance |
| | | Reserves: Recreation | | | | | | Playing fields, swimming, hiking, fishing |
| | | Flora & Fauna | | | | | | Disturbance to veg. & fauna, access |
| | | Aboriginal | | | | | | Entry with approval only |
| | | National Park | | | | | | Noise, dust access, pollution, social effects |
| | | Special Environmental Area | | | | | | Register of Sp. Envir. Areas |
| | | Coastal | | | | | | Site road inland, control access |
| | | Severance | | | | | | Dividing land use |
| | | | | | | | | |
| | | | | | | | | |
| | Cultural | Scenic Areas | | | | | | Toilets, litter, visual intrusion |
| | | Historic Sites | | | | | | Monuments, buildings |
| | | Aboriginal Sites | | | | | | Surveys, W.A. Museum |
| | | | | | | | | |
| | Traffic | Access | | | | | | Alterations to travel pattern |
| | | Planning Schemes | | | | | | M.R.P.A., L.A. |
| | | Business | | | | | | Parking, bypass |
| | | Traffic Pattern | | | | | | Volumes, speeds, types of vehicles |
| | | Services | | | | | | Bus routes, deliveries |
| | | Safety | | | | | | Intersections, traffic lights, medians |
| | | Off road vehicles | | | | | | Restrict or prevent |
| | Property | Institutions | | | | | | Children, pedestrians, cyclists |
| | | Damage | | | | | | Register of Sp. Envir. Areas |
| | | Residences | | | | | | Community effect |
| | Personal | Job Creation | | | | | | Workforce |
| | | Comfort | | | | | | Noise, fumes, sunglare |
| | | Local Area | | | | | | Children, pedestrians, cyclists |
| | | | | | | | | |

(C) Projects with potentially medium to large environmental effects, especially where solutions are not identified or where specialist knowledge is required, should be given a C assessment. An example would be a road relocation through an environmentally sensitive area.

(D) Projects having a major environmental effect should be given a D assessment. These require more formal documentation such as a Notice of Intent (No I) or, rarely, an Environmental Review and Management Programme (ERMP) which would be referred to EPA. An example would be a significant route through a fragile coastal area. It is not expected that many LA projects would be in category D.

For category A works it is usually only necessary for the officer to advise that the work is considered to be in this category. The checklist may be used to decide this if the officer so desires.

For category B projects the environmental assessment form, plus a statement a few paragraphs long explaining the main effects of the work and how they are to be minimised, is needed. A typical statement is given in Appendix 3.

For category C projects a report several pages long, together with simple diagrams, is required. In some cases the report may also be needed to show that a project which has potentially large negative effects can be designed to avoid those effects. Such a report may form the NoI for the project should it be decided more formal documentation is required. A typical report may be obtained from the MRD. Other forms of report may be prepared after general discussion with MRD or DCE officers.

For category D projects, detailed liaison with DCE officers will be necessary to ensure that the nature of the documentation suits the individual project.

The most important part of any assessment is to recognise potentially large environmental effects so that action may be taken. The action should be aimed at minimising the negative effects and maximising the postive effects.

To assist in the assessment, Appendix 2 provides examples of some topics of environmental interest.

2.5 Submission of Assessment

Environmental assessment is essentially a self appraisal process. However, where significant effects are expected, then DCE is also interested.

In the case of projects funded through MRD programmes the MRD will advise on procedures for submitting assessments. In the case of self-funded projects, categories A & B assessments need no further action, categories C & D assessments should be sent direct to DCE.

## 2.6 Information Sources

Information on the environmental assessment of roadworks can be gained from the following sources:

- Department of Conservation and Environment, 1980: Wetlands: Guidelines for Protection and Management. DCE Bulletin No 79.
- Department of Conservation and Environment, 1985: Wetlands Associated with Road Proposals. Perth Metropolitan Area. (Not yet published.)
- M G Lay, 1981: Source Book for Australian Roads. Australian Road Research Board.
- Main Roads Department, 1978: Guidelines for the Planning, Operation and Rehabilitation of Borrow Pits.
- Main Roads Department, 1982: Conservation and Regeneration Techniques.
- Government Departments or Agencies such as:

| | |
|---|---|
| Aboriginal Sites, WA Museum | Agriculture |
| Conservation and Environment | Fisheries and Wildlife |
| Forests | WA Herbarium |
| Lands and Surveys | Main Roads |
| Metropolitan Water Authority | Mines |
| WA Museum | National Parks Authority |
| Public Works | Tourism Commission |
| Waterways Commission | |

# 3. CONCLUSIONS

It is the desire of both the Department of Conservation and Environment and the Main Roads Department that environmental effects are considered for all road projects. The guidelines presented in this Bulletin should assist local authorities in the assessment of the scale of these effects. The environmental assessment form is sufficient documentation for many roadworks. However, this form also indicates those projects on which further information is required.

DCE and MRD officers are available to provide advice where there is doubt in assessing either the degree of environmental impact or engineering options to mitigate environmental effects.

APPENDIX 1

MINIMISING THE EFFECT OF ROADS IN ENVIRONMENTALLY SENSITIVE AREAS

| Area Through Which Road Passes | Typical Adverse Effect | Some Measures to Minimise Effect |
|---|---|---|
| WATER CATCHMENT | Contamination of water by sedimentation, bitumen oils, dust from road; concentration of human activity, vandalism, litter. | Consider sediment traps especially during construction. Protect drainage outlets against scour. Close supervision of bituminous prime and sealing work. Revegetate cleared areas. Provide tourist amenities, restrict access. |
| SEMI-ARID AND ARID | Disruption of natural drainage patterns with consequent effect on flora and fauna. Erosion in sandy soils due to concentration of flows. Destruction of flora during construction. | Minimise disruption to natural drainage pattern especially through use of floodways, minimising table drains on the downhill side, and frequent culverts. Re-establish vegetation in construction areas. |
| CROPLAND | Damage to crops by dust from road. | Provide dustless surface such as bitumen seal. |
| WETLAND | Disruption of a rich source of wildlife including natural migratory patterns. Increases sediment loads in drains and streams with consequent decrease in light penetration and killing of aquatic life. Disruption to free water flow (permanent or temporary) leading to de-oxygenisation and the consequent killing of flora and aquatic life. | Many wetlands in WA have already been lost. It is important to retain the remaining wetlands if at all possible, therefore the prime aim is to site the road to avoid the wetlands and associated vegetation. Otherwise provide sediment traps on roadside drains; minimise disruption to natural drainage patterns especially the "streamlining" of creeks; construct culverts prior to completion of road embankment. |
| COASTAL | Concentration of human activity at terminus of road. Stability of sand dunes endangered by loss of vegetation during construction and by changes in natural drainage patterns. Destruction of flora by vandalism, minibikes and beach buggies. | Site road inland rather than along foreshore, with discreet access points to foreshore. Provide adequate road user amenities at terminii. Stablise table drains and earthworks with vegetation. |
| FOREST OR CONSERVATION RESERVE | Destruction of natural vegetation. Barrier to animal movement. Disruption of fauna habitat. Introduction of weeds. concentration of human activity, vandalism, litter. Spreading of dieback and other diseases. | Locate route through cleared area if possible. Minimise clearing for temporary uses such as haul road or borrow pits. Revegetate earthworks and borrow areas, or at a minimum, scarify the surface of such areas. Localise impact of tourist activity by adequate road user facilities at a limited number of sites. Restrict parking or 'pull off' areas along the route. Liaison with Forests Department on quarantine areas and fire fighting access. |
| HISTORIC OR MEMORIAL SITE, SCENIC VIEW | Concentration of cars and people, litter and vandalism. | Limit access to the environmental capacity of the site. Provide adequate road user amenities, including litter facilities. |
| URBAN | Neighbourhood severance, especially from schools, community and recreation areas; air and noise pollution; visual intrusion. | Careful planning of route location, access points and over/under passes. Provision of acoustic mounds. Tree planting well in advance of construction. |
| ISLANDS OF VEGETATION | Reduce the overall size so that plants/animals cannot continue to survive. | Select route to avoid, or to reduce effect, so that a viable size of "island" remains. |
| CORRIDORS OF VEGETATION | Cuts link between islands of vegetation. | Retain vegetation strip on one side of road. Provide extra land for regeneration of vegetation. |

APPENDIX 2

## SOME TOPICS OF ENVIRONMENTAL INTEREST

**Drainage:**

Flooding of areas upstream of new structures. Possible deprivation of areas downstream of new road formations, especially in sheet flow country. Increase in velocity through floodway, bridge or culvert may cause localised scouring, plus sedimentation downstream. Avoid straightening creeks if possible. Consider cut and fill effects on drainage.

**Wetlands:**

Drainage/flooding/silting of wetlands due to changing the natural drainage pattern, or removal of vegetation. See Wetlands: Guidelines for Protection & Management, DCE, Perth, 1980.

**Dust:**

Usually only during construction. It may be possible for the alignment of a gravel or dirt road to allow the prevailing wind to blow dust away from houses.

**Native Plants:**

Affected mainly by clearing and verge maintenance. Can be affected by the introduction of more dominant species, by seeding verges or herbicides. Remember that surveying and setting out should avoid unnecessary extra clearing. Avoid introduction of weeds. Burning-off should be avoided. Co-operate with wildflower tour operators to avoid wildflower removal during tourist season. Minimise off-road disturbance during roadworks.

**Rare Flora**

Cannot be disturbed without Ministerial approval. Borrow areas should be checked.

A system of marking rare flora, and other special environmental areas, is being implemented by the MRD and is available for use by LAs. It consists of a field marker showing only the SLK (straight line kilometre), and a register to be held in the office containing further details. For further information contact the Urban Planning Section of the MRD, Perth.

**Weeds:**

Weeds frequently dominate native plants, especially if the native plants are reduced by clearing and verge maintenance. Avoid the transport of weeds into new areas during earthworks operations. Local Agricultural Dept. officers can usually supply information, individual earthworks areas may need to be considered. The Forests Department has methods for cleaning down equipment. Carefully consider the need for herbicide use and avoid burning off. Consider

mowing rather than using graders for road verge and shoulder vegetation clearing in order to stabilise the verge area and reduce the need to import additional gravel.

**Dieback:**

The spread of dieback is of particular concern. Forests Department approval must be obtained before entering a State Forest. Hygiene procedures must be carried out before entering any uninfected area or when leaving any infected area. Check with local people (e.g. wildflower society) if other areas are infected, or may be especially vulnerable to the possible introduction of dieback.

**Native Animals:**

Most large animals are sufficiently mobile to avoid direct destruction, however changes of habitat can give long term problems. Known habitats should be avoided if possible or at least given consideration during design, construction and possibly maintenance. Smaller species (eg frogs) can be very localised and not mobile enough to move to new areas.

The main problems would be: nesting grounds, food supply, fences/barriers to movement, conflict with vehicles, noise, pollution. If possible time work to avoid bird nesting periods (normally spring time).

**Rare/Endangered Species:**

Such as the short neck tortoise, dibbler, noisy scrub bird. These creatures and their habitats should not be disturbed.

**Forests:**

Fire fighting access should be considered, especially adjacent to controlled access roads.

Forest areas often also act as water catchments and the approval of the PWD or MWA may be required.

Recreation can also be particularly important.

See also "Dieback".

**Reserves:**

- Recreation - Usually under control of MRPA or the local authority. Road proposals can change the safety of, tranquility of, and access to, such areas.
- Flora and Fauna - Under the control of Department of Fisheries and Wildlife whose consent to entry and for removal of materials is required. Check for dieback.

- Aboriginal - Normally under the control of the Aboriginal Lands Trust or WA Museum. Permission for entry is required.

- National Parks - Under the control of the National Parks Authority. Consent to remove material is required. There are also some small reserves "for National Parks" which are not vested.

- Other Reserves - Reserves vested in the Minister for Lands and unvested reserves require Lands Department approval. Reserves vested in local authorities require local authority approval.

- Proposed Reserves - Particuarly EPA Red Book recommendations, should be considered.

**Historic Sites:**

Usually buildings associated with early settlement. These are classified into groups of importance by the National Trust of Australia (WA) or the WA Heritage Committee. Publications giving the locations of these buildings are available. Not all old buildings are protected but careful consideration should be given to any adverse affect on any old building.

**Aboriginal Sites:**

Such as paintings, ceremonial grounds, areas containing artifacts and burial grounds, are protected by the Aboriginal Heritage Act and are under the control of the WA Museum. Entry, damage to or removal of any objects, is prohibited without Museum consent.

These areas are usually small, scattered throughout the State and may be difficult to recognise. Consequently, a survey by a person qualified in archaeology (for artefact sites) and either enthnology or anthropology (for sacred sites) may be required.

For further advice and assistance contact the Registrar of Aboriginal Sites at the WA Museum.

**Social:**

Some points to consider during planning and design are:

- The effect of bypassing businesses.

- Cutting communities or farms.

- Noise and vibration. Consider sites in relation to facilities such as hospitals, quiet urban areas.

- Safety of pedestrians, cyclists and vehicle drivers.

- Social effects of route location, particularly on close-knit communities.

- Other development resulting from projects (eg. need for additional link road, strip development along new road).

Some effect will be unavoidable when relocating a road which services people. The effects may be positive or negative.

**Coastal Environments:**

In Western Australia there is a great diversity of coastal environments ranging from the rugged and complex Kimberley coast to mangroves of the Pilbara, the sandy west coast, the granite headland/sandy embayments of the south coast to the massive limestone cliffs of the Nullabor. During the design, construction and maintenance phases of roads in such areas, careful management is necessary to retain the stability of dune sands, protect fragile vegetation and maintain landscape values.

DCE should be informed of proposals within a kilometre of the coast.

APPENDIX 3

**TYPICAL ENVIRONMENTAL STATEMENT**
(To Be Attached To Environmental Assessment Form)

AB ROAD, NO. 123

33.50 - 42.50 SLK

**PROJECT:**

This will be the start of an ongoing project to improve the road between A and B.

The existing road is 5.6 m wide and will be widened to 7.0 m seal, in addition a number of substandard curves are to be upgraded, one of which is in this section. This curve has been the cause of one serious injury accident, and three reported near miss accidents, in the last year.

**AREAS AFFECTED BY THE PROJECT:**

Minor land acquisitions are required from both private and Forestry land. Gravel for the construction will be from forestry areas and dieback is of concern; discussions have already been held with the Forestry Department and an amicable solution has been reached.

Preliminary discussions have been held with private landowners and no objections are anticipated. Negotiations for the acquisition of land from one owner has already commenced.

There are no areas of significant vegetation affected by the widening into private land, since the area has already been cleared for grazing. The loss of trees adjacent to the forest is not considered significant because very many similar trees will remain on the large area of Forest land not affected by this project.

**SUMMARY:**

Due to the traffic increase since this road was reconstructed it has been decided to widen to 7.0 m seal to improve general safety. Because of dieback problems work will have to be carried out between November and May. It is anticipated there will be no problems with resumptions. The environmental assessment is Category B.

Signed.....
SHIRE ENGINER/SHIRE CLERK

Date.....