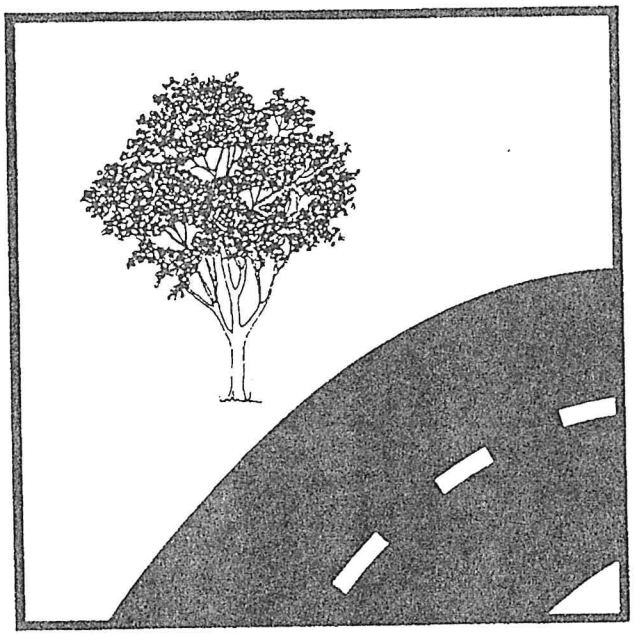
Monitor and Maintain Assets

Unit 2

Roads and the Roadside Environment



Roads and the Roadside Environment

Unit 2 Contents

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Unit 2

Learning Outcome 1

Apply practices that minimise the degradation of land and vegetation and enhance maintenance and fire prevention.

Assessment Criteria

1.1 Recognise value of local environment.

1.2 Identify local and introduced species.

1.3 Discuss factors effecting vegetation type.

1.4 Describe local vegetation community types.

1.5 Compare various plant density effects.

1.6 Describe nutrient cycle.

1.7 Compare variations to supply of air and water to the root system.

1.8 Outline criteria for limitation of spread of fire.

Learning Outcome 2

Establish appropriate work practices for the successful regeneration of vegetation.

Assessment Criteria

2.1 Outline erosion and salinity effects on the roadside environment.

2.2 Outline local authority environmental policy and planning considerations.

2.3 Plan preparation, planting and protection of regenerated area.

Introduction

Roads represent a considerable investment in design, construction and maintenance and are therefore one of the most important assets provided and maintained by **Local Government Authorities** (LGA's). Roads are also very important to people as they are the key to a large proportion of daily travel. Whether it be to and from work, school or shopping or just as important to most of us, roads provide access to sporting, recreational, holiday and other leisure activities.

Roads, therefore are seen as an asset, while on the other hand the roadside environment has been ignored. In fact, it has been seen as a nuisance. It is that area of land bordering the road that we have to waste funds on. Money that would be better spent on the real asset; the road.

Fortunately this attitude has changed markedly in recent years as it has been realised there is much value in the roadside environment. Past attitudes contributed to a continual downward spiral of neglect abuse and low esteem. That attitude has now been reversed in many areas where the roadside environment is now valued, protected and improved.

The construction and maintenance of roads has been covered extensively in modules 4 and 5 of this course. Therefore this unit will only look at roads from the condition monitoring point of view, with the main focus being on the maintenance of the roadside environment as a valuable asset.

Monitoring of Roads

Throughout Australia there is a huge network of roads, somewhere in the region of 260 000 kilometres of sealed roads and over double that number of unsealed roads. Local Government Authorities are responsible for approximately 80% of these, the balance being the responsibility of the Federal Government or others. The responsible authority will need to **monitor** the condition of the roads at regular intervals in order to be in a position to provide the most cost effective maintenance program for the long term preservation of the asset. To monitor the road means to observe and record its condition. By monitoring the road on a regular basis (at least annually) any changes in the roads condition can be interpreted to indicate the maintenance required. It is of course desirable if small problems are fixed before they become major. Unfortunately all to often the small problem is ignored because of time or money restraints and all resources go into fixing big problems.

To successfully monitor a road surface some sort of guide or standard is required to judge surface and pavement conditions against. This has been produced by NAASRA (**National Association of Australian State Road Authorities**) in a publication called "A guide to the visual assessment of pavement condition". This publication or, parts of it, are used as a guide by LGA's when monitoring the roads on their asset registers. NAASRA as an organisation has been superseded by **AUSTROADS** as the peak body representing the federal government and the road authorities of the states and territories

A typical survey of roads for a LGA would follow a set procedure. The worker would be provided with a list of roads and a locality plan or map to show their location. The worker would inspect each road and record its condition on a list. For practical reasons it is not possible to closely examine every metre of road. Therefore a good practice would be to look closely at typical sections of road and particularly at any problem areas and then observe the remainder from a slow moving vehicle. As a guide approximately 10% of the road surface would be examined in detail this way

The reasons for changes to the condition of roads are varied and complex, but in general for the purpose of monitoring the road condition can be categorised as follows:

- surface problems
  - cracks
  - texture loss
  - patches
- pavement problems
  - deformation
  - failure

The condition of each road will be noted and given a score indicating whether:

- no action is required,
- some action is required, or
- urgent action is required

Self-Help Questions 1 - 6

1. LGA is an abbreviation for what?
2. Approximately how many kilometres of road are there in Australia
3. What is meant by monitoring a road?
4. Who or what are NAASRA and AUSTROADS?
5. When conducting a road condition survey approximately what percentage of the road surface would be looked at in detail?
6. List five categories of road condition problem

Assignment 2 (Part A)

Conduct a survey (monitor an asset) of a section of road near your home or work using a suitable form. If you monitored a road in assignment 1, then you must select a road with different characteristics. For example, a sealed road with kerb and channel as against a gravel road or a major highway for one and a small suburban street for the other.

Either:

1. Ask your employer or LGA for a copy of the form they use

   or

2. Devise your own form using Appendix 1 as a guide

The exercise will be of most value if you choose a section of road in need of some maintenance or alternatively a section of new road with obvious faults in it. Do not choose a section of road that you believe to be in near perfect condition.

Follow the general procedure outlined in unit 2 but comment on the following aspects:

- The road condition
- The road markings
- The road edge and shoulder
- The roadside furniture

In addition to LGA survey requirements look for and report on any damage caused by general roadside activity such as:

- maintenance machinery
- burning off
- other service operators such as Telstra or Western Power
- tourism
- vandalism
- grazing stock etc.

Wait until you have finished part 2 before sending this part to your tutor.

The Roadside Environment

As you read this section you should also refer to the Compulsory text Roadside Handbook by WA Roadside Conservation Committee (a division of CALM)

Roads are built within an area known as the **road reserve**. The width of the road reserve will depend on various historical considerations but will generally be about 30 m wide for main roads and approximately 20 m wide for minor roads. This width is measured between the property lines on either side of the road. The part of the road not built on is a flora and fauna reserve and as such requires care and consideration as well as sensitive maintenance. In the early days of Australia's development the road reserve was not considered important as there was plenty of bush on either side. After years of clearing for housing and agriculture there is now very little bush left in many areas. In these highly developed areas the road reserve provides the only remaining habitat for native birds and animals as well as a reservoir for the seeds of flowers, plants and trees In many rural areas developed for agriculture the road reserve provides the only corridor connecting the few remaining remnants of native bush with State and National parks. The condition of the roadside environment has therefore become vital to the survival of many of our native species. It is this realisation that has generated a new interest in and enthusiasm for the roadside environment

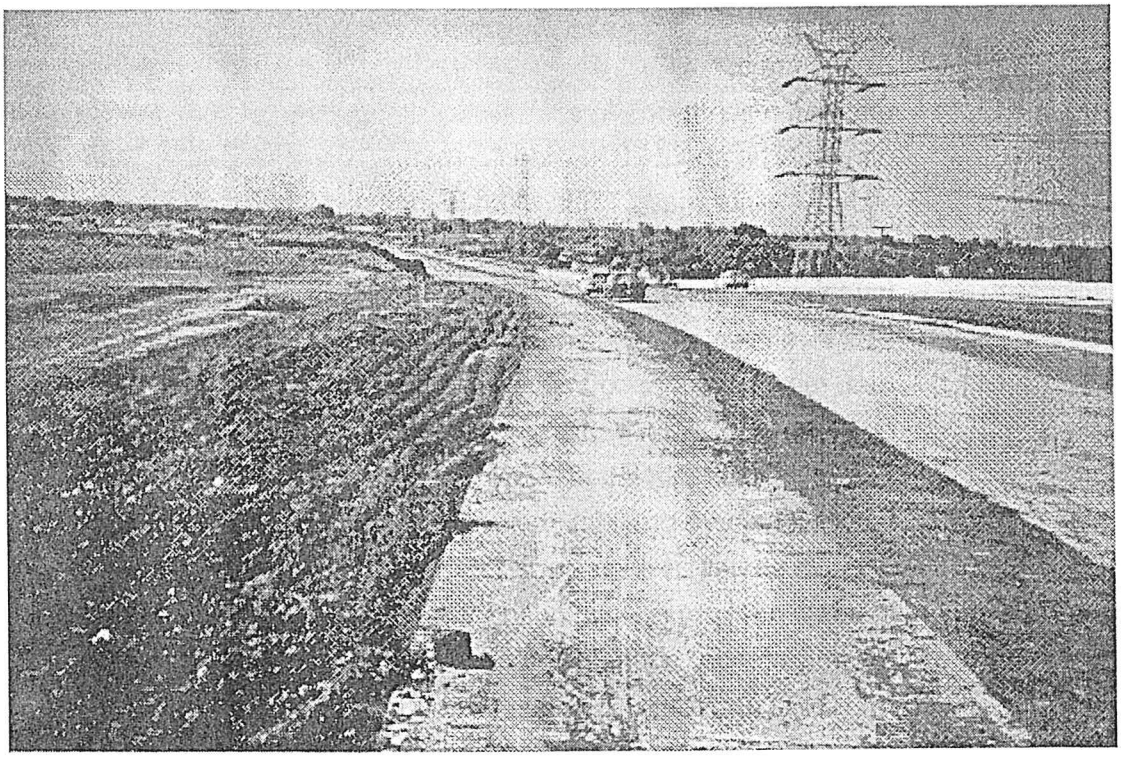

Figure 1 Urban road development

To most roadworkers the road reserve is their workplace. It is where they work and where they rest during work breaks. Therefore, their habits and work practices directly influence the appearance and improvement or degradation of the roadside environment. The road reserve is also greatly influenced by its interaction with the surrounding land areas. Birds, animals and wind blown seeds for example, pay little attention to boundary lines drawn on a map. Only the larger farm animals will be controlled by fencing. Kangaroos, foxes and rabbits for example, find average farm fencing to be no barrier to their free movement. Hence there is potential for animals to move from pasture to reserve and back again. The same applies to weeds, birds, vermin and fire. All this must be taken into account in maintaining the roadside environment as a valuable and worthwhile community asset.

The primary purpose of the road reserve is to provide a space in which to build a road. Road building is an activity that is inevitably going to be very hard on the environment; but it does not have to destroy it. Figure 1 shows an urban road that totally destroys the roadside environment. Modern practice would be to follow up with a regeneration/replanting scheme.

The emphasis today is to have **minimal impact** on the environment. That is to say, we accept that to build a road, we must remove some trees, bushes and plants. Birds and animals will be disturbed and topsoil and earth will be removed but only to the smallest possible extent. More importantly though, the total plan will provide a suitable environment to **rehabilitate** the local native species that have been inadvertently disturbed, i.e. to bring it back to as close as possible to it's natural state. To achieve this it will be necessary to:

- plan all stages of the work
- define the working area
- work within the defined area
- cover and replant or reseed exposed areas as soon as possible
- plant suitable local native species
- remove provinence declared and environmental weeds
- control declared species of pest animals
- include appropriate fire control measures
- include appropriate erosion control measures
- include follow up inspections to check that the measures above are effective.

Figure 2 shows partially regenerated roadside environments. On the left, in both photographs, the reserve contains noxious weeds and introduced species. On the right, in both photographs, the local native varieties of trees and shrubs have been planted to re-establish a link with the bushland beyond.

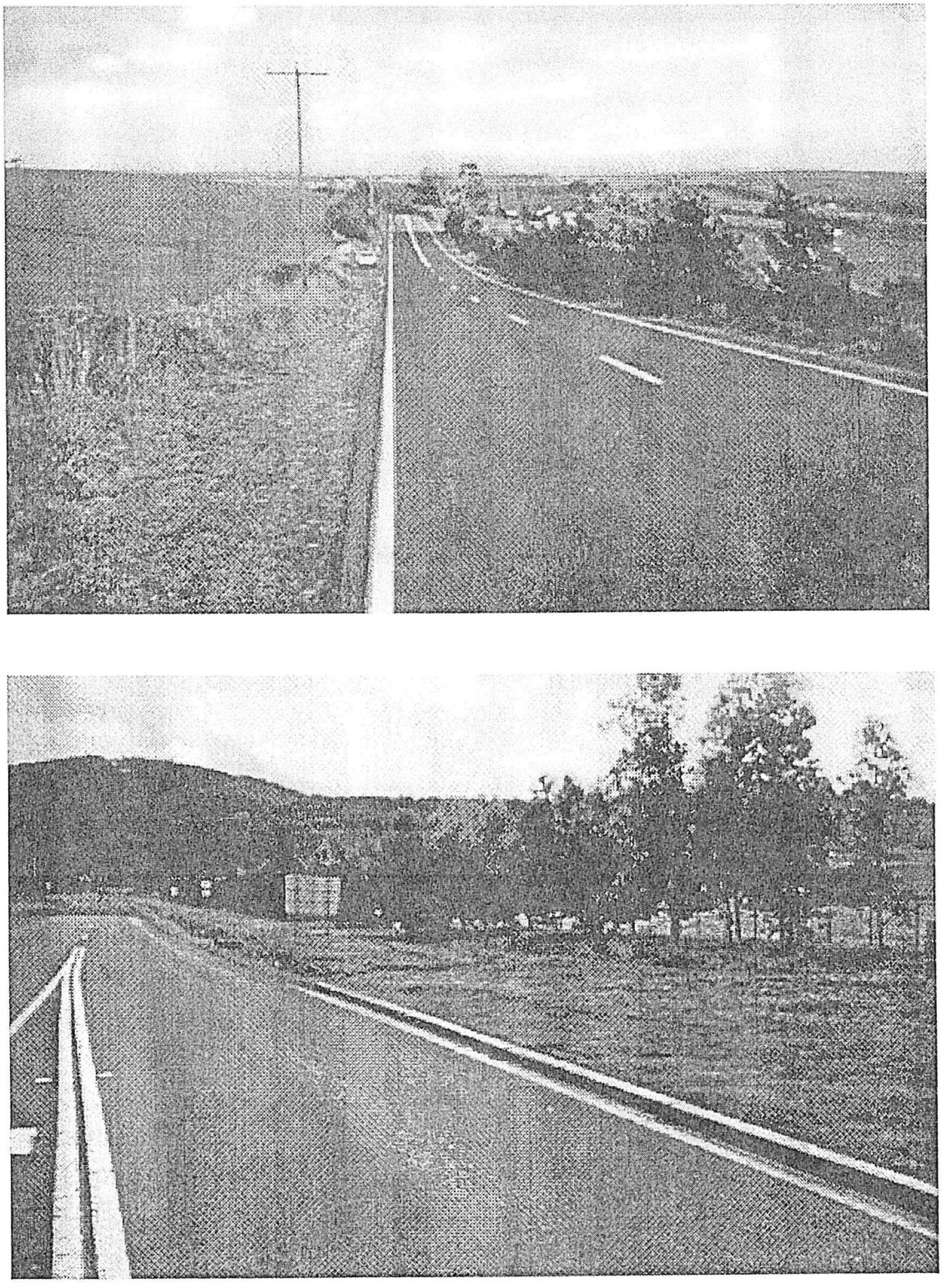

Figure 2(a) and (b) Replanted native vegetation

To gain an appreciation of the many considerations effecting the roadside environment it would be useful to look at it from three points of view:

1. The road construction phase.
2. Continuing roadside and road maintenance.
3. Roadside management plans.

Self-Help Questions 7- 10

7. Explain the need for wildlife corridors.
8. The roadside reserve is the only remaining habitat for_____
9. Explain the terms minimal impact and rehabilitate.
10. List the ten steps required to rehabilitate an area.

The Road Construction Phase

Road building techniques will vary slightly from one area to another and with variations in soil and rock type and weather conditions but the general steps are:

1. clearing
2. stripping
3. transporting and stockpiling materials
4. compacting materials
5. operating heavy machinery
6. servicing heavy machinery
7. parking machinery of all types.

All of these activities will be part of the work plan, but it is as well to remember that it is the activities on the fringe of the construction zone that have the most potential for long term damage to the asset. The simple act of parking a scraper under a shady tree and accidentally bumping the trunk will leave a scar visible to passing

motorists for the next 50 years or more. A severe knock from heavy plant may lead to the slow death of what was a mature and attractive shade tree.

Most state and territory road authorities have documentation outlining good construction practice and for the purpose of this module we will use the *Roadside Handbook.* Read part 2 Construction Guidelines and then answer the following questions.

Self-Help Questions 11 - 17

11. How can you tell where the construction zone ends?
12. Why clean down machines before moving them to another site?
13. Explain the purpose of walking the construction route.
14. How would you mark a stockpile area?
15. Outline uses for all parts of trees removed from construction zones.
16. What are the disadvantages of tidying up native vegetation?
17. Where should you wash down machines?

Road Maintenance

Road maintenance is an ongoing activity that is intended to maintain or improve the value of the asset. In the past this was interpreted to mean the road only but now it includes the roadside environment with all of its associated flora and fauna that are indigenous to the area. A plant, tree or animal may be native to Australia (indigenous) but taken to another area could become just as much a pest as introduced species from overseas. Cootamundra wattles from central NSW for example are now considered to be environmental weeds in parts of Victoria well outside its normal range. It would be advisable to make notes on any indigenous flora and fauna that are applicable to your specific area.

Now read Part 3 Maintenance Guidelines from the Roadside Handbook and answer the following questions.

Self-Help Questions 18 - 25

18. What is natural regeneration?

19. Why avoid mowing?

20. Where is the mowing limit in most situations?

21. If you are not sure of the work in hand who would you approach for alternatives?

22. Where would you look for information on drain spoil disposal sites?

23. List four desirable features of a stockpile site.

24. Describe or sketch the three cut method of pruning overhanging branches.

25. Give two examples of minimum sized machines for the job.

Figure 3 Mainly undisturbed native roadside environment

Roadside Management Plans

The value of the roadside environment cannot be stressed too strongly for its value as a source of local seed, as a habitat for rare and endangered species and as a wildlife corridor. On the other hand, poor management practices or just plain neglect may allow the roadside to become a haven for noxious weeds and vermin and a potential fire hazard.

The balance of trees, shrubs and ground cover minimise the need for mowing and provide a seed and wildlife reserve. See Figure 3.

Figure 4 shows how mowing has removed native cover species and encouraged introduced grasses.

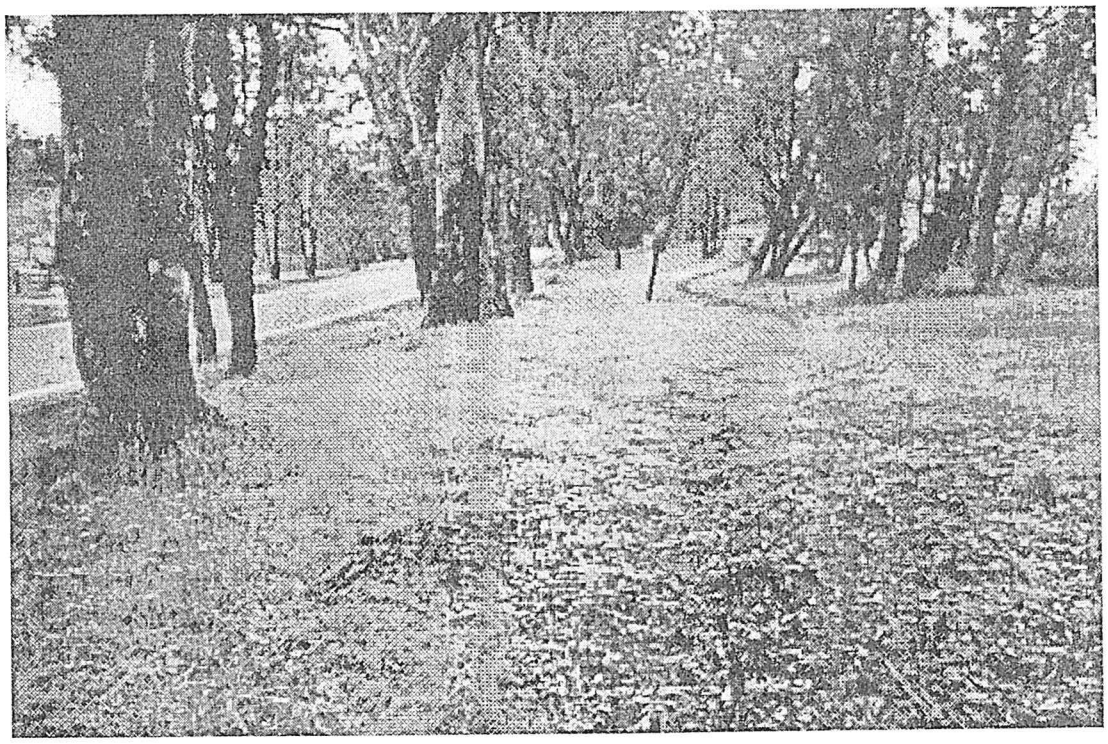

Figure 4 Good native trees with over-mown ground cover

LGA's often have conflicting demands placed on them in regard to road reserves. They have to balance the demands of landholders, residents, fire brigades and fund managers. To assist them in achieving a balance many are developing **Roadside Management Plans** often in conjunction with a **local roadside committee**. Such committees can effectively enlist the help of local communities for such difficult tasks as noxious weed removal.

For assistance with setting up local committees and in preparing roadside management plans contact **the Roadside Conservation Committee** which is listed in the references for this module.

It is anticipated that in the near future LGA's will produce and implement roadside management plans which hopefully will lead into the production of pamphlets and booklets illustrating local plants and pest plants for their particular area. These publications could prove to be very popular and helpful to local residences who can then assist their LGA's by only planting appropriate varieties and removing problem plants and weeds. Contacts for examples are listed in the references for this module.

The trees in the foreground of Figure 5 have been damaged at the base by bumping with slashers. This is a common problem where excessive mowing takes place in a treed environment.

Figure 5 Maintenance damage to trees

Now read chapter 1. General Environmental Guidelines from the Roadside Handbook and answer the following questions.

Self-Help Questions 26- 39

26. What does remnant vegetation include?

27. Disturbing the soil unnecessarily will encourage what?

28. Where are the fine feeder roots of a tree to be found?

29. List four things that workers should not do within the drip line of a tree.

30. What are noxious weeds and environmental weeds?

31. Briefly explain the problems of erosion.

32. List the first three steps in site preparation for tree and shrub planting.

33. Which is the preferred month for planting?

34. What name do we give to plants that are native to an area?

35. Is a planning permit required for removing native vegetation from a new road site?

36. Outline the aims of a management plan.

37. What is the purpose of a "significant roadside area sign"?

38. Name the body that uses environmental markers.

39. Outline the boundaries of the roadside environment.

Answers to Self-Help Questions

1. Local Government Authority.

2. 780 000

3. To observe and record it's condition.

4. National Association of Australian Road Authorities and the body representing the Federal Government and the road authorities of the states and territories.

5. 10%

6. Cracks, texture loss, patches, deformation and failure.

7. To link remaining patches of native bush with state and national parks.

8. Native animals, birds, flowers, plants and trees.

9. Minimal impact: some disturbance to birds animals trees and soil is inevitable but should be kept to the smallest possible extent.
Rehabilitate: bring it back to its natural state.

10. Plan all stages of the work, define the working area, work within the defined area, cover and replant exposed area as soon as possible, plant suitable local native species, remove noxious weeds, control vermin, include appropriate fire and erosion control methods, include follow up methods to check effectiveness of the above.

11. The construction zone is the area marked out with pegs where all the construction activities take place.

12. Dirty machinery can spread weeds and soil diseases.

13. To identify the limits of areas to be stripped or disturbed and any areas of significance to be protected also to mark trees for felling and to locate stockpiles, plant compounds and access roads.

14. Use pegs and tape or fence.

15. Millable timber for fence posts, then firewood for the public, then mulch the remainder.

16. Tidying up removes shrubs and ground covers and damages the trunks of trees.

17. On grassy areas well away from creeks.

18. The natural establishment of native plants from seed fall or suckering.

19. Regular mowing removes young plants.

20. Mow a strip up to the back of the table drain.

21. Ask your supervisor about alternatives.

22. Check the Roadside Management Plan.

23. Clear of native trees shrubs and native grasses and weed free.

24.
- The under cut
- The upper cut
- The final trim cut as per diagram page 29 of the Roadside Handbook.

25. Use a backhoe from the road shoulder or a bobcat within the native vegetation rather than a dozer for clearing and replanting.

26. Trees shrubs and groundcovers, creepers grasses and herbs.

27. Weeds and soil erosion.

28. In the top 30cm of soil.

29. Avoid:
- working within the drip line
- storing equipment materials vehicles
- storing fill materials
- cutting or soil removal.

30. Noxious weeds are plants that have been declared a serious threat to agriculture or the environment. Environmental weeds are non local plants which invade and replace local native vegetation.

31. Erosion removes valuable top soil and produces sediment which silts drains, creeks and rivers.

32. Slash, spray, rip.

33. May.

34. Indigenous.

35. Yes, in most cases.

36. To develop the best way to manage and maintain the roadside.

37. The sign alerts travellers, local people and roadside works to the special value of roadside vegetation.

38. In Western Australia, the State Road Authority, Department of Environmental Protection and CALM (Department of Conservation and Land Management) or equivalent body in other states or local municipality show on the sign.

39. The property lines on either side of the road.

Assignment 2 (Part B)

Select a length of road that has a significant proportion of native vegetation in its reserve and conduct a survey to assess the following:

- Native trees, shrubs and ground cover.
- Introduced species (trees, shrubs and ground cover)
- Look for and comment on the following practices:
  - mowing/over-mowing
  - fire protection methods
  - protection of native species
  - stockpiling activities
  - soil compaction
  - burning off/cleaning up
  - scarring or other adverse signs of poor maintenance
  - practices
  - inappropriate parking/wayside stops.

Part of your task is to seek help in identifying local or introduced species. Where you are having difficulty your local parks and gardens supervisor, the library or the local national parks office may be able to help. You are not expected to positively identify every variety but you should be able to identify the main species in your area.

In heavily urbanised areas where little native vegetation remains it may be necessary to travel to an outer area or use a length of river bank or coastal foreshore or native reserve as a substitute.

Your assignment should have a front page with a brief description of the assets, why you chose them and what help you had if any. Attached to the assignment should be a map or locality plan showing where your chosen assets are located. and who owns them. All should be clipped in a simple folder and sent according to the instructions with this module.