ROAD MAINTENANCE CODE OF PRACTICE
FOR THE WET TROPICS WORLD HERITAGE AREA
What is the Road Maintenance Code of Practice?

This Road Maintenance Code of Practice (the Code) outlines best workplace practices to achieve desired goals in the Wet Tropics World Heritage Area (WTWHA). It outlines requirements necessary to achieve best practice road maintenance that minimises negative environmental impacts on the WTWHA. This Code has been developed through consultation with the Wet Tropics Management Authority (WTMA), TMR environmental specialists, engineers and work crews (refer Appendix A).

How to Use this Code of Practice (Code)

This Code is divided into seven sections based on types of maintenance works in TMR’s Road Maintenance Performance Contract (RMPC). Each section categorises RMPC activities and provides requirements to minimise negative environmental impacts on the WTWHA (Requirements). These sections are:

- **Emergent Works** page 8
- **Roadside Works** page 12
- **Bridge Works** page 24
- **Drainage Works** page 30
- **Road Furniture Works** page 39
- **Sealed Road Surface Works** page 46
- **Non Surface Disturbance Works** page 51

Before starting work:

1. Refer to the relevant section based on the RMPC activities you are to undertake.

2. Refer to FIGURE 1 to determine if works will be within the ‘footprint of disturbance’. Should works go outside the road formation you shall contact your TMR Environmental Officer (EO) who may then discuss with the Wet Tropics Management Authority (WTMA).

3. Follow the ‘Requirements’ in the relevant section of this Code.
FIGURE 1

Works that remain within the road formation will not impact natural values and are able to be undertaken in accordance with this Code of Practice. Works in these areas (i.e. within the Road Formation) is permitted without further consultation. Activities include: pavement edge repair; surface correction; pothole patching; resealing; crack treatment with emulsion/aggregate; profile planning, scarifying, asphalt overlaying, surface sweeping; surface debris removal; line marking.

Works in areas that are within the footprint of disturbance, but off the road formation, may impact natural values and will require further consideration. Before undertaking works in these areas, please discuss proposed activities with a TMR Environmental Officer. Potential impacts on the natural values of the WTWHA may need to be discussed with WTMA.

Works in the “No Go Zone” areas are outside the ‘footprint of disturbance’ and are not permitted under this Code of Practice. Generally permits would be required for any activities (e.g. developing side tracks) in these areas that might impact natural values such as vegetation, soil or water.
**What is the Wet Tropics World Heritage Area?**

The Wet Tropics World Heritage Area (WTWHA) is an area of approximately 900,000ha between Townsville and Cooktown including rainforest, mangrove forest and eucalypt forests. The area has been included on the World Heritage List due to its important natural values that have been recognised as having international significance. The WTWHA is also important for its diverse cultural history and significance to indigenous Australians. It is one of the world’s most diverse areas of animals and plants. It is home to 30% of Australia’s marsupials; 25% of Australia’s frogs; 62% of Australia’s butterflies and approximately 50% of Australia’s birds. Land features, plants and animals found in the WTWHA provide scientists with a record of how the earth has evolved. There are plant species in the WTWHA that have existed for millions of years.

**Why does TMR need a Code of Practice?**

1. **A Code of Practice is a requirement of a permit authorising the conduct of maintenance works within the WTWHA. This permit is issued to TMR by the Wet Tropics Management Authority (WTMA) (refer Appendix A).**

2. **Roads impact on the values of the WTWHA by:**

   - Creating a barrier to animal movement (e.g. many tree dwelling animals cannot cross roads). This barrier can mean that groups inbreed and/or that food and breeding areas cannot be reached.
   - Creating disturbed areas that allow weeds and pests to establish (e.g. toads invade weedy grasses along roadsides). Weeds and pests compete with native species for habitat and food. They can also change conditions so areas along roads are no longer suitable for some local native species (e.g. weedy areas promote fires that cause changes to vegetation types).
   - Creating areas where erosion is increased (e.g. High rainfall can continually erode steep cuttings in erosion prone soils common in the WTWHA). Erosion causes loss of topsoil and land area. Erosion can also cause sediment build-up in waterways, affecting habitat values and restricting animal movements and sometimes even killing aquatic animals. Runoff from roads can carry contaminated water from traffic and other sources (e.g. petro-chemicals emitted from vehicles). Contaminated water travels along road surfaces and table drains to waterways where it may harm and sometimes kill native animals and plants.
Road kills decrease the biodiversity of the WTWHA.

Roads create a gap in the forest. This gap changes conditions in the area by letting light enter. Gaps also create a barrier to animal movement. Canopy connectivity helps to reduce these impacts.

The Rainforest Aboriginal people of the WTWHA have the oldest rainforest culture in the world.

Roads present the WTWHA to the community and tourists.

3. Roads present the WTWHA to the community and tourists. Well maintained roads enhance the visual values of the area.
Requirements to Minimise Negative Environmental Impacts from Road Maintenance on the WTWHA

Avoid disturbance

- Avoid disturbance to sensitive or significant areas (e.g. cultural heritage; rare plants)
- Minimise clearing and unnecessary damage to vegetation
- Maintain canopy connectivity
- Minimise sediment washing into waterways
- Minimise noise, dust and light
- Seek specialist advice on managing vegetation

Rehabilitate disturbed areas

- Conserve, protect and reuse weed-free topsoil
- Stabilise to prevent erosion
- Promote the growth of native plants
- Seek specialist advice on rehabilitation methods

Maintain animal corridors and habitat

- Maintain canopy connectivity (especially at water courses)
- Minimise sediment washing into waterways
- Maintain fauna furniture (e.g. animal crossings, such as culverts and rope bridges)
- Seek specialist advice about avoiding animal breeding areas and ensuring the success of animal crossings

Prevent contamination

- Manage waste
- Contain chemicals
- Clean up spills

Prevent weed spread

- Wash down vehicles and equipment before undertaking works in WTWHA
- Avoid the introduction of weeds in materials
- Seek specialist advice on weed treatment

Minimise visual impact

- Cover graffiti
- Remove waste and tidy site
- Consider visual impacts of new features

Identify Potential Problems

- Notify TMR foreman and environmental officer about potential issues (e.g. weeds; dieback; myrtle rust; cultural heritage discoveries)
Prevent Weed Spread

Wash-down vehicles or machinery to remove weed seeds/cuttings if vehicles leave the road formation or go through weedy areas.

Wash down is a thorough process of cleaning all areas of vehicles and machinery that may catch weeds and weed seeds. Wash down must occur in a dedicated area where runoff can be contained and weeds treated.
This section defines emergent works on roads and how such works shall be managed to minimise impacts to the WTWHA.

**What are emergent works?**

Emergent works are not defined under Queensland legislation. However, TMR has determined that emergent work is any work required to protect people’s lives and health. These are unplanned (or first response) works that have arisen from an emergency situation. Emergent works can include response to land slips and tree fall as a result of storm events. The response to large scale emergencies such as a cyclone can be particularly challenging. It includes work which is necessary to reopen or make safe any transport infrastructure. Also included is improvement of transport infrastructure, where the primary purpose is for repairing the infrastructure; works outside the transport corridor are permitted should these works be essential for the repair. It does not include works to improve the efficiency and/or enhancement of transport infrastructure, where the primary purpose is not to repair the infrastructure. Similarly, once the corridor has reopened, emergency works do not include RMPC maintenance activities as described in this Code. TMR’s definition is supported by Section 27 of the Wet Tropics Plan 1998 where a person may carry out any activity for the protection of life.
and/or the urgent protection of property in all WTWHA management zones. For the purpose of this Code, this includes works to reopen and make safe the road network within 60 days of an event. All works must be undertaken in accordance with the principles of “Keep the Trees, Please” (refer Appendix F).

Emergent works include:

- **Landslip management**
  - vegetation trimming, clearing and removal
  - scaling of loose rocks and soil
  - installation of infrastructure for the stabilisation of batters
- **Fallen, damaged and dangerous vegetation**
  - clearing and trimming
  - removal or mulching
- **Temporary installations**
  - road bunding
  - temporary barriers
  - temporary side tracks
- **Clean up**
  - management of fuel / chemical spills
  - soil removal
  - roadside sweeping

### Requirements

**Note that this Code does not consider Emergency Management Queensland or Queensland Police Service requirements.** TMR shall implement advice received from appropriate authorities.

**Contact a WTMA officer and advise of the emergency event and the management regime implemented and organise a site inspection as soon as possible.** It is acknowledged that often in an emergency situation contact with WTMA will not occur until emergency management activities are underway or complete. Be mindful that the extent of works to reopen and make safe the road network still needs to be done in a manner that minimises environmental impact and avoids damage to the World Heritage Area’s natural values.

#### Avoid Disturbance

- Clear only vegetation that is essential to reopen and make safe the road network, with special attention to limiting the clearing of large trees, maintaining canopy connectivity and limiting edge effects (FIGURES 1 and 4).
- When scaling batters clear only the minimal area that is essential to reopen and make safe the road network.
• Locate stockpiles, plant turn around sites or storage enclosures within the road formation and the already disturbed area, where possible.

• Match the machine size to the job.

**Prevent Contamination**

**Manage fuel and chemicals**

• Where safe, prevent contamination of waterways and adjacent habitat by containing spills. This may be undertaken by isolating the spill in the table drain, as close to the source as possible, and may require the dumping of soil to act as a containment structure.

• Where applicable and safe, use a hydrocarbon boom.

• Determine the appropriate absorbent and management regime for spills. Ensure a fit-for-purpose spill kit is available.

• Where applicable, truck the spilled material and/or absorbent to an approved disposal site. Do not push spoil material over embankments.

• Report all spills in watercourses to DEHP (refer Appendix G).

• Prevent contamination of waterways and land by containing fuels and other chemicals.

• Store chemicals outside of the WTWHA if possible.

• Ensure storage sites are a minimum of 100m away from watercourses.

• Ensure all chemical containers (including fuel drums and paint tins) are in a watertight enclosure (e.g. bunded pallets and drip trays). The enclosure needs to be large enough to contain 110% capacity of the chemicals it is containing (e.g. a 100 litre drum should be contained within an enclosure able to hold 110 litres). This will prevent overflow during rainfall and conforms to the Australian Standard AS1940.

• Capture and remove all grease, oil, lubricants etc when maintaining or refuelling machinery within the WTWHA.

**Manage Vegetation/Waste**

Generally, fallen or cut vegetation should be recycled back into the vegetation, either by placing the vegetation on the forest floor being careful not to damage other standing vegetation or by mulching. Vegetation cannot be removed from the WHA without the consent of WTMA.

• Mulch manageable sized vegetation trimmings (not weeds) and return to adjacent vegetated areas, where possible.

• Manage larger logs by undertaking the following, where possible:
1. Place logs in adjacent areas to provide animal habitat without disturbing existing vegetation. If it is not possible to return large logs to the adjacent area discuss with WTMA where the logs might be able to be stockpiled.

2. Remove logs from areas with steep slopes, where logs may roll and damage adjacent vegetation.

3. Remove logs from areas where they may be a safety risk to motorists.

- Remove non-vegetated waste such as earth and rocks to an appropriate site (e.g. landfill). Seek advice from TMR Environmental Officer, if required. Transport waste in a covered skip or truck to an appropriate disposal facility.

*Seek advice*

- Seek advice from a TMR Environmental Officer regarding the appropriate rehabilitation methods. Note: Different areas and situations require specific treatment and specialist advice can be obtained regarding the best approach to rehabilitate sites.

- Refer to Appendix B for surface stabilisation and revegetation guidelines. Rehabilitation can involve surface stabilisation against erosion and revegetation or surface stabilisation only.

*Rehabilitate Disturbed Areas*

All areas disturbed by works to reopen and make safe the road network after emergent events shall be rehabilitated. When undertaking rehabilitation, consider the following:
What are ‘Roadside Works’?
“Roadside Works” includes any maintenance activity off the road formation but within the ‘footprint of disturbance’ (FIGURE 1). Landslip Management has been included in this Section for low risk sites (i.e. landslips which are less than 3m high and 50m long) and within the original footprint of disturbance (i.e. when the road was constructed). Installation or repair of road furniture is covered in the ‘Road Furniture Works’ chapter.
“Roadside Works” includes:

• Vegetation Management / Rehabilitation
  - Slashing and mowing
  - Trimming vegetation
  - Spot spraying or wick application of herbicide
  - Seeding or planting
  - Mulching

• Batter stabilisation*
  - Landslip management
  - Fallen trees
  - Vegetation trimming, clearing and removal
  - Scaling of loose rocks and soil
  - Installation of make safe techniques for stabilisation
  - Soil and rock removal

• Visibility Clearing
  - Trees
  - Earthworks
• Tidying
  - Litter collection
  - Graffiti removal
  - Roadside sweeping
  - Servicing rest areas and driver reviver sites
*TMR routinely inspects batters to assess their stability and potential to adversely impact life or property. This is especially relevant given the geographic and climatic conditions that prevail in the WTWHA.

Requirements

Avoid Disturbance

Minimise clearing
• Do not go outside the ‘footprint of disturbance’ (FIGURE 1).
• Do not source gravel and water supplies from the WTWHA.
• Talk to TMR Environmental Officer if you:
  - believe the work could create disturbance beyond the road formation (i.e. the outer edge of the table drain) (FIGURE 1).
  - need to clear roadside vegetation (alive or dead) that obstructs visibility or is a safety threat (FIGURE 1, 3 and 4).
  - need to undertake works on batters.
• Clear only vegetation that is essential to undertake works, with special attention to limiting the clearing of large trees, maintaining canopy connectivity and limiting edge effects (FIGURE 1 and 4). Consider animal crossing and breeding areas (e.g. known cassowary crossings).
• Minimise the upslope disturbance when scaling batters of loose material (i.e. soil and rock) within the ‘footprint of disturbance’.
• Do not trim tree branches with a sidearm slasher (FIGURE 5).
• Avoid mowing if possible. Note: Mowing encourages grasses, spreads weeds and can kill native herbs and shrubs that do not regrow as quickly.
• Encourage low growing native plants on roadsides. Note: This can reduce maintenance work.
• Match the machine size to the job.
• Locate stockpiles, plant turn around sites or storage enclosures within the road formation (i.e. already disturbed area).
  Note: Placing stockpiles at the base of trees can kill them by preventing oxygen from reaching the tree roots.
• Restrict parking of vehicles and machinery to the road formation.
  Note: If vehicles leave the road formation, strict washdown of vehicles will be required to prevent weed spread (FIGURE 2 at front of Code).
FIGURE 3

MAINTAIN VISIBILITY

VISIBILITY BLOCKED BY VEGETATION

REMOVE FOR SAFETY

CLEAR ONLY VEGETATION BLOCKING VISIBILITY

VISIBILITY BLOCKED BY ROCK

CUTTING FOR SAFETY

CONTACT TMR ENVIRONMENTAL OFFICER

CONTACT WTMA IF WE ARE OUTSIDE F.O.D AND SIGNIFICANTLY IMPACTING NATURAL VALUES AND/OR ABOVE THRESHOLD OF LOW RISK LANDSLIPS
Debate between stakeholders regarding the maintenance of canopy connectivity is acknowledged, however this Code of Practice requires that canopy connectivity be encouraged in all areas with consideration of the minimum clearance zone requirements.
FIGURE 5

TRIMMING PRACTICE

- Use chainsaws for trimming.
- Avoid using heavy machinery.

MAY LEAD TO INTRODUCTION OF DISEASE

MAY LEAD TO NEW SHOOTS

MORE TRIMMING WORK
**Maintain canopy connectivity**

In addition to assisting animals to cross roads, canopy connectivity can reduce “edge effects” (such as increased light, heat and noise or reduced humidity). Edge effects change the habitat for native plants and animals and can encourage non native species such as weeds or grasses which can support feral animals.

- Trim trees manually so they are ‘trained’ to grow above vertical 5.5m clear zones (FIGURES 4 and 5). Note: Training trees can reduce maintenance (e.g. 3-5 yearly as opposed to 6 monthly to annual attention).
- Do not trim branches with a sidearm slasher or flail mower as this damages the vegetation, leaving shattered branches that make the plant susceptible to disease.
- Do not remove canopy closure from around watercourses if possible.

**Minimise noise, dust and light**

- Minimise noise in the WTWHA (e.g. fit engine guards on machinery).
- Minimise dust that may be generated by maintenance works e.g. avoid working in high wind, water dusty areas.
- Avoid “temporary” lighting within the rainforest for long periods. Lights will disturb animals that rest at night.

**Protect cultural heritage**

- Report any items/areas of cultural heritage (refer Appendix D) that are discovered to the DEHP (refer Appendix G). This is a legal requirement and will assist the DEHP to record the location.

**Rehabilitate Disturbed Areas**

Rehabilitation shall be undertaken in areas of disturbed ground that have been created by works (e.g. installation of a large structure; manual removal of weeds from a large area) or following landslides. When undertaking rehabilitation:

**Seek advice**

- Seek advice from your EO regarding the appropriate method of rehabilitation (refer Appendix G).
  Note: Different areas and situations require specific treatment and there are people who can provide specialist advice regarding the best approach (e.g. providing components of a hydromulch mix).
- Refer to Appendix B for surface stabilisation and revegetation guidelines. Rehabilitation can involve surface stabilisation against erosion and revegetation or surface stabilisation only.
**Time works**

- Undertake initial stabilisation of large disturbed areas (e.g. landslide; installation of a large structure) against erosion (e.g. mulching) immediately in the wet season and within 2 weeks in the dry season or when the climatic conditions are deemed suitable by a TMR Environmental Officer.

- Permanently revegetate disturbed areas as soon as possible, following the initial stabilisation (refer Appendix B). Note: Sourcing appropriate species can take time - early planning is required to ensure hydromulching can commence within the above designated timeframes.

**Manage topsoil**

- Strip and stockpile topsoil prior to disturbing large areas where rehabilitation will be necessary (e.g. installation of a large culvert). Note: Stockpile should be within the ‘footprint of disturbance’ and away from water courses. If topsoil is to remain stockpiled for a period of time when it may rain, it should be protected (e.g. covered with weed free mulch or tarpaulin and bound by log/silt fence).

- Respread weed-free stockpiled topsoil over a scarified surface (e.g. scratched with grader teeth) on completion of works.

**Select revegetation methods and species**

- Seek specialist advice to ensure:
  1. The right species are chosen for the particular area and situation. Refer Appendix B for guidelines on species selection and Appendix G for specialist contacts.
  2. That revegetation will be successful. Note: some revegetation methods will work better than others in various situations. Refer Appendix B for revegetation methods available for roadside works in the WTWHA.

**Maintain revegetated areas**

- Protect revegetated areas from erosion by mulching or using geotextile blankets.

- Ensure on-going maintenance (i.e. fertilising and watering) of revegetated areas until plants are established.

- Maintain a vegetated ground cover between the works area and the adjacent watercourse or use erosion and sediment control techniques.

**Maintain Animal Corridors and Habitat**

Native animals use roadside vegetation (including logs and dead trees) as habitat and to cross roads.
**Minimise clearing**
- Consider clearing vegetation after the start of the wet season as many animals move at the beginning of the wet season.

  Note: It is acknowledged that TMR undertakes pre-wet season safety audits to ensure that all safety risks have been identified and rectified, which includes removal of broken tree limbs and loose rocks.

- Do not remove dead trees/branches and fallen logs if they are not a safety risk. These are often used by native animals.

- Talk to TMR Environmental Officer if you:
  1. believe you could create disturbance beyond the road formation (i.e. the outer edge of the table drain) (FIGURE 1).
  2. need to clear roadside vegetation (alive or dead) that obstructs visibility or is a safety threat (FIGURE 1, 3 and 4).
  3. need to undertake works on batters.

- Protect animal crossing and breeding areas.

- Avoid mowing if possible and encourage low growing native plants on roadsides.

**Maintain canopy connectivity**
In addition to assisting animals to cross roads, canopy connectivity can reduce “edge effects”. Entry of light and noise disturbs native plants and animals and encourages ferals.

- Do not disturb existing canopy connectivity. Many tree dwelling mammals need canopy connectivity to cross roads. Trim vegetation in a manner that encourages canopy connectivity. (Refer ‘Avoid Disturbance’ Section above and FIGURES 4 and 5). Note: Canopy connectivity should particularly be encouraged over gullies and creeks as many animals move along them.

- Trim trees manually so they are ‘trained’ to grow above vertical 5.5m clear zones (FIGURES 4 and 5). Note: Training trees can reduce maintenance (e.g. 3-5 yearly as opposed to 6 monthly to annual attention).

- Do not remove canopy closure from around bridges if possible.

- Encourage canopy connectivity in all instances.

- Maintain existing clear zones in the shrub layer at known cassowary crossings. This can help drivers to see cassowaries in time to prevent collisions.

- Maintain fauna furniture (e.g. animal crossings, such as culverts and rope bridges).
**Prevent Contamination**

**Contain chemicals**

Prevent contamination of waterways and land by containing fuels and other chemicals.

a. Store correctly
   
   • Store chemicals outside of the WTWHA if possible.
   
   • Ensure storage sites are a minimum of 100m away from watercourses and within the road formation.
   
   • Ensure all chemical containers (including fuel drums and paint tins) are in a watertight enclosure (e.g. bunded pallets and drip trays). The enclosure needs to be large enough to contain 110% capacity of the chemicals it is containing (e.g. a 100 litre drum should be contained within an enclosure able to hold 110 litres). This will prevent overflow during rainfall and conforms to the Australian Standard AS1940.

b. Use correctly

   • Use only non-residual herbicides, and those without surfactants (spreading agents) in the vicinity of watercourses. Residual herbicides persist in the soil and can be washed into watercourses
   
   • Capture and remove all grease, oil, lubricants etc when maintaining or refuelling machinery within the WTWHA.

**Clean up spills**

• The Works Supervisor must report all spills in watercourses to DEHP (refer Appendix G).

• Ensure a fit-for-purpose spill kit is available on site. Note: Special spill kits and containment devices are available for spills into water. Ensure staff are trained in its use.

• In the event of spills to water:
   1. Identify the source (e.g. hole in bund) and block further spill.
   2. Prevent spill from spreading (e.g. oil spills can be contained within an enclosure as oil will not mix with water).
   3. Use spill kit to clean up.
   4. Scrape or soak up contained/treated spill (where appropriate).
5. Seek advice from DEHP about correct waste disposal (refer Appendix G).
6. Seek advice if further treatment may be necessary.

- In the event of spills to land:
  1. Identify the source (e.g. hole in bund) and block further spill.
  2. Prevent spill from spreading.
  3. Use spill kit to clean up.
  4. Dig out contaminated soil and replace with clean material, if necessary.
  5. Seek advice from DEHP about correct waste disposal (refer Appendix G).
  6. Seek advice if further treatment may be necessary.

**Manage Waste**

Waste may be created by works or the public. Waste includes: vegetation trimmings; chemical drums; food scraps; cans, tins and bottles; machinery parts; oil rags; tyres; flagging tape; etc.

- No soil or native vegetation (waste) can be removed from WTWHA without approval of WTMA.
- Mulch manageable sized vegetation trimmings (not weeds) and respread on the ground of adjacent vegetated areas. Do not disturb existing vegetation.

- Manage large logs by undertaking the following:
  1. Place logs in adjacent areas to provide animal habitat without disturbing existing vegetation. Hollow logs especially provide shelter and nesting sites for a large number of animals.
  2. Remove logs from areas where they may be a safety risk to motorists. These logs may be taken off-site to an approved disposal site if required.
  3. Remove logs from areas with steep slopes, where logs may roll and damage adjacent vegetation. These logs may be taken off-site if required.
- Do not bury or burn waste.
- Separate all waste that can be reused or recycled (e.g. glass, cans etc).
- Remove all waste, other than trimmings and logs, from the WTWHA to an appropriate site (e.g. Landfill). Seek advice from TMR Environmental Officer, if required. Transport waste in a covered skip or truck to an appropriate disposal facility.

**Prevent Weed Spread**

Roadsides are disturbed areas that allow weeds and pests to establish (e.g. feral rats can invade weedygrasses along roadsides). Weeds and pests compete with native species for habitat and food. They
can also change conditions so native areas along roads are no longer suitable for some native species (e.g. promote fires that cause change in vegetation types). TMR has a legal responsibility to manage weeds.

**Identify weeds**
- Look for weed problems during works such as:
  - Weeds never seen in an area before.
  - Large increase of weeds in an area.
  - Regrowth of weeds in a treated area.
- Report above problems to the Maintenance Supervisor who should discuss solutions with a TMR Environmental Officer. Note: Local governments, with assistance from DEHP, can manage weeds for TMR if problems are reported to them. Refer to Appendix C for problem weed species in the WTWHA.

**Prevent weeds**
- Wash down vehicles, to remove weeds and weed seeds and prevent spreading weeds to new areas, when:
  - vehicles or machinery are driven off the road formation (FIGURE 2).
  - mowing and slashing equipment is moved to another work site.
Note: Wash down is a thorough process of cleaning all areas of vehicles and machinery that may catch weeds and weed seeds (FIGURE 2). Washdown should occur in a dedicated area where runoff can be contained and weeds treated.
- Ensure that all materials imported onto the site are free of weeds and weed seeds. Ensure all purchased materials (e.g. topsoil; mulch) are certified as weed free using vendor declaration certificates.
- Apply herbicides in a ‘spot spray or wick’ manner to weed infested areas. ‘Blanket’ spraying along roadsides is not permitted in the WTWHA.
- Do not transport topsoil. Respread weed-free topsoil in the immediate vicinity of the area it was stripped from.

**Treat weeds**
When undertaking weed management observe the following:
- Use only non-residual herbicides and those without surfactants (spreading agents) in the vicinity of water courses. Residual herbicides may be used in table drains only if they are used in a spot spray manner. Note: Residual herbicides persist in the soil and can be washed into watercourses. Surfactants can lead to suffocation of amphibians.
- Undertake weed control (e.g. slash and spray) and
ensure:
- Native vegetation is not also killed
- Areas where weeds are removed are replanted with native plants (refer Appendix B). Note: Regrowth of native plants can prevent weed regrowth.

Minimise Visual Impact

It is important to minimise negative impacts on the visual beauty of the WTWHA. Roads present the WTWHA to the community and tourists. Well maintained roads enhance the presentation values of the area.

- Consider the visual effect of roadside works. If you think works will have a major effect, discuss with your Supervisor.
- Paint over graffiti with a similar colour to the affected surface (e.g. rock faces, guard rail, etc) as soon as possible to discourage repeat acts of graffiti. Note: Graffiti decreases the natural beauty of an area. Communities expect governments to treat graffiti.
- Notify the relevant local government when abandoned vehicles are found. Local government is responsible for removal of these. Note: Abandoned vehicles lower the natural beauty of the WTWHA.
- Maintain road side stops and lookouts by:
  - Mowing around seating and viewing areas
  - Picking up litter
  - Controlling weeds
  Note: Roadside stops and lookouts present the WTWHA to road users. If you observe that views have been obstructed by overgrown vegetation, please inform TMR Environmental Officer.
- Trim trees adjacent to roads in a way that encourages canopy connectivity (FIGURES 4 and 5).
  Note: Driving along a road where trees connect overhead is a pleasant experience for visitors to the WTWHA.
What are Bridge Works?

“Bridge Works” are maintenance activities on any component of a bridge structure (FIGURE 9). Works that require disturbance to watercourse banks or beds (e.g. reinstating timber piles) are considered major works which will require advice from WTMA (refer Appendix G). Major works are not covered in this Code.

“Bridge Works” includes:

- Bridge servicing
- Cleaning out expansion joints and associated drains
- Timber preserving/waterproofing treatment
- Repairing/replacing kerbs
- Replacing deck planks
- Treating for termites
- Cleaning/repaing steel surfaces
Requirements

Avoid Disturbance

Minimise clearing

• Do not disturb watercourse beds or banks. Seek advice from a TMR Environmental Officer if you think works will require such disturbance (FIGURE 9).

• Trim vegetation at watercourses only when it is needed to access a bridge. Cut vegetation at watercourses in a way that allows resprouting (i.e. only remove the parts of branches that obstruct works).

Note: Vegetation along watercourses (riparian vegetation) has an important role in stabilising banks and often provides a safe movement path for animals.

Minimise noise, dust and light

• Minimise noise in the WTWHA (e.g. fit engine guards on machinery).

• Avoid "temporary" lighting within the rainforest for long periods. Lights can disturb animals.

Protect cultural heritage

• Report any items/areas of cultural heritage (refer Appendix D) that are discovered to DEHP (refer Appendix G). This is a legal requirement and will assist DEHP to record the location.

Maintain Animal Corridors and Habitat

• Give special consideration to known riparian fauna corridors.

Prevent Contamination

Contain chemicals

• Do not clean scuppers by hosing into waterways.

• Prevent contamination to waterways and land by containing fuels and other chemicals, by the following:

  a. Store correctly

• Store chemicals outside of the WTWHA if possible.

• Keep storage sites outside the floodplain of the water course and away from the bridge and table drains. Locate storage sites within the road formation.

• Keep all chemical containers (including fuel drums and paint tins) in a watertight enclosure (e.g. bunded pallets and drip trays). The enclosure needs to be large enough to contain 110% capacity of the chemicals it is containing (e.g. a 100 litre drum should be contained within an enclosure able to hold 110 litres). This will prevent overflow during rainfall and conforms to the Australian Standard AS1940.
b. Use correctly

- Capture all removed surface coatings (e.g. scraped vinyl based paints) in a watertight device (e.g. scaffold contained in canvas). This device should be in place prior to works commencing. Collect all captured waste material and remove from the WTWHA to an appropriate facility.

  Note: Lead based paint is highly toxic and is a regulated waste (under the Environmental Protection Act 1994). Works involving this will require strict workplace health and safety and environment procedures. Refer to TMR Environmental Officer.

- Capture and remove all grease, oil, lubricants etc when maintaining or refuelling machinery within the WTWHA.

**Clean up spills**

- The Works Supervisor must report all spills in watercourses to DEHP (refer Appendix G).
- Ensure a fit-for-purpose spill kit is available on site

  Note: Special spill kits and containment devices are available for spills into water. Ensure staff are trained in its use.

- In the event of spills to water:

  1. Identify the source (e.g. hole in bund) and block further spill.
2. Prevent spill from spreading (e.g. oil spills can be contained within an enclosure as oil will not mix with water).

3. Use spill kit to clean up.

4. Scrape or soak up contained/treated spill (where appropriate).

5. Seek advice from DEHP about correct waste disposal (refer Appendix G).

6. Seek advice if further treatment may be necessary.

In the event of spills to land:

1. Identify the source (e.g. hole in bund) and block further spill.

2. Prevent spill from spreading.

3. Use spill kit to clean up.

4. Dig out contaminated soil and replace with clean material, if necessary.

5. Seek advice from DEHP about correct waste disposal (refer Appendix G).

6. Seek advice if further treatment may be necessary.

**Manage Waste**

Waste may be created by works or the public. Waste includes: chemical drums; food scraps; cans, tins and bottles; machinery parts; oil rags; tyres; flagging tape; etc.

- Separate all waste that can be reused or recycled (e.g. glass, cans etc).

- Collect debris (e.g. sweep up excess crumbled bitumen) and remove from site.

- Remove all waste from the WTWHA to an appropriate site (e.g. Landfill). Seek advice from TMR Environmental Officer, if required. Transport waste in a covered skip or truck to an appropriate disposal facility.

**Prevent Weed Spread**

TMR has a legal responsibility to manage weeds.

- Wash-down vehicles to remove weed seed/cuttings if vehicles leave the road formation or go through weedy areas (refer FIGURE 2). Wash-down must occur at a wash-down facility (not on site) prior to moving to another site.

- Refer to “Prevent Weed Spread” in the ‘Roadside Works’ section for methods of identification, prevention and treatment of weeds.
Identify Potential Problems

- Look for potential problems in the area during works such as new weeds not seen before, ‘dieback’ (refer Appendix E) and signs of erosion.

- Refer to ‘Identify Potential Problems’ in the ‘Non-Surface Disturbance Works’ section for more details about the sort of things to look for.
What are Drainage Works?

“Drainage Works” is repair and/or replacement of parts of the road drainage system, including culverts and floodways.

“Drainage Works” include:

- Installing/repairing/cleaning earth surface drains
- Installing/repairing/cleaning concrete surface drains
- Installing/repairing/cleaning culverts and pipes
- Repairing inlet/outlet scours
- Installing/inspecting/cleaning subsoil drains
- Cleaning floodways
- Installing/maintaining/removing Erosion and Sediment Control (ES&C) measures

DRAINAGE WORKS

WILL WORK REQUIRE EXCAVATION?

YES

WILL WORK STAY WITHIN THE FOOTPRINT OF DISTURBANCE?

NO

Example: Cleaning culverts

Example: Extension of structure

NO

REFER TO TMR ENVIRONMENTAL OFFICER

ADDITIONAL WTMA PERMIT

YES

FOLLOW CODE OF PRACTICE (DRAINAGE WORKS)
**Requirements**

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**Avoid Disturbance**

*Minimise clearing*

- Talk to TMR Environmental Officer if you intend to create disturbance beyond the road formation (i.e. the outer edge of the table drain) (FIGURE 1).
- Locate stockpiles within the road formation (i.e. already disturbed area).
  
  Note: Placing stockpiles at the base of trees can kill them by preventing oxygen from reaching the tree roots.

*Minimise noise, dust and light*

- Minimise noise in the WTWHA (e.g. fit engine guards on machinery).
- Avoid "temporary" lighting within the rainforest for long periods. Lights can disturb animals.

*Protect cultural heritage*

- Report any items/areas of cultural heritage (refer Appendix D) that are discovered to DEHP (refer Appendix G). This is a legal requirement and will assist DEHP to record the location.

---

**Manage Sediment in Drainage Structures**

*a. Clean Culverts and Pipes*

- Clean culverts regularly.
  
  Note: Regular cleaning will not require the use of sediment trapping devices - refer below.
- Clean out low volumes of sediment (i.e. 1/3 height of culvert or less) with a hose (FIGURE 10).
- Clean out large volumes of sediment (i.e. greater than 1/3 height of culvert) as follows:
  1. Enclose area adjacent to outlet of culvert with a sediment trapping device (e.g. sandbags).
  2. Gently hose or sweep sediment from the culvert (i.e. do not erode area).
  3. Remove captured sediment (e.g. with shovel).
  4. Transport sediment out of WTWHA or to an approved stockpile site, in a covered truck.
    
    Note: Sediment may contain heavy metals washed from the road.
  5. Remove sediment trapping device prior to leaving site.
b. Clean Drains (FIGURE 11)
• Clean concrete drains as follows:
  1. Sweep with a broom and collect sediment.
  2. Inspect for signs of edge erosion (which may undermine the structure) and repair if present. Seek advice from a supervisor.
• Clean earth drains and ensure:
  - the profile of the drain is retained (to maintain capacity and avoid generating erosion & sediment
  - grading is restricted to outer edge of table drains.

c. Clean Sediment Retention Devices (FIGURE 11)
• Clean all sediment retention devices (e.g. sediment basins; rock check dams) regularly to ensure capacity is maintained.
• Transport sediment to an approved stockpile site, in a covered skip or truck.
  Note: Sediment may contain heavy metals washed from the road.

Manage Disturbed Soil
Disturbed soil, generated by drainage works, should be managed so it doesn’t wash into watercourses. Sediment build-up in waterways can stop water from reaching habitats and can restrict or kill aquatic animals.
• Install/replace drainage structures (e.g. culverts; subsoil drains) (FIGURE 12), by following this procedure:
  1. Enclose area of works with a sediment trapping device (e.g. sandbags).
  2. Excavate required area (e.g. trench).
  3. Install structure (e.g. culvert).
  4. Provide protection at the outlets of drainage structures, particularly where these empty directly into watercourses. Seek advice from a TMR Environmental Officer on required outlet protection.
  5. Reuse excavated soil where possible (e.g. backfill trench).
  6. Remove excess soil (i.e. soil that cannot be compacted into disturbed work area) from WTWHA or transport to an approved stockpile site.
  7. Remove sediment trapping devices and tidy area prior to leaving site.
  8. Rehabilitate area if necessary. Refer “Rehabilitating Disturbed Areas” in Roadside Works chapter.
FIGURE 10

CLEAN CULVERTS
FIGURE 11

MAINTENANCE OF EXISTING STRUCTURES

- TABLE DRAINS
  - CLEAR TABLE DRAINS
  - CLEAN WHEN AT 1/3 CAPACITY
- CONCRETE LINED DRAINS
  - REMOVE SEDIMENT & REPAIR EROSION
  - REMOVE SEDIMENT FENCES
  - ROCK CHECK DAMS
FIGURE 12

LARGE INSTALLATION e.g. CULVERT

SANDBAG AREA

EXCAVATE AREA

REBUILD AREA

PROTECT AREA

TIDY AREA

SOIL

BITUMEN

REUSE EXCAVATED SOIL

PROTECT AND STABILISE INLET & OUTLET

REMOVE RESEARCH SANDBAG & COVER SOIL & BITUMEN
Maintain Animal Corridors and Habitat

• Give special attention to significant areas (e.g. known habitat trees).
• Take care not to disturb vegetation surrounding culverts. Vegetated cover is often important to encourage animals to use culverts as safe passageways.

Prevent Contamination

Contain chemicals

• Prevent contamination to waterways and land by containing fuels and other chemicals, by the following:
  a. Store correctly
  • Store chemicals outside of the WTWHA if possible.
  • Keep storage sites outside the floodplain of the water course and away from the bridge and table drains. Locate storage sites within the road formation.
  • Keep all chemical containers (including fuel drums and paint tins) in a watertight enclosure (e.g. bunded pallets and drip trays). The enclosure needs to be large enough to contain 110% capacity of the chemicals it is containing (e.g. a 100 litre drum should be contained within an enclosure able to hold 110 litres). This will prevent overflow during rainfall and conforms to the Australian Standard AS1940.

  b. Use correctly
  • Use only non-residual herbicides, and those without surfactants (spreading agents) in the vicinity of watercourses. Residual herbicides persist in the soil and can be washed into watercourses
  • Apply all herbicides in a spot-spray manner (i.e. only spray in vicinity of weeds). Blanket spraying along roadsides is not permitted in the WTWHA.
Note: spot spraying of residual herbicides may be undertaken in table drains, however non-residuals are preferred.

• Capture and remove all grease, oil, lubricants etc when maintaining or refuelling machinery within the WTWHA.

Clean up spills
• The Works Supervisor must report all spills in watercourses to DEHP (refer Appendix G).
• Ensure a fit-for-purpose spill kit is available on site.
  Note: Special spill kits and containment devices are available for spills into water. Ensure staff are trained in its use.

• In the event of spills to water:
  1. Identify the source (e.g. hole in bund) and block further spill.
  2. Prevent spill from spreading (e.g. oil spills can be contained within an enclosure as oil will not mix with water).
  3. Use spill kit to clean up.
  4. Scrape or soak up contained/treated spill (where appropriate).
  5. Seek advice from DEHP about correct waste disposal (refer Appendix G).
  6. Seek advice if further treatment may be necessary.

• In the event of spills to land:
  1. Identify the source (e.g. hole in bund) and block further spill.
  2. Prevent spill from spreading.
  3. Use spill kit to clean up.
  4. Dig out contaminated soil and replace with clean material, if necessary.
  5. Seek advice from DEHP about correct waste disposal (refer Appendix G).
  6. Seek advice if further treatment may be necessary.
Manage Waste
Waste may be created by works or the public. Waste includes: vegetation trimmings; chemical drums; food scraps; cans, tins and bottles; machinery parts; oil rags; tyres; flagging tape; etc.

- Mulch manageable sized vegetation trimmings (not weeds) and respread on the ground of adjacent vegetated areas. Do not disturb existing vegetation.

- Manage large logs by undertaking the following:
  1. Place logs in adjacent areas to provide animal habitat without disturbing existing vegetation. Hollow logs especially provide shelter and nesting sites for a large number of animals.
  2. Remove logs from areas where they may be a safety risk to motorists. These logs may be taken off-site to an approved disposal site if required.
  3. Remove logs from areas with steep slopes, where logs may roll and damage adjacent vegetation. These logs may be taken off-site if required.

- Do not bury or burn waste.
- Separate all waste that can be reused or recycled (e.g. glass, cans etc).
- Collect debris (e.g. sweep up excess crumbled bitumen) and remove from site.

- Remove all waste, other than trimmings and logs, from the WTWHA to an appropriate site (e.g. landfill). Seek advice from TMR Environmental Officer, if required. Transport waste in a covered skip or truck to an appropriate disposal facility.

Prevent Weed Spread
TMR has a legal responsibility to manage weeds.

- Wash-down vehicles to remove weed seed/cuttings if vehicles leave the road formation or go through weedy areas (refer FIGURE 2). Wash-down must occur at a wash-down facility (not on site) prior to moving to another site.

- Refer to “Prevent Weed Spread” in the ‘Roadside Works’ section for methods of identification, prevention and treatment of weeds.

Identify Potential Problems
- Look for potential problems in the area during works such as new weeds not seen before, ‘dieback’ (refer Appendix E) and signs of erosion.

- Refer to ‘Identify Potential Problems’ in the ‘Non-Surface Disturbance Works’ section for more details about the sort of things to look for.
What are Road Furniture Works?

“Road Furniture Works” is repair and/or replacement of road furniture items along the roadside. Road furniture of a large size and/or that is quite different to the existing roadside may have a major visual impact. If you think a new structure might be in this category, WTMA should be contacted (refer Appendix G).

“Road Furniture Works” includes:

- Installing/repairing road signs.
- Installing/repairing/replacing guardrail.
- Repairing wire rope barriers.
- Repairing/replacing guide markers.
- Cleaning/painting guide markers.
- Cleaning/painting guard rail.
- Installing fences.

### ROAD FURNITURE WORKS

**What are Road Furniture Works?**

"Road Furniture Works" is repair and/or replacement of road furniture items along the roadside. Road furniture of a large size and/or that is quite different to the existing roadside may have a major visual impact. If you think a new structure might be in this category, WTMA should be contacted (refer Appendix G).

"Road Furniture Works" includes:

- Installing/repairing road signs.
- Installing/repairing/replacing guardrail.
- Repairing wire rope barriers.
- Repairing/replacing guide markers.
- Cleaning/painting guide markers.
- Cleaning/painting guard rail.
- Installing fences.
Requirements

Avoid Disturbance

Minimise clearing
• Talk to TMR Environmental Officer if you intend to create disturbance beyond the road formation (i.e. beyond the outer edge of the table drain) (FIGURE 1).
• Locate stockpiles within the road formation (i.e. already disturbed area). Note: Placing stockpiles at the base of trees can kill them by preventing oxygen from reaching the tree roots.

Minimise noise, dust and light
• Minimise noise in the WTWHA (e.g. fit engine guards on machinery).
• Avoid "temporary" lighting within the rainforest for long periods. Lights can disturb animals.

Protect cultural heritage
• Report any items/areas of cultural heritage (refer Appendix D) that are discovered to DEHP (refer Appendix G). This is a legal requirement and will assist DEHP to record the location.

Manage Disturbed Soil
Disturbed soil generated by road furniture installations must be managed so it doesn’t wash into watercourses and harm aquatic animals or plants.

a. Large Installations (e.g. fence/culvert) - FIGURE 12
When installing large items of road furniture that will create large areas of disturbed ground, follow this procedure:

1. Enclose area of works with a sediment trapping device (e.g. sandbags).
2. Excavate required area (e.g. trench).
3. Install structure (e.g. culvert).
4. Reuse excavated soil where possible (e.g. backfill trench).
5. Remove excess soil (i.e. soil that cannot be compacted into disturbed work area) from WTWHA or transport to an approved stockpile site.
6. Remove sediment trapping devices and tidy area prior to leaving site.
7. Rehabilitate area if necessary. Refer “Rehabilitating Disturbed Areas” in Roadside Works chapter.
b. Small Installations (e.g. guide posts; guard rails) - FIGURE 13

When installing small items of road furniture that will only create small areas of disturbed ground, follow this procedure:

1. Excavate where necessary (e.g. post holes).
2. Install structure (e.g. posts)
3. Reuse excavated soil where possible (e.g. Push around post).
4. Compact all loose soil (e.g. with shovel).
5. Tidy area prior to leaving site.

Prevent Contamination

Contain chemicals

• Prevent contamination to waterways and land by containing fuels and other chemicals, by the following:

a. Store correctly

• Store chemicals outside of the WTWHA if possible.
• Keep storage sites outside the floodplain of the water course and away from the bridge and table drains. Locate storage sites within the road formation.

b. Use correctly

• Capture and remove all grease, oil, lubricants etc when maintaining or refuelling machinery within the WTWHA.

• Keep all chemical containers (including fuel drums and paint tins) in a watertight enclosure (e.g. bunded pallets and drip trays). The enclosure needs to be large enough to contain 110% capacity of the chemicals it is containing (e.g. a 100 litre drum should be contained within an enclosure able to hold 110 litres). This will prevent overflow during rainfall and conforms to the Australian Standard AS1940.
FIGURE 12

**LARGE INSTALLATION e.g. CULVERT**

- **SANDBAG AREA**
- **EXCAVATE AREA**
- **REBUILD AREA**
- **PROTECT AREA**
- **TIDY AREA**

- Use excavated soil for protection and stabilisation of inlet and outlet.
- Remove excess soil and bitumen.
FIGURE 13

**SMALL INSTALLATION** *e.g.* **GUARD RAIL**

- **EXCAVATE AREA**
- **BUILD AREA**
- **TIDY AREA**

- **REUSE EXCAVATED SOIL**
- **REMOVE SOIL & EXCESS SOIL**
Clean up spills

- The Works Supervisor must report all spills in watercourses to DEHP (refer Appendix G).
- Ensure a fit-for-purpose spill kit is available on site. Note: Special spill kits and containment devices are available for spills into water. Ensure staff are trained in its use.

- In the event of spills to water:
  1. Identify the source (e.g. hole in bund) and block further spill.
  2. Prevent spill from spreading (e.g. oil spills can be contained within an enclosure as oil will not mix with water).
  3. Use spill kit to clean up.
  4. Scrape or soak up contained/treated spill (where appropriate).
  5. Seek advice from DEHP about correct waste disposal (refer Appendix G).
  6. Seek advice if further treatment may be necessary.

- In the event of spills to land:
  7. Identify the source (e.g. hole in bund) and block further spill.
  8. Prevent spill from spreading.
  9. Use spill kit to clean up.
  10. Dig out contaminated soil and replace with clean material, if necessary.
  11. Seek advice from DEHP about correct waste disposal (refer Appendix G).
  12. Seek advice if further treatment may be necessary.

Manage Waste

Waste may be created by works or the public. Waste includes: chemical drums; food scraps; cans, tins and bottles; machinery parts; oil rags; tyres; flagging tape; etc.

- Do not bury or burn waste.
- Separate all waste that can be reused or recycled (e.g. glass, cans etc).
- Collect debris (e.g. sweep up excess crumbled bitumen) and remove from site.
- Remove all waste from the WTWHA to an appropriate site (e.g. Landfill). Seek advice from TMR Environmental Officer, if required.
- Transport waste in a covered skip or truck to an appropriate disposal facility.
Prevent Weed Spread

TMR has a legal responsibility to manage weeds.

• Wash-down vehicles to remove weed seed/cuttings if vehicles leave the road formation or go through weedy areas (refer FIGURE 2). Wash-down must occur at a wash-down facility (not on site) prior to moving to another site.

• Refer to “Prevent Weed Spread” in the ‘Roadside Works’ section for methods of identification, prevention and treatment of weeds.

Minimise Visual Impacts

It is important to minimise negative impacts on the visual beauty of the WTWHA. Roads present the WTWHA to the community and tourists. Well maintained roads enhance the presentation values of the area.

Consider visual impacts of new features

• Contact a TMR Environmental Officer if you are concerned that new road furniture will have a large visual impact. The Environmental Officer will seek advice from WTMA.

• Avoid paint splatter and drips as these look untidy.

Identify Potential Problems

• Look for potential problems in the area during works such as new weeds not seen before, ‘dieback’ (refer Appendix E) and signs of erosion.

• Refer to ‘Identify Potential Problems’ in the ‘Non-Surface Disturbance Works’ section for more details about the sort of things to look for.
What are Sealed Road Surface Works?

“Sealed Road Surface Works” are any activities that maintain pavements.

“Sealed Road Surface Works” include:

- Pavement edge repair
- Surface correcting
- Pothole patching
- Resealing
- Crack treatment with emulsion/aggregate
- Profile planing
- Scarifying
- Asphalt overlaying
- Surface sweeping
- Surface debris removal
- Line marking
Requirements

Avoid Disturbance

Minimise clearing
- Talk to TMR Environmental Officer if you intend to create disturbance beyond the road formation (i.e. the outer edge of the table drain) (FIGURE 1).
- Locate stockpiles within the road formation (i.e. already disturbed area).
  Note: Placing stockpiles at the base of trees can kill them by preventing oxygen from reaching the tree roots.
- Restrict parking of vehicles and machinery to the road formation.

Minimise noise, dust and light
- Minimise noise in the WTWHA (e.g. fit engine guards on machinery).
- Avoid "temporary" lighting within the rainforest for long periods. Lights can disturb animals.

Protect cultural heritage
- Report any items/areas of cultural heritage (refer Appendix D) that are discovered to DEHP (refer Appendix G). This is a legal requirement and will assist DEHP to record the location.

Prevent Contamination

Contain chemicals
- Prevent contamination to waterways and land by containing fuels and other chemicals, by the following:

  a. Store correctly
- Store chemicals outside of the WTWHA if possible.
- Keep storage sites outside the floodplain of the water course and away from the bridge and table drains. Locate storage sites within the road formation.
- Keep all chemical containers (including fuel drums and paint tins) in a watertight enclosure (e.g. bunded pallets and drip trays). The enclosure needs to be large enough to contain 110% capacity of the chemicals it is containing (e.g. a 100 litre drum should be contained within an enclosure able to hold 110 litres). This will prevent overflow during rainfall and conforms to the Australian Standard AS1940.
b. Use correctly

- Capture and remove all grease, oil, lubricants etc when maintaining or refuelling machinery within the WTWHA.
- Capture waste product with a sand filled container when cleaning bitumen spray bars. Dispose waste product outside of the WTWHA in an appropriate manner. Seek advice from TMR Environmental Officer for appropriate disposal.
- Do not spray bitumen if rain is forecast 24 hours before or after the proposed date of spraying.

Note: If rain occurs during or soon after spraying, there is a high potential for hydrocarbons to be washed into creeks. This is hazardous for frogs and other aquatic animals.

Clean up spills

- The Works Supervisor must report all spills in watercourses to DEHP (refer Appendix G).
- Ensure a fit-for-purpose spill kit is available on site.

Note: Special spill kits and containment devices are available for spills into water. Ensure staff are trained in its use.

- In the event of spills to water:
  1. Identify the source (e.g. hole in bund) and block further spill.
  2. Prevent spill from spreading (e.g. oil spills can be contained within an enclosure as oil will not mix with water).
  3. Use spill kit to clean up.
  4. Scrape or soak up contained/treated spill (where appropriate).
  5. Seek advice from DEHP about correct waste disposal (refer Appendix G).
  6. Seek advice if further treatment may be necessary.

- In the event of spills to land:
  1. Identify the source (e.g. hole in bund) and block further spill.
2. Prevent spill from spreading.
3. Use spill kit to clean up.
4. Dig out contaminated soil and replace with clean material, if necessary.
5. Seek advice from DEHP about correct waste disposal (refer Appendix G).
6. Seek advice if further treatment may be necessary.

**Manage Waste**

Waste may be created by works or the public. Waste includes: chemical drums; food scraps; cans, tins and bottles; machinery parts; oil rags; tyres; flagging tape; etc.

- Do not bury or burn waste.
- Separate all waste that can be reused or recycled (e.g. glass, cans etc).
- Collect debris (e.g. sweep up excess crumbled bitumen) and remove from site.
- Remove all waste from the WTWHA to an appropriate site (e.g. Landfill). Seek advice from TMR Environmental Officer, if required.
- Transport waste in a covered skip or truck to an appropriate disposal facility.

**Prevent Weed Spread**

TMR has a legal responsibility to manage weeds.

- Wash-down vehicles to remove weed seed/cuttings if vehicles leave the road formation or go through weedy areas (refer FIGURE 2). Wash-down must occur at a wash-down facility (not on site) prior to moving to another site.
- Refer to “Prevent Weed Spread” in the ‘Roadside Works’ section for methods of identification, prevention and treatment of weeds.
Identify Potential Problems

- Look for potential problems in the area during works such as new weeds not seen before, ‘dieback’ (refer Appendix E) and signs of erosion.
- Refer to ‘Identify Potential Problems’ in the ‘Non-Surface Disturbance Works’ section for more details about the sort of things to look for.
**What are Non-surface Disturbance Works?**

“Non-surface Disturbance Works” are maintenance activities that do not physically add to or remove from the road formation or roadside. These activities generally involve observing or inspecting. Observation and inspection activities do not require special care in the WTWHA if vehicles do not leave the road formation.

“Non-surface Disturbance Works” include:

- Inspections for safety clearance zones.
- Bridge and/or road surface inspections.
- Drainage structure inspections.
- Environmental Management Plan auditing.
Requirements

Prevent Weed Spread
TMR has a legal responsibility to manage weeds.

• Wash-down vehicles to remove weed seed/cuttings if vehicles leave the road formation or go through weedy areas (refer FIGURE 2). Wash-down must occur at a wash-down facility (not on site) prior to moving to another site.
• Refer to “Prevent Weed Spread” in the ‘Roadside Works’ section for methods of identification, prevention and treatment of weeds.

Identify Potential Problems
Maintenance workers can help manage the WTWHA by identifying potential problems or solutions during their works.

Identify environmental issues relating to roads
a. Identify erosion and sediment build-up
• Look for signs of instability, erosion or sediment build-up. Examples of things to look for are:
  - likely landslip areas
  - sediment build-up in culverts and drains
  - erosion adjacent to concrete lined drains
  - erosion at outlet of culverts.
• Report these potential problems to the Maintenance Supervisor who should discuss solutions with a TMR Environmental Officer.
  Note: Early detection can prevent costly problems developing.

b. Identify weeds
• Look for weed problems such as:
  - Types of weeds never seen in an area before.
  - Large increase of weeds in an area.
  - Regrowth of weeds in a treated area.
• Report these problems to the Maintenance Supervisor who should discuss solutions with a TMR Environmental Officer.
  Note: Local governments, with assistance from NR&M, can manage weeds for TMR if problems are reported to them. Refer to Appendix C for problem weed species in the WTWHA.

c. Report important fauna sightings
• Report sightings of animals crossing roads or animals that have been killed on roads to TMR Environmental Officer and researchers (refer to Appendix G).
• This can help identify:
  - hotspots for road kills
  - possible sites for fauna overpasses and underpasses.

**Notify other government departments about issues relevant to them**

**a. Dieback**

Dieback causes death of plants. There are many causes of Dieback. A known cause of Dieback in the WTWHA is the fungus *Phytophthora cinnamomi* which attacks the roots of plants and stops them from getting water. Refer to Appendix E.

• Report suspected Dieback signs to DEHP (Parks and Wildlife) so that the Dieback may be mapped and managed (refer to Appendix G).

**b. Weeds**

• Report weed problems (as described above) to DEHP (refer to Appendix G) so that they can remove vehicles. Note: Abandoned vehicles can obstruct traffic and impact the natural beauty of the WTWHA.

**c. Cultural Heritage**

• Report any items/areas of cultural heritage (refer to Appendix D) that are discovered to DEHP (refer to Appendix G). This is a legal requirement and will assist DEHP to record the location.

**d. Abandoned Vehicles**

• Report abandoned vehicles to the relevant local government (refer to Appendix G) so that they can remove vehicles.
International and Commonwealth Law

In 1974 Australia adopted the United Nations Educational, Scientific and Cultural Organisation (UNESCO) World Heritage Convention. This Convention is a recognition of the need to identify and permanently protect the world’s special areas.

Australia’s commitment is recorded in the:

(a) World Heritage Properties Conservation Act 1983 (Commonwealth);

(b) Wet Tropics of Queensland World Heritage Area Conservation Act 1994 (Commonwealth);

(c) Environment Protection and Biodiversity Conservation Act 1999.

Queensland State Law

The Wet Tropics Management Plan 1998 was established by the Wet Tropics World Heritage Protection and Management Act 1993 (Qld).

Under this Plan, permits are required to maintain roads and clear vegetation along roadsides within the WTWHA.

These permits are issued by the Wet Tropics Management Authority (WTMA). This Authority was established to manage the WTWHA by the Wet Tropics World Heritage Protection and Management Act 1993.

Transport and Main Roads permit from the WTMA

Transport and Main Roads is required to comply with a permit issued by the WTMA when maintaining roads and clearing vegetation in the WTWHA.

A permit is required because the Wet Tropics Management Plan 1998 provides that:

• A person must not maintain a road within the Wet Tropics World Heritage Area unless it is lawfully carried out under a permit. [Section 26(1)(g)]

• A permit may be issued to a person to clear vegetation around a road to the extent necessary for its appropriate use. [Section 33(e)]
Why do we need a Code of Practice?

The *Wet Tropics Management Plan 1998* states that a condition of a permit, to carry out an activity (such as road maintenance), may be that the applicant (in this case, Transport and Main Roads) must comply with a code of practice for the activity. WTMA requires that TMR prepare and follow a Code of Practice for road maintenance activities and the clearing of roadside vegetation, in the WTWHA.

The Road Maintenance Code of Practice applies only to works within the ‘footprint of disturbance’ (FIGURE 1 at front of Code).

WTMA wants works to stay within the ‘footprint of disturbance’ because:

1) Section 65(1) of the Wet Tropics Management Plan 1998 states that the Authority (WTMA) may issue a permit only if the roadworks under the permit would not have a net adverse impact on the integrity of the area or there is no prudent and feasible alternative.

2) Section 65(2) requires that, to the greatest possible extent, roadworks be confined to land already cleared or otherwise degraded.

3) Section 65(3) says that the Authority may permit canopy clearing only if it is satisfied that:
   a) this is needed for public safety, provision of a community service, access to a residence or an activity the Authority considers necessary to properly manage the area under this plan; or
   b) this will reduce the impact on the area’s integrity of other activities being carried out or likely to be carried out.

What happens when works need to be outside the ‘footprint of disturbance’?

When works fall outside of the ‘footprint of disturbance’ they are not covered by the Transport and Main Roads permit to maintain roads in the WTWHA.

The following works are considered outside the ‘footprint of disturbance’ and will require an additional permit from WTMA for each and every instance:

- upgrading, extending or widening of an existing road;
- activities requiring canopy clearing;
- clearing beyond the existing disturbed or cleared area.
Methods of Stabilising Disturbed Ground

Disturbed surfaces should be stabilised to prevent erosion. The table below outlines some methods of stabilising disturbed ground for roadside works in the WTWHA.

Table 1. Some methods of stabilising disturbed ground for roadside works in the WTWHA.

<table>
<thead>
<tr>
<th>Stabilisation Method</th>
<th>Pros</th>
<th>Cons</th>
<th>Applications</th>
<th>Things to consider</th>
</tr>
</thead>
</table>
| Brush Matting                | Placing native brush material (twigs, cuttings, leaf litter) carefully harvested from adjacent bushland over disturbed surface. | ▪ Can provide a source of local native seed for natural revegetation if material with seeds is included  
▪ Encourages plant growth by retaining moisture, regulating soil temperatures & encouraging soil microorganisms.  
▪ Low cost  
▪ Can be done manually | ▪ Natural revegetation can be less successful in rainforest  
▪ Can blow/slide off exposed or steep areas  
▪ Labour intensive | Less steep, accessible areas  
▪ Natural revegetation more successful in eucalypt forest or rainforest edges where many fast growing species (eg wattles) germinate from seeds stored on trees |
| Hand Mulching                | Straw, woodchips etc placed over disturbed surface.                  | ▪ Encourages plant growth by retaining moisture, regulating soil temperatures & encouraging soil microorganisms  
▪ Low cost for small areas  
▪ Can be done manually  
▪ Can suppress weeds if applied thickly | ▪ Can blow/slide off exposed or steep areas  
▪ Labour intensive | Less steep, accessible areas  
▪ Mulch should be weed free  
▪ Pine bark and can leach toxins |
| Hydromulching                | Mulch mixed with water and an organic binder sprayed from a hydromulching machine. (Approximately 200kg of organic matter per hectare.) | ▪ Encourages plant growth by retaining moisture and regulating soil temperatures  
▪ Seed can be included with the mulch  
▪ Can reach steep or otherwise inaccessible areas  
▪ Fast coverage of large areas | ▪ Requires specialist machinery  
▪ Water soluble glues not be as effective in wet areas | Inaccessible slopes and large disturbed areas  
▪ Seek advice from TMR Environmental Officer on appropriate application rates  
▪ Seek advice from TMR Environmental Officer on appropriate seed mixes (if included) |
| Bonded Fibre Matrix          | Similar to hydromulch with much higher levels of organic materials and stronger non-soluble binders. (Approximately 4000 – 10000kg of organic matter per hectare.) | ▪ Sticks to steep slopes  
▪ Seed can be included with the mulch.  
▪ Can reach steep or otherwise inaccessible areas  
▪ Fast coverage of large areas  
▪ Binders will not fail in wet conditions. | ▪ Requires specialist machinery.  
▪ Can inhibit natural regrowth  
▪ Visually unattractive | Steep, inaccessible slopes and large disturbed areas  
▪ Seek advice on appropriate application rates  
▪ Seek advice on appropriate seed mixes (if included) |
<table>
<thead>
<tr>
<th>Stabilisation Method</th>
<th>Pros</th>
<th>Cons</th>
<th>Applications</th>
<th>Things to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Erosion Control Blankets / Textiles</td>
<td>Rolled blankets woven from organic or inorganic materials that are pegged onto the ground</td>
<td>Things to consider</td>
<td>Small slopes</td>
<td>seek advice on appropriate seed mixes or plants if included</td>
</tr>
<tr>
<td>Rock Mulch</td>
<td>Small sized rock placed over a surface to prevent it from being eroded</td>
<td>Can provide long term erosion protection if installed correctly</td>
<td>Small areas where water flow is concentrated</td>
<td>A smooth soil surface and often geotextile is necessary under the rock</td>
</tr>
<tr>
<td>Soil Nailing</td>
<td>Coir logs staked in place with timber stakes across unstable slopes.</td>
<td>Can bind soil layers together and provide surfaces for planing to prevent landslips</td>
<td>Steep, unstable batters and in stabilising landslips</td>
<td>seek advice on the number and positioning of coir logs necessary for the site</td>
</tr>
<tr>
<td>Rock mattresses or Gabions</td>
<td>Rock held in place by a wire basket.</td>
<td>Can stabilise steep unstable slopes</td>
<td>Steep, unstable batters &amp; areas where water flow is concentrated</td>
<td>Galvanised wire should be used</td>
</tr>
<tr>
<td>Dump rock</td>
<td>Large sized rock placed at the base of unstable slopes</td>
<td>Quick, relatively cheap method for stabilising the base of landslips where roads have slipped</td>
<td>Limited to stabilising base of landslips in emergency situations where other options are not available</td>
<td>Topsoil and seed can be added to promote vegetation growth over the rock</td>
</tr>
</tbody>
</table>

Note: This table is a guide only. Seek advice about the best stabilisation measures for each site.

The surface protection measures outlined in this table can be applied with or without planting or seeding. Vegetation is usually the best long-term method of stabilising ground and some revegetation is preferred in most areas. Revegetation could be undertaken at a different time to initial stabilisation work. See tables below for revegetation guidelines.

If possible, topsoil that has been saved by stripping before works or recovered from landslips, should be spread under/over surface protection to assist natural revegetation. For large areas treatment of topsoil to remove weed seeds should be considered.
Revegetation Guidelines

1. Which Species?
   - Seek expert advice as soon as possible regarding the best species for each situation.
   - When selecting species consider:
     - Safety (eg frangible plants within clear zones; some short lived pioneer species such as black wattle should not be planted close to roads.)
     - Purpose of revegetation and site conditions. Some plants are better suited to some situations than others eg plants that naturally colonise landslides may be good choices for stabilising landslips.
     - Level of maintenance (eg. low growing natives do not require mowing or slashing).
     - Weed prevention. Do not use species that could become environmental weeds (Refer table 2 below). Many cover crops can become environmental weeds and are not encouraged. If cover crops are used these should be sterile hybrids.
   - It is important that local plant types are planted in disturbed areas. Guidelines for species selection for different ‘provenances’ of the WTWHA are included in table 3 below. It is best practice to collect and grow plants from seeds or cuttings collected from the local area. This is because a plant of the right species from a nursery may not have the genetic make up adapted to that area. Note: Sourcing plants from local seed/cuttings can take up to 12 months.

Table 2. Plants used in revegetation which have become environmental weeds in the wet tropics.

| ● Black Spear Grass (*Heteropogon contortus*) | ● Buffell Grass |
| ● Grader Grass (*Themeda quadrivalvis*)      | ● Indian Couch  |

Table 3. Plants suitable for different ‘provenances’ of the WTWHA. *(List supplied by the Centre for Tropical Rehabilitation.)*

<table>
<thead>
<tr>
<th>LOWLAND RAINFOREST AREAS 0 – 400m asl</th>
<th>Low growing species.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees/Shrubs</td>
<td></td>
</tr>
<tr>
<td>Fig</td>
<td><em>(Ficus congesta)</em></td>
</tr>
<tr>
<td>Fig</td>
<td><em>(Ficus septica)</em></td>
</tr>
<tr>
<td>Iron Malletwood</td>
<td><em>(Rhodamnia sessiliflora)</em></td>
</tr>
<tr>
<td>Brown Laurel</td>
<td><em>(Cryptocarya tripinnervis)</em></td>
</tr>
<tr>
<td>Weeping Cleistanthus</td>
<td><em>(Gleistanthus apodus)</em></td>
</tr>
<tr>
<td>Turn in the wind</td>
<td><em>(Mallotus paniculatus)</em></td>
</tr>
<tr>
<td>Kamala</td>
<td><em>(Mallotus mollissimus)</em></td>
</tr>
<tr>
<td></td>
<td><em>(Lomandra hystrix)</em></td>
</tr>
<tr>
<td></td>
<td><em>(Alpinia caerulea)</em></td>
</tr>
</tbody>
</table>
### Table 3. Plants suitable for different ‘provenances’ of the WTWHA (continued)

(List supplied by the Centre for Tropical Rehabilitation.)

<table>
<thead>
<tr>
<th>UPLAND RAINFOREST AREAS 400-800m asl</th>
<th>Low growing species.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees/Shrubs</td>
<td></td>
</tr>
<tr>
<td>Fig (Ficus congesta)</td>
<td>Native Ginger</td>
</tr>
<tr>
<td>Fig (Ficus septica)</td>
<td>Sword Grass</td>
</tr>
<tr>
<td>Ironwood (Rhodomyrtus pervagata)</td>
<td></td>
</tr>
<tr>
<td>Creek Satinash (Syzygium australie)</td>
<td></td>
</tr>
<tr>
<td>Lillipilli Satinash (Acmena smithii)</td>
<td></td>
</tr>
<tr>
<td>Brown Myrtle (Decaspermum humile)</td>
<td></td>
</tr>
<tr>
<td>Brown Laurel (Cryptocarya triplinervis)</td>
<td></td>
</tr>
<tr>
<td>Maesa (Maesa dependans)</td>
<td></td>
</tr>
<tr>
<td>Pink Myrtle (Archirhodomyrtus beckleri)</td>
<td></td>
</tr>
<tr>
<td>Pidgeon Berry (Wickstroemia indica)</td>
<td></td>
</tr>
<tr>
<td>Kamala (Mallotus mollissimus)</td>
<td></td>
</tr>
<tr>
<td>Red Kamala (Mallotus philippensis)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HIGHLAND RAINFOREST AREAS 800m + asl</th>
<th>Low growing species.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees/Shrubs</td>
<td></td>
</tr>
<tr>
<td>Turkey Bush (Rhodamния sericea)</td>
<td>Native Ginger</td>
</tr>
<tr>
<td>Fig (Ficus congesta)</td>
<td></td>
</tr>
<tr>
<td>Fig (Ficus septica)</td>
<td></td>
</tr>
<tr>
<td>Lillipilli Satinash (Acmena smithii)</td>
<td></td>
</tr>
<tr>
<td>Fig (Ficus copiosa)</td>
<td></td>
</tr>
<tr>
<td>Boombil (Ficus hispida)</td>
<td></td>
</tr>
<tr>
<td>Pink Myrtle (Archirhodomyrtus beckleri)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EUCALYPT FOREST AREAS</th>
<th>Low growing species.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees/Shrubs</td>
<td></td>
</tr>
<tr>
<td>Sim’s Wattle (Acacia simsii)</td>
<td>Kangaroo Grass</td>
</tr>
<tr>
<td>Red Wattle (Acacia flavescens)</td>
<td>Sword Grass</td>
</tr>
<tr>
<td>Brown Salwood (Acacia aulacocarpa var minor)</td>
<td></td>
</tr>
<tr>
<td>Ti-trees (Leptospernum species)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ALL AREAS</th>
<th>Low growing species.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trees/Shrubs</td>
<td></td>
</tr>
<tr>
<td>Pandanas</td>
<td>Native Ferns</td>
</tr>
<tr>
<td>Native Palms</td>
<td>October surprise vine</td>
</tr>
<tr>
<td>Apricot Myrtle (Pilidiostigma tripicum)</td>
<td></td>
</tr>
<tr>
<td>Guioa</td>
<td>Smilax vine</td>
</tr>
<tr>
<td></td>
<td>Milla Milla Vine</td>
</tr>
<tr>
<td></td>
<td>Cissus vines</td>
</tr>
<tr>
<td></td>
<td>(Cissus spp.)</td>
</tr>
</tbody>
</table>
2. Which Revegetation Method?
The table below outlines revegetation methods that might be used on disturbed areas likely to be encountered in road maintenance works.

Table 3. Some revegetation methods available for roadside works in the WTWHA.

<table>
<thead>
<tr>
<th>Plant stock</th>
<th>Planting method</th>
<th>Pros/Cons</th>
<th>Applications</th>
<th>Things to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td><strong>Hydroseeding</strong></td>
<td>▪ Can cover large and difficult to reach areas quickly but can be expensive and require special machinery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Seed mixed with water sprayed from a hydromulch machine)</td>
<td>▪ Seed easily washed away unless mulch and binder used</td>
<td>Areas where hydromulching is being used</td>
<td>▪ Seek advice on appropriate seed mix and seeding rates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Except for wattles, success of seed establishment is unproven</td>
<td></td>
<td>▪ Viability of seed mix – many seeds can not be stored over long periods</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Areas where hydromulching is being used</td>
<td></td>
<td>▪ Mulch should also be applied to control weeds and promote growth</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Seed easily washed away unless mulch and binder used</td>
<td></td>
<td>▪ Consider treating topsoil to kill weeds for larger areas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Except for wattles, success of seed establishment is unproven</td>
<td>All accessible areas</td>
<td>▪ Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Areas where hydromulching is being used</td>
<td></td>
<td>▪ weed control may be necessary</td>
</tr>
<tr>
<td></td>
<td><strong>Hand seeding</strong></td>
<td>Efficient and cheap for small accessible areas</td>
<td></td>
<td>▪ watering may be necessary until established after germination</td>
</tr>
<tr>
<td></td>
<td>(Spreading seed by hand)</td>
<td></td>
<td></td>
<td>▪ Seek advice on appropriate seed mix and seeding rates</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Viability of seed mix – many seeds can not be stored over long periods</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Mulch should also be applied to control weeds and promote growth</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Consider treating topsoil to kill weeds for larger areas.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ weed control may be necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ watering may be necessary until established after germination</td>
</tr>
<tr>
<td></td>
<td><strong>Respread topsoil</strong></td>
<td>Can regenerate small areas with locally adapted species faster than other methods</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Topsoil can contain weed seeds</td>
<td>Small areas of disturbance.</td>
<td>▪ Seek advice on appropriate species and stock</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Should be considered in combination with other methods in most situations</td>
<td>▪ Plants with a higher root to shoot ratio are best eg long vs short tubes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Mulch should also be applied</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ weed control may be necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ watering may be necessary until established after germination</td>
</tr>
<tr>
<td></td>
<td><strong>Tube Stock</strong></td>
<td>More expensive than seed but have a higher percent establishment</td>
<td>All accessible areas</td>
<td>▪ Plants with a higher root to shoot ratio are best eg long vs short tubes</td>
</tr>
<tr>
<td></td>
<td>(potted seedlings)</td>
<td>Often have better form and quickly overtake more advanced stock</td>
<td></td>
<td>▪ Mulch should also be applied</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ weed control may be necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ watering may be necessary until established after germination</td>
</tr>
<tr>
<td></td>
<td><strong>Advanced Plants</strong></td>
<td>Expensive, difficult to handle and require more maintenance than tube stock.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Immediate appearance improvement</td>
<td>Visible areas eg Road side stops</td>
<td>▪ Seek advice on appropriate species and stock</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Plants with a higher root to shoot ratio are best eg long vs short tubes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Mulch should also be applied</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ weed control may be necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>▪ watering may be necessary until established after germination</td>
</tr>
</tbody>
</table>
Environmental Weeds = Weeds that compete with native plants and can cause serious damage to natural areas. These are of most concern to WTMA.

Declared Weeds = Weeds declared under the Land Protection (Pest and Stock Route Management) Act 2002. There is a legal requirement to control declared weeds.

If weeds are declared under the ‘P1’ (Illegal to introduce) or ‘P2’ (Must destroy) category of this Act, Transport and Main Roads is legally required to destroy any plants in the road reserve and could be fined or sued if this plant is spread as a result of road works.

It is important that the locations of weeds are reported to DEHP (refer Appendix F) or the relevant local government pest management officer so that infestations can be mapped. A control program may be developed in consultation with local government and DEHP. In many cases local governments or DEHP can control weeds on behalf of TMR as part of their existing programs if they are aware of weed locations.

<table>
<thead>
<tr>
<th>Weed</th>
<th>Description</th>
<th>Why a problem?</th>
<th>Where found?</th>
<th>What to do if seen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siam Weed</td>
<td>Grows as a dense scrambling bush with soft, hairy leaves and purple flowers.</td>
<td>Considered one of the world’s worst weeds with the potential to rapidly spread across the north and east coast.</td>
<td>Small infestations recently recorded in the Tully-Mission Beach area.</td>
<td>Report the location of any plants seen to your EO. Your EO should immediately report this to DEHP who will advise of further action required. Strict washdown/material certification should be undertaken when working in, or receiving materials from, the Mission Beach/Tully area.</td>
</tr>
<tr>
<td>(Chromolaena odorata)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mile-a-minute</td>
<td>Vine with heart-shaped leaves, greenish-white flowers grouped on long stems.</td>
<td>Considered one of the world’s worst tropical weeds. Can smother native forests and could spread throughout the wet tropics.</td>
<td>Small infestation recently recorded in the Mission Beach Area.</td>
<td>Report the location of any plants seen to your EO. Your EO should immediately report this to DEHP who will advise of further action required. Strict washdown/material certification should be undertaken when working in, or receiving materials from, the Mission Beach/Tully area.</td>
</tr>
<tr>
<td>(Mikania micrantha)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Road Maintenance Code of Practice for the Wet Tropics World Heritage Area 2012

<table>
<thead>
<tr>
<th>Weed</th>
<th>Description</th>
<th>Why a problem?</th>
<th>Where found?</th>
<th>What to do if seen?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Miconia</strong></td>
<td>Tree with large distinctly veined leaves, dark green above and purple underneath.</td>
<td>Spreads rapidly shading out native forests and pastures and increases erosion by killing ground cover plants.</td>
<td>Major weed in Pacific Island rainforests (has destroyed 70% of Tahiti’s native forests) and could have a major impact on the Wet Tropics.</td>
<td>Report the location of any plants seen to your EO. Your EO should immediately report this to DEHP who will advise of further action required.</td>
</tr>
<tr>
<td><em>Miconia calvescens</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pond Apple</strong></td>
<td>Small tree with soft grey stems containing obvious small air holes. Leaves turn yellow and fall in the dry. Large green custard apple-like fruit.</td>
<td>Dense Pond Apple stands can invade and completely replace paperbark and mangrove wetland and streamside forests.</td>
<td>Now spreading through areas between Ingham and Cooktown.</td>
<td>Report the location of any plants seen to your EO. Your EO should report the location to DEHP and the area’s local government pest management officer.</td>
</tr>
<tr>
<td><em>Annona glabra</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Singapore Daisy</strong></td>
<td>Creeper with fleshy, shiny dark green leaves with irregular teeth and bright yellow ‘daisy’ flowers.</td>
<td>Rapidly spreads forming a thick ground cover that prevents regeneration of native plants.</td>
<td>Has been used in landscaping and is found along roadsides throughout the Wet Tropics.</td>
<td>Report the location of any plants seen to your EO. Your EO should report the location to DEHP and the area’s local government pest management officer.</td>
</tr>
<tr>
<td><em>Sphagneticola trilobata</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Laurel Vines/ Blue Trumpet
 *(Thungbergia species)*

<table>
<thead>
<tr>
<th>Description</th>
<th>Why a problem?</th>
<th>Where found?</th>
<th>What to do if seen?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vigorous vine with large 'choko-like' lobed leaves and a large distinctive 'trumpet-like' blue/purple/yellow flower.</td>
<td>Major threat to remnant vegetation in the Wet Tropics. Can quickly smother vegetation and pull down mature trees.</td>
<td>Scattered distributions along coastal streams from Tully to the Daintree. Some species which are serious weeds in other countries have not been recorded in Australia yet and should be prevented from establishing.</td>
<td>Report the location of any plants seen to your EO. Your EO should report the location to DEHP and the area's local government pest management officer.</td>
</tr>
</tbody>
</table>

## Alligator Weed
 *(Alternanthera philoxeroides)*

<table>
<thead>
<tr>
<th>Description</th>
<th>Why a problem?</th>
<th>Where found?</th>
<th>What to do if seen?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small plant with dark green leaves with a distinct middle vein and white paper-like ball-shaped flowers. Can form dense mats in water.</td>
<td>Can block waterways and smother wetlands.</td>
<td>Grows along waterways and damp ground. Found in a small number of places in Queensland but has potential to spread though out coastal areas.</td>
<td>Report the location of any plants seen to your EO. Your EO should report the location to DEHP and the area's local government pest management officer.</td>
</tr>
<tr>
<td>Weed</td>
<td>Description</td>
<td>Why a problem?</td>
<td>Where found?</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hymenachne (Hymenachne amplexicaulis)</td>
<td>Stolon grass up to 2.5m high with large leaf blades that clasp the stem at their base.</td>
<td>Can totally modify tropical wetlands.</td>
<td>Introduced as a ponded pasture. Has invaded 1,000ha of land in the Wet Tropics.</td>
</tr>
<tr>
<td>Para Grass (Brachiaria mutica)</td>
<td>Large trailing grass that spreads with large stolons extending out up to 5m. Hairy shiny thin leaves. Purplish flowers grouped densely along inflorescence branches at the end of each grass stem.</td>
<td>Destroys waterbird breeding habitats and chokes tropical streams; replaces native vegetation</td>
<td>Wetlands and streams in the wet-dry and wet tropics and sub tropics</td>
</tr>
<tr>
<td>Guinea Grass (Panicum Maximum)</td>
<td>Tall upright grass (up to 3m) with fine hairless flowers in inflorescences at the end of stems. Long soft narrow leaves and rice like seeds.</td>
<td>Spreads quickly, smothering native plants. Can promote fire spread into fire sensitive areas such as riparian rainforests.</td>
<td>Widespread along roadsides in some areas of the WTWHA.</td>
</tr>
</tbody>
</table>

Sources: This list was compiled from information obtained from WTMA, DEHP and the Centre for Tropical Freshwater Research.
APPENDIX D: Cultural Heritage Examples

EXAMPLES OF HISTORIC CULTURAL HERITAGE:
- quarries and mine sites
- grave sites
- abandoned town sites
- old dwellings
- wells
- camp fires and hearths
- surveyor marks
  (see Photo A)
- roads and bridges
  (see Photo B)

Survey Markings, Birdsville, SW QLD
Heritage Crossing, Annan River, Far North QLD
EXAMPLES OF PRE-HISTORIC CULTURAL HERITAGE:

- Rock art (See Photo C)
- scarred trees (i.e. bark removed to make things like canoes)
- carved trees (i.e. bark removed and heartwood carved)
- stone arrangements and circles
- axe grinding gooves (See Photo D)
- camp fires
- cemeteries
- middens (shellfish remains associated with stone artefacts)
- stone flake artefact scatters (See Photo E)
APPENDIX E: Dieback Identifiers

Dieback causes death of plants. There are many causes of Dieback. One known cause of Dieback in the WTWHA is the fungus *Phytophthora cinnamomi* which attacks the roots of plants and stops them from getting water.

Dieback occurs naturally in the bush. However it may be spread by human activities (e.g. along roads and walking tracks) and affect much larger areas than it would naturally. The presence of dieback must be confirmed by specialists. However, there are simple field indicators you can use to help determine if Dieback is present:

These indicators are:

- Small areas of trees that die suddenly (e.g. within 6-12 months).
- Unusual discolouration of leaves (commonly red/yellow).
- Obvious spread of death in trees (e.g. oldest death in the centre or on the uphill end of a group of sick trees).
- Obvious boundaries between healthy and sick vegetation (e.g. see photo).

If you think vegetation may be affected by Dieback, please contact DEHP (Parks and Wildlife) (refer Appendix G).
MYRTLE RUST FACTS

Myrtle rust is a serious fungal disease that affects plants in the Myrtaceae family, such as rose apple (lilly pilly), tea tree and bottle brush.

Myrtle rust cannot be eradicated and will continue to spread in Queensland because it produces large numbers of spores that are easily spread by wind, human activity and animals.

However, to determine how far it has spread and to learn more about the disease, Biosecurity Queensland needs to know if you think you have seen myrtle rust.

Call 13 25 23 or fill in the online form to report any suspected sightings

APPENDIX F: Keep the Trees

Keep the trees, please!
Cleaning up roads after a cyclone in the Wet Tropics World Heritage Area

Call WTMA on:
4052 0540 (BH)
0407 679 460 (AH)
Stage 1. Immediately after a cyclone:

- Clear the roadway of trees and debris as soon as possible.
- Deal with any immediate dangers.
- Call WTMA before working on road verges (permit conditions apply).
Stage 2. The road to recovery

Ask WTMA **BEFORE** you begin work on roadside verges to:

- Remove or mulch any vegetation debris or windrows.
- Assess the risk of standing trees and remove dangerous trees.
- Undertake any earthworks.
- Revegetate the roadside verges and control weeds.

Verge

Verge
This booklet was produced by the Wet Tropics Management Authority to help protect roadside vegetation.

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### APPENDIX G: Helpful Contacts

<table>
<thead>
<tr>
<th>What</th>
<th>Why</th>
<th>Who</th>
</tr>
</thead>
</table>
| **ALL ENVIRONMENTAL QUERIES**             | • To discuss solutions for all environmental queries, including issues outlined below  
                                          | • To contact specialists on your behalf                                | Transport and Main Roads Environmental Officers  
                                          |                                                                       | Northern and Far North Regions  
                                          |                                                                       | Refer Transport and Main Roads Intranet Directory |
| **ANIMALS (INJURED ANIMALS)**             | To report:                                                          | Department of Environment and Heritage Protection  
                                          | • Animals injured by motorists                                       | Hot line 1300 130 372  
                                          | • Animals injured by works                                            | Townsville 4722 5211  
                                          |                                                                       | QPWS Cairns 4047 9662 |
| **ANIMALS (NATIVE ANIMAL CORRIDORS)**     | To provide information to researchers on:                          | Wet Tropics Management Authority  
                                          | • Common areas of road kill                                           | 4052 0541 |
                                          | • Known fauna passage ways/culverts                                  |                                                                       |
                                          | • Recommended sites for fauna underpasses or overpasses              |                                                                       |
| **CULTURAL HERITAGE (REFER APPENDIX D)** | Discovery of cultural heritage items or areas (refer Appendix D)    | Department of Environment and Heritage Protection  
<pre><code>                                      |                                                                       | Townsville 4722 5211 |
</code></pre>
<table>
<thead>
<tr>
<th>What</th>
<th>Why</th>
<th>Who</th>
</tr>
</thead>
<tbody>
<tr>
<td>MYRTLE RUST/DIEBACK</td>
<td>Observation of Dieback indicators (refer</td>
<td>Biosecurity Queensland 13 25 23</td>
</tr>
<tr>
<td>(REFER APPENDIX E)</td>
<td>Appendix E)</td>
<td></td>
</tr>
<tr>
<td>DISPOSAL OF CONTAMINATED</td>
<td>Small chemical spills to land</td>
<td>Department of Environment and Heritage</td>
</tr>
<tr>
<td>SOIL AND OTHER WASTE</td>
<td></td>
<td>Protection Hot line 1300 130 372</td>
</tr>
<tr>
<td>EMERGENCY SPILLS (CHEMICAL</td>
<td>All chemical spills to watercourses</td>
<td>Department of Environment and Heritage</td>
</tr>
<tr>
<td>AND OTHER)</td>
<td>Large chemical spills (i.e. greater than 1000</td>
<td>Protection Hot line 1300 130 372</td>
</tr>
<tr>
<td>LANDSLIP STABILISATION</td>
<td>litres to land</td>
<td></td>
</tr>
<tr>
<td>REVEGETATION</td>
<td>Plant and seed species selection</td>
<td>Wet Tropics Management Authority 4052 0541</td>
</tr>
<tr>
<td></td>
<td>Plant and seed collection</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Community group assistance for planting</td>
<td></td>
</tr>
<tr>
<td>What</td>
<td>Why</td>
<td>Who</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------------------------------------------------------------------</td>
<td>------------------------------------------</td>
</tr>
<tr>
<td>WEEDS</td>
<td>Observation of weeds:</td>
<td>Biosecurity Queensland</td>
</tr>
<tr>
<td></td>
<td>• New types of weeds never seen in an area before</td>
<td><strong>13 25 23</strong></td>
</tr>
<tr>
<td></td>
<td>• Large increase of weeds in an area</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Regrowth of weeds in an area that has been treated</td>
<td></td>
</tr>
<tr>
<td>WORKS OUTSIDE THE SCOPE OF THIS CODE OF PRACTICE (WORKS OUTSIDE THE ‘FOOTPRINT OF DISTURBANCE’)</td>
<td>Large trees to be removed for safety material sourcing</td>
<td>Wet Tropics Management Authority</td>
</tr>
<tr>
<td></td>
<td>Water extraction</td>
<td>(Environmental Officers)</td>
</tr>
<tr>
<td></td>
<td>Stockpile site approval</td>
<td><strong>07 4052 0541</strong></td>
</tr>
<tr>
<td></td>
<td>Earthworks to improve motorist visibility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Installation of a structure outside the ‘footprint of disturbance’</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introducing a major visual impact</td>
<td></td>
</tr>
<tr>
<td>VEHICLES¹ (ABANDONED VEHICLES)</td>
<td>Vehicles abandoned on road formation</td>
<td>Local Government Authority</td>
</tr>
<tr>
<td></td>
<td>Vehicles pushed off road formation</td>
<td>Refer Directory Assistance</td>
</tr>
</tbody>
</table>

1 Abandoned vehicles can obstruct traffic and lower the natural beauty of the WTWHA. If sighted, local government should be notified so that they can remove vehicles.