

## Guidelines for the preparation of Vegetation Management and Restoration Plans 2008

### Introduction

These guidelines will assist with the preparation of vegetation management and restoration plans (VMRP) required when a development application or landform modification activity impacts on land with significant ecological values.

The guidelines specify the recommended level of information required for a VMRP to enable Council to adequately assess and report on development applications or land disturbance practices.

Hornsby Shire covers a total of 51,000 hectares of which approximately 67% is bushland. In order to sustain this unique environment in the "Bushland Shire" it is important that a balance between conservation, restoration and development are met.



To work towards ecologically sustainable development within the Hornsby Shire, development applications proposed on land containing bushland or adjacent to bushland are assessed for environmental impacts by the Bushland and Biodiversity Management Team.

Assessment is made to determine whether the proposed development will impact on bushland, fauna habitats and threatened species, populations, endangered ecological communities or their habitats, and to what extent those impacts may occur.

Council must comply with the appropriate planning legislation and policies when assessing the impact of a proposed development on bushland and native flora and fauna.

These include:

- Environment Protection and Biodiversity Conservation Act 1999
- Environmental Planning and Assessment Act 1979
- Threatened Species Conservation Act 1995
- Protection of the Environment Operations Act 1997
- The Local Government Act 1993
- State Environmental Planning Policy No. 19 - Urban Bushland
- State Environmental Planning Policy No. 44 - Koala Habitat
- Sydney Regional Environmental Plan No. 20 - Hawkesbury-Nepean River (1996)
- Hornsby Shire Council's Biodiversity Conservation Strategy 2006
- Hornsby Shire Council Local Environmental Plan
- Hornsby Shire Council Development Control Plans
- Hornsby Shire Council's Offsets Policy 2007

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## The importance of biodiversity conservation

The word 'biodiversity' is a combination of two words: biological and diversity. It refers to the variety of life on Earth. Biodiversity encompasses all the living things that exist in a certain area, in the air, on land or in water: plants, animals, microorganisms, fungi.

Animals and plants don't exist in isolation. All living things are connected to other living things and to their non-living environment (earth forms, rocks and rivers). If one tiny species in an ecosystem becomes extinct, we may not notice, or think it's important, however the biodiversity and processes of that ecosystem will be altered, and all the species in that and other ecosystems can be affected.

There have been 30 different plant communities identified within the Hornsby Shire and these vegetation communities provide a home for more than 1,000 native vascular plant species, 338 native vertebrate animal species and a huge variety of invertebrates.

Hornsby Shire supports 6 Endangered Ecological Communities and important habitat for 76 threatened flora and fauna species.

Despite large national and regional parks in and around the Shire many flora and fauna species occur outside of these conservation reserves, and need to be protected. These special bushland attributes contribute to Hornsby's unique 'sense of place' and character and is something Council is committed to retain within "The Bushland Shire".

## When is a Vegetation Management or Restoration Plan required?

The implementation of a Vegetation Management and Restoration Plan (VMRP) ensures the ongoing biodiversity conservation and sustainable management of the vegetation is met within a development, and that inappropriate land clearing and land modification activities are effectively remediated.

Council has identified three main situations where a VMRP may be requested dependant on different development or land modification situations that affect remnant native vegetation.

All restoration orders are assessed on individual site specific requirements and issues. The situations apply as a guide to assist in understanding why a VMRP has been requested, however Council may request a VMRP where any significant vegetation occurs.

The situation to which your VMRP applies will reflect the level of reporting provided. The more ecologically complex or sensitive the site or project will determine the level of information required in a VMRP.

## SITUATION 1

Applies to residential subdivisions or developments on lands that support remnant native vegetation or scattered remnant trees with native understorey species classified as an Endangered Ecological Community or threatened species habitat as listed under the Threatened Species Conservation Act 1995.

### **Council's aim of net improvement of native vegetation (HSC 2006) requires:**

- Retention and protection of existing native trees and vegetation during the land disturbance phase and following completion of the development or restoration project.
- Active management or appropriate enhancement plantings to ensure long term conservation of remnant native vegetation and habitat.

## SITUATION 2

Applies to residential subdivisions or developments on lands that support remnant native vegetation regarded as significant because of its biodiversity value or importance as a vegetation corridor or riparian corridor.

### **The land to be disturbed supports:**

- A defined parcel of remnant native vegetation that may or may not be an Endangered Ecological Community.
- Significant native vegetation and/or native bushland along a watercourse (riparian zone) which is likely to require restoration or is modified by the development proposal.
- Forms part of a vegetation corridor; that is directly or indirectly connected to other vegetation.

### **Or it may:**

- Share a border with a bushland area.
- Incorporate an Asset Protection Zone.
- Be a community title development where bushland will be managed for conservation purposes and/or as private open space within the development.

### **Council's aim of net improvement of native vegetation requires:**

- Retention and protection of existing native vegetation, riparian zone or vegetation corridor.
- Mitigation of all adverse threats to the native vegetation or riparian zone both during the land disturbance phase and following completion of the development or restoration project.
- Active management and or restoration of the native vegetation or riparian zone to ensure the long term conservation of habitat.
- Asset Protection Zones are managed in accordance with Rural Fire Service and Council guidelines and incorporate ecologically acceptable practices.

Riparian land is any land which adjoins, directly influences or is influenced by a body of water. Most people think of riparian land as being close to streams, billabongs, wetlands and lakes. However, riparian land also includes farm dams, drainage lines, the floodplains connected to streams, and estuaries and tidal interchange areas. (Schneider 2007).

Department of Water & Energy - [Vegetation Management Plan guidelines](#).

### **SITUATION 3**

Applies when illegal clearing or modification of native vegetation has been undertaken without consent. This applies whether a Development Application has been submitted, but not yet finalised, or the clearing is not associated with any Development Application on the subject site.

A restoration plan is required. This should outline how the site will be stabilised and the processes to be implemented to rehabilitate the site to its pre-disturbance condition. If rehabilitation to its pre-disturbance condition is not possible due to the level of modification the plan should outline how the ecosystem on the subject site is to be reconstructed.

## **Aims and Objectives of Vegetation Management and Restoration Plans.**

The aim of vegetation management is to manage the land in a way that protects its natural values. This is achieved primarily by retaining the distribution, abundance and diversity of native species and communities presently existing on the land, and where appropriate, regenerating pre-existing natural communities.

The primary objective of ecological restoration is to rehabilitate or re-establish a functioning and sustainable ecosystem of the type that exists or existed on the site prior to development or land disturbance. Restoration is the process of assisting recovery. It does not necessarily imply total intervention (DECC 2005).

One of the first steps to achieving this is to determine the most appropriate restoration method to use on a specific site. This is largely based on the site's resilience. A 'rehabilitation' philosophy rather than a 'reconstruction' philosophy should always be applied where the site has resilience.

Resilience refers to the ability of an ecosystem to regenerate naturally and to withstand, or recover from, disturbances such as weed invasion, clearing or fire.

The key approaches for ecological restoration should be:

(Source: Department of Environment and Climate Change)

### **RETAIN**

Retain remnant indigenous vegetation on site. Conserving existing natural areas should be the priority.

### **REGENERATE**

Where bushland remains but is degraded by weed invasion, urban run off, grazing etc., regeneration should be the primary goal. Even quite damaged bushland is valuable and capable of regenerating if given the right assistance.

### **REVEGETATE**

Where a site has failed to respond to natural and or assisted regeneration techniques or there is no regeneration potential, reconstruction through revegetation is then an option.

The following table is intended as a general rule to assist with determining which restoration methodology may apply to a specific site. Efforts to retain and protect remnant vegetation through encouraging natural restoration are cheaper, less time consuming and may be more successful than replanting. (Hunter Catchment Management Trust 2003). All sites vary and some sites may require a combination of techniques. Your consultant will advise you on the approach required.

Table 1. Restoration Methodology

Key Approach to restoration	Resilience level and Remnant Characteristics	Anticipated Recovery Capacity	Level of Intervention Required
<p><b>RETAIN</b>            Retain remnant indigenous vegetation on site. Conserving existing natural areas should be the priority.</p>	<p><b>Native remnant has very high resilience.</b></p> <ul style="list-style-type: none"> <li>Remnant is virtually weed free.</li> <li>The canopy, mid stratum and groundcover layer vegetation are all present or typical for that plant community.</li> <li>There is a diverse assemblage of native plant species.</li> <li>The original natural soils persist.</li> </ul>	<p><b>Recovery capacity is high.</b>            A 'natural regeneration' approach should be applied.</p>	<p><b>Minimal – possible actions may include:</b></p> <ul style="list-style-type: none"> <li>Prevention of future impact</li> <li>Removal of scattered weeds</li> <li>Fencing to protect from grazing or other disturbances</li> <li>Re-directing drainage away from bushland.</li> </ul>
<p><b>REGENERATE</b>            Where bushland remains but is degraded by weed invasion, urban run off, grazing etc. regeneration should be the primary goal. Even quite damaged bushland is valuable and capable of regenerating if given the right assistance.</p>	<p><b>Native Remnant has moderate resilience.</b></p> <ul style="list-style-type: none"> <li>Remnant has moderate weed densities, mainly in the mid stratum and ground layer</li> <li>The canopy, mid stratum and ground layer are present or typical for that plant community but may have minor levels of modification due to weeds, clearing, grazing etc.</li> <li>There is a diverse assemblage of native plants though in some areas weeds may dominate</li> <li>The original natural soils persist but may be slightly disturbed or modified</li> </ul>	<p><b>Recovery capacity is good.</b>            An 'assisted regeneration' approach should be applied</p>	<p><b>Moderate – possible actions may include:</b></p> <ul style="list-style-type: none"> <li>Prevention of future impacts</li> <li>Removal of current degrading impacts ie. run-off, inappropriate land use practices</li> <li>A staged weed removal program using bush regeneration methods</li> <li>Ensure appropriate follow up weeding</li> <li>Fencing to protect from grazing or other disturbances</li> <li>The use of passive triggers to encourage natural regeneration ie fire, soil, scarification</li> </ul>
<p><b>REVEGETATE</b>            Where a site has failed to respond to natural and or assisted regeneration techniques or there is no regeneration potential, reconstruction through revegetation is then an option.</p>	<p><b>Native remnant has very poor or no resilience.</b></p> <ul style="list-style-type: none"> <li>Area is highly degraded due to past and present land uses and the long term persistence of degrading impacts.</li> <li>The canopy, midstratum and ground layers are absent or highly modified and not typical for that plant community.</li> <li>Severe weed densities cover the site and have been present for a long time.</li> <li>Very few native plant species persist and there is no evidence that native plants are regenerating on site.</li> <li>Original soil profile is highly disturbed, completely modified or infilled.</li> </ul>	<p><b>Recovery capacity is very low or non existent.</b>            A revegetation or reconstruction approach should be applied</p>	<p><b>High – possible actions may include:</b></p> <ul style="list-style-type: none"> <li>Removal of current degrading impacts ie. run off, inappropriate land use practices</li> <li>Removal of significant weed levels and possibly top soil containing the weed propagule reservoir</li> <li>Implement soil stabilization measures</li> <li>Revegetate using provenance specific plants</li> <li>Capping</li> <li>Top soil translocation</li> </ul>

## Levels of information required within a Vegetation Management and Restoration Plan

What should be included in your VMRP is dependent on the specific site considerations and may require only a simple site plan and schedule of works that clearly defines how and when the restoration or management of the site is achieved. If you already have a flora and fauna assessment for the site, this information should be provided to your consultant or contractor to reduce any duplication of information and make the VMRP a practical implementation plan for the works to be done on the ground.

### Level 1 VMRP

Level 1 VMRP: This would require a low level of information but must still address all the site specific issues. Consider the ecological values of the site and have clear restoration and management objectives. The plan is required for a period of at least three years and must contain a clear site plan and a schedule of works. A reporting schedule which demonstrates the works have been undertaken will be required.

### Level 2 VMRP

All requirements of a Level 1 report and additional technical information. This may include specifics on seed collection, propagation, bank stabilisation, and planting densities if revegetation is required. It may also include strategies to prevent future impacts and a staged restoration approach. This may also need to include any rock stabilisation or creek/embankment construction works. It would need to demonstrate that persons qualified to undertake the restoration works would be employed to implement the plan. The reporting schedule should reflect the timing and stages of the plan to clearly demonstrate that the restoration works were progressing and being maintained through the life of the plan.

### Level 3 VMRP

All requirements of both Level 1 and 2 and additional information that reflects the complexity of the restoration or fabrication works involved. This may include earth works such as soil capping or topsoil translocation. The minimum time frame for this type of project would be 5 years with a reporting schedule of initial Stage 1 works and then at regular intervals to demonstrate restoration was being achieved and the objectives of the project have been met.

# Guidelines for writing a Vegetation Management and Restoration Plan

## Preliminary Considerations for the Consultant

Some initial desktop investigations can be undertaken by the consultant, before visiting the site, to obtain existing background or relevant information that may relate to the subject site, and assist with conceptual planning of a VMRP.

### Identify the exact nature and extent of the proposed development or activity.

#### View existing plans to establish:

- The project site location and its boundaries
- Proposed nature of the development
- Proposed building footprint
- Site history or background to project
- If any development consent conditions or special circumstances apply to the subject site
- If other reports or correspondence apply to the subject site ie. **Flora and Fauna reports, Bushfire Reports etc.** This can be done using [Council's Online Tracking System](#).

*In the case of illegal clearing or land modification try and ascertain the pre disturbance condition of the site and reason for the clearing*

### Identify key attributes of the subject site and determine constraints such as:

- Easements that may need to be considered within the VMRP
- Service infrastructure ie. Gas, electricity, water, communications, sewage
- Any safety or privacy issues with neighbouring properties
- Asset protection zones that may need to be considered. [Bushfire Prone Land Map](#)
- Acid Sulphate Soils - [Acid Sulphate Soil Maps](#)
- Catchment location and water shed
- Hydrology issues ie. Flooding, drainage, surface water run off
- Surrounding landscape and land use
- [Threatened Species information](#).
- Determine if any [Key Threatening Processes](#) apply to the site.
- Existing vegetation community likely to occur on site – [Native Vegetation Communities of Hornsby Shire \(Smith 2007\)](#)
- Habitat and corridor values of the vegetation
- Geology and soil landscape – Identify soil limitations
- Topography ie. Slope, aspect, erosion zones and deposition zones

## Report Structure and Requirements.

The following guidelines provide a recommended plan structure and outline the reporting requirements for a VMRP.

Any Vegetation Management or Restoration Plan submitted to Council for approval must cover a time frame of a minimum of three years and in a more complex Situation 3 plan Council will require a five year VMRP.

## 1. Introduction

This section details reasons for the proposed project and introduces the site to the reviewer.

### Background

- Purpose for the report
- Identify land tenure and ownership
- Locate site on an aerial map detailing local context that shows surrounding landscapes and land use, connectivity to other bushland areas and defines the site boundaries.
- Provide Information and a description of the proposed development or land disturbance activity

## Site Plan

Identify the site and the area to which the VMRP applies by providing a detailed site plan of the property. The plan should be in an appropriate scale of 1:200 or 1:500 depending on the level of detail required. Information to be provided on the site plan includes:

- Scale, North point, Property Address, Date and Author or Source
- The location of existing or proposed buildings and structures on the site;
- Identify adjacent surrounding land use
- Identify zonings within the property (particularly rural areas)
- Site boundaries and size of subject site to which the VMRP applies;
- Topography indicating contours, aspect and slopes
- Identify any natural features such as escarpments or rock outcrops, drainage lines, watercourses or riparian zones, including ephemeral and intermittent;
- Identify the receiving waters and catchment

*Riparian Zones and water courses provide essential ecosystem services. They filter and improve water quality as well as provide 'highways' for the movement of genetic material. The degradation of waterways leads to the loss of biodiversity.*

## 2. Site Assessment

**This section provides the reviewer details of the ecological and habitat values of the area to which the VMRP applies. Not all the information listed below will be required for all VMRPs. You only need to address the issues that have relevance to your project. Obviously the more ecologically complex the site and the project is the greater level of detail will be required by the reviewer.**

The assessment of a restoration site is the process through which we determine the resilience of the ecosystem on that site, so an appropriate management strategy can be applied.

## Methodology

Provide details of the methodology and effort used to undertake the site assessment.

- Literature reviews, indicate if any other reports prepared for the current or past development application were reviewed in preparation of this VMRP. If there is a flora and fauna report for the site then field surveys for this information may not be necessary.
- When and how often was the site visited and what field survey techniques or threatened species surveys were undertaken.

## Natural Resource Information

Identify and describe the kind of ecosystem to be restored and it's current condition.

Provide details such as the:

- Description of the vegetation communities and habitats present
  - » Identify the plant community, describe the dominant species, vegetation structure and plant community classification according to Council's reference document [Native Vegetation Communities of Hornsby Shire \(Smith 2007\)](#) or an existing flora and fauna report for the site.
  - » Identify noxious and environmental weeds present
  - » Identify vegetation corridors and adjoining bushland or habitat values
  - » Provide species inventories as an appendix if required

*Level 3 - for restoration plans following illegal land modification or clearing, provide a description of the former vegetation communities and habitats that existed on site prior to clearing or modification activities.*

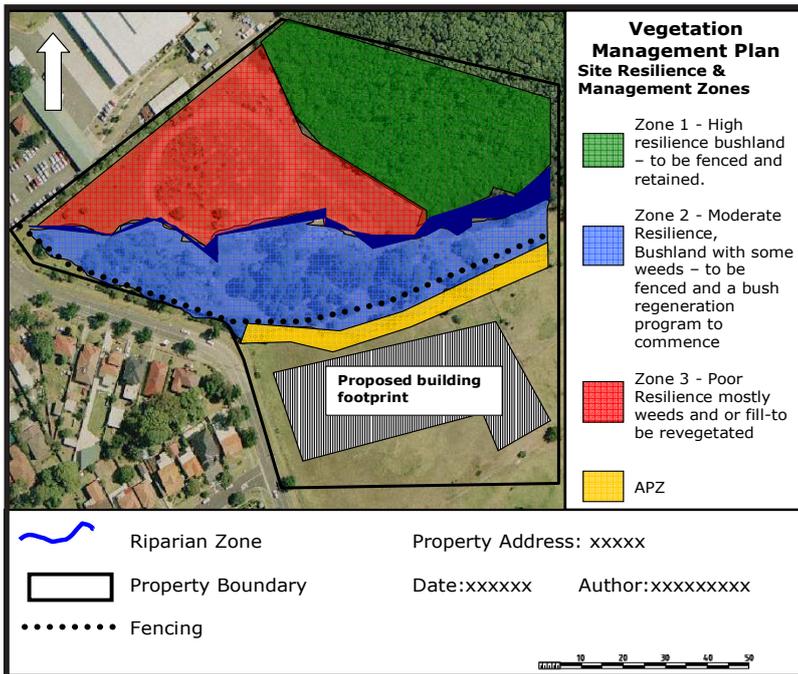
- Describe the condition of the vegetation to which the VMRP applies. Provide details on:
  - » Weed distribution patterns and densities
  - » Alteration or modification of any of the structural layers due to issues such as grazing, clearing, frequent fires, past land use practices
  - » Identify areas that have higher or lower resilience levels
- Watercourses and riparian zones
  - » Identify catchment area and water shed
  - » Identify issues with regard to drainage, erosion, surface water run off and stormwater
  - » Document level of streambank erosion, if it exists
  - » Document any water quality issues that may exist
- Soils and geology
  - » Identify “Soil Landscapes ” according to classifications in [Soil Landscapes of the Sydney 1:100 000 \(Chapman and Murphy, 1989\)](#)
  - » Detail soil limitations as stated in [Soil Landscapes of the Sydney 1:100 000 \(Chapman and Murphy, 1989\)](#)
  - » Document whether the soils have been subjected to modification or they appear to be relatively undisturbed natural soils
- Fauna Habitats
  - » Document any native fauna populations and habitats that have been identified on site, especially threatened fauna if any.

All levels - Maintaining natural hydrological processes are a priority. Minimising impacts to natural vegetation along watercourses and flow regimes will maintain creekline stability and health of terrestrial and aquatic ecosystems.

Level 2 – This is particularly relevant for restoration plans following clearing and land disturbance where erosion protection measures are being implemented.

Level 3 – If extensive soil modification has occurred and natural contours, slopes or levels have been altered the changed conditions must be documented.

When the site assessment is completed you have the information required to identify the kind of ecosystem to be restored and the type of restoration strategy to be applied. A useful way of presenting this information is on a map. It is useful to divide the site into management zones based on the condition of the bushland and the proposed restoration actions required. A clear concise map allows the reviewer to easily interpret the site information provided.



Example Map 1:  
Not indicative of any proposed development

### 3. Management Issues

This section reports on the management issues affecting the site. It should outline what the management issues are and the proposed restoration measures to be implemented to retain, protect, regenerate or rehabilitate the ecosystem.

- Identify the management issues and prepare a list of objectives designed to achieve restoration goals. Objectives are the specific activities to be undertaken to achieve project goals. The restoration ecologist should identify all actions and treatments needed to accomplish each objective.

- Management Issues for consideration may include:

- » Native vegetation management
- » Managing threatened species habitats – Are any threatened species habitat areas to be directly or indirectly affected by the development
- » Weed management
- » Stream and watercourse issues
- » Surface run off/ drainage issues
- » Stormwater management
- » Stabilization of soils
- » Erosion and sediment control
- » Grazing
- » Fragmentation and retention of corridors
- » Creation or/and maintenance of Asset Protection Zones
- » Inappropriate land use

Weed invasion occurs in natural areas mainly as a result of:

- Physical disturbance due to clearing, mowing, grazing or construction activities
- Increased soil moisture due to run off
- Increased nutrients from run off, dumping or surrounding land use practices
- Increased light levels due to clearing or dieback
- An increase in weed propagules and seed dispersal agents

**A useful way of summarising management issues, objectives and intended actions is in a table format. This allows the reviewer to assess information rapidly and relevantly. The following table shows an example only and is not indicative to a specific project.**

**Table 2. Examples of management issues and actions**

Management issues	Objective	Actions *	Performance Criteria
Zone 1 Degradation of remnant due to periodic grazing by horses	To stop grazing by horses within the bushland remnant	1. Erect exclusion fencing to northern boundary of the remnant	1. To be completed within 3 months of plan approval 1.1. Fence to be sturdy enough to withstand horses leaning on it 1.2. Fence to be maintained in working condition as long as surrounding paddocks support horses 1.3. Specifications for fencing provided in Appendix 4.
Zone 2 Bushland degradation due to weed invasion	To implement a weed removal program over a three year period	1. Primary weeding to remove herbaceous ground cover weeds 2. Secondary weeding to control any weed regrowth 3. Follow up weeding s to ensure weeds do not re invade 4. Monitor and review	1. To be completed within 1 month of plan approval 2. To be undertaken 3 months after primary weeding is completed 3. Follow up weeding sessions to be conducted at 6 monthly intervals for 3 year 4. The Bush regeneration contractor is to provide 6 monthly reports on the progress of the weed removal program
Zone 3 Loss of native vegetation	To revegetate area to expand remnant	1. Primary weed to remove woody weeds 2. Scarify soil to a depth of 20cm 3. Lay weed matting as per specifications in Appendix 5 4. Plant 'Certified Provenance' tubestock 5. Undertake maintenance and replenishment plantings 6. Monitor and review	1. To commence 3 months after plan approval 2. Only 'Certified Provenance' plants to be used 3. Replenishment plantings to replace losses after 12 months
Loss of 2 mature native canopy trees on site	4 native canopy trees (Eucalyptus haemastoma) need to be reinstated following approval to remove 2 within the building footprint	1. Plant 4 Scribbly Gums (Eucalyptus haemastomas) in appropriate locations to the front and rear of the property 2. Protect and maintain canopy trees until they become established and ensure retention until maturity	1. To be completed when all building and landscaping works are completed 1.1 Only 'Certified Provenance' plants to be used 2. If any of the trees die a replacement planting is required

\* Actions will form the basis of the works schedule.

## 4. Restoration Methods

Outline the proposed restoration measures. Provide details on:

### Preliminary activities

- Fencing or barriers may need to be erected as protection measures for areas where habitat retention or natural regeneration is proposed or protection of individuals or clusters of remnant trees
  - » The fencing should ideally be an open mesh or bar type structure to allow air flow and light through and provide continuity with adjacent vegetation so as not to impede the function of a vegetation corridor. There must be openings underneath the barrier to allow for small fauna movements.
  - » Fencing must be sturdy enough to be stock or vermin proof if access by these is being excluded.
- Strategies for the collection and propagation of endemic plant species of local provenance for any proposed revegetation works.
  - » For any revegetation works that are required to plant local native species, the collection and propagation of plant material must be considered in the early stages of the project because it will take time to collect provenance specific material and propagate it, sometimes up to 18 months. Council will require some form of documentation from the supplier to prove authenticity.
- Any collection and propagation of provenance plants must be undertaken by suitably qualified personnel.

*Provide specifications for any fencing as an Appendix in the VMRP.*

### The right plants for the right area

The geographic origins of plants are an important consideration for revegetation. Plants of the same species are often distributed across a wide area but develop patterns of local adaptation, meaning they become suited to the specific conditions in the local area. This means that plants have a better chance for survival if they are locally adapted to the area being revegetated. (Source: CSIRO, Centre for Plant Diversity Research).

Seed for revegetation should be collected from species within larger reproductive populations, a minimum of 100-200 reproductive plants where possible. Avoid collecting seed from one small population only, to limit inbreeding. Seeds collected from many plants across a landscape provide genetic diversity that generates vigorous seedlings which contribute to good revegetation success. (Broadhurst 2007)

### Vegetation Management - Weed Control

- Weed control measures proposed to control and manage existing and future processes leading to weed invasion. An important element of weed control is an understanding of the causes of weed invasion and appropriate measures to minimise these causes.
- Weed control techniques to be implemented on site. Weed control must be carried out in a manner that minimises negative environmental impacts such as over clearing that may lead to erosion or destruction of fauna habitats. Different techniques are required in varying situations, especially along watercourses, that are sensitive to pollution impacts.
- Appropriate follow up weeding schedules. Follow up weeding is crucial to the success of most restoration projects. Detail proposed follow up and maintenance weeding program for the 3 or 5 year term of the plan.
- Weed monitoring. Regular monitoring is an important part of bushland restoration. Monitoring should be undertaken to identify and respond to the occurrence of new weed species that may compromise the restoration effort and to allow a review or change of strategy in accordance to plant responses.
- Proposed disposal method for weed propagules and green waste.

*Level 2 - Water quality entering natural areas is to be maintained at a level which is acceptable for natural area management. Additional run off is not to discharge into bushland areas.*

### Vegetation Management - Corridors

- Vegetation corridors are to be retained as far as possible to link fragmented tracts of bushland to larger areas of vegetation. This facilitates flora and fauna movements which improves biodiversity health. Vegetation corridors may be regenerated or replanted. As a general rule the wider the corridor the better.

### Vegetation Management - Revegetation Works

- Revegetation works proposed. Any revegetation works must ensure use of a diversity of locally indigenous plant species and include details of proposed planting densities, and species assemblages to ensure that the plantings are consistent with the surrounding plant communities.

*No exotic plant species are to be planted within or adjacent to any riparian or bushland restoration zones.*

Planting densities will vary depending on the desired plant community. To create a more natural look plant in random clumps rather than neat rows. When including groundcovers in a planting program, it is important to plant them in single-species clusters to achieve solid patches of cover quickly. This method will also help with weed management. (DECC 2005). [Greening Australia](#) and [Florabank](#) provide useful information on all aspects of revegetation.

- Tubestock, Hiko Cells or advanced tubestock are recommended for use in revegetation projects. They are cost effective and more reliable to establish.
  - » Details of the planting program and methods proposed.
  - » Outline specific pre – planting site preparation measures such as weeding, or soil preparation.
- The use of fertilizers, water-retaining crystals, ties and tree guards.

*Staking of trees is not recommended because it inhibits development of a sturdy root system. This can affect the growth of the tree as well as making it prone to blowing over in strong winds because the roots are too weak to hold it up.*

### Vegetation Management - Asset Protection Zones

- Asset Protection Zones for bushfire management. Detailed vegetation management techniques proposed for the creation or maintenance of any Asset Protection Zones within the site
  - » Locate and mark the extent of the APZ and identify the vegetation to be removed and the vegetation to be retained
  - » Outline how the APZ is to be maintained in accordance with the prescriptions in Planning for Bushfire Protection – [NSW Rural Fire Service](#).

### Vegetation Management - Buffer Zones

- The inclusion or creation of buffer zones. Native vegetation buffer zones around remnants or along watercourses can protect vegetation from the harmful effects of weed invasion, erosion, wind damage and nutrient inputs.

### Soil Stabilization

- In the case of restoration plans details of erosion mitigation measures during any land disturbance phase and sediment control devices must be outlined
  - » Details of proposed surface stabilisation measures.
  - » Erosion, jute or weed matting is the preferred soil stabilizer in areas where loose material stabilizers may wash into waterways or down slopes and pollute receiving areas.
  - » Brushmatting should only be considered if appropriate donor sites are available or any native vegetation to removed from a site can be stored and re used or appropriate sterile material can be sourced externally
  - » Mulches , leaf litter or leaf mulches are preferred to wood or bark chip which release nutrients because of rapid decomposition which enhances weed growth.
    - ◇ Ideally if any native vegetation is being removed from APZ or building footprints these can be mulched and re used on site. Any green mulch must be allowed to weather for at least 8 weeks prior to planting to prevent nitrogen draw down affects on seedlings.
    - ◇ Imported mulch should be provided by an accredited supplier and certified weed free
    - ◇ Recommended depths for mulches are 15 -30mm
  - » Sterile cover crops can be useful to establish a rapid cover on exposed soils as a stabilizer, prior to establishing more permanent vegetation cover. Caution is advised as sometimes seed is not all sterile which could create a new weed problem
  - » Details of soil surface preparations that may be required such as levelling, or ripping and scarifying to reduce compaction
  - » Details of any proposals for the importation of suitable topsoil

*The use of any matting products that uses plastic netting on the under surface is not permitted due to the threat of entanglement of small birds, animals and reptiles.*

*Mulches must not be used in bushland areas where natural regeneration from the soil seed bank is expected.*

### Stream and Watercourse Management

- Details of proposed measures to be undertaken to prevent stream bank erosion
- Details of any proposed activities along streams. Activities must be strictly controlled with the primary objective of retaining natural vegetation and aquatic communities.  
[Department of Water & Energy - Vegetation Management Plan guidelines.](#)

*Situation 2 – Watercourses within bushland are particularly susceptible to disturbance and degradation by weed invasion. Specific measures are to be taken to monitor and control disturbance in these areas.*

### Stormwater and Run Off Management

- Outline drainage, run off and stormwater management proposals. Additional run off, including exacerbated surface run off, is not to discharge into bushland areas
- Provide details of any special design requirements that apply for pipe discharge into natural areas, including measures for dissipation of stormwater velocity, pollution and sediment control devices.

## Maintenance Activities

The attainment of objectives may depend as much on follow-up activities as it does to the care given to initial activities. Post primary work and maintenance activities are very important.

- Outline any maintenance activities that are proposed for the term of the VMRP, which will be 3 or 5 years. Some restoration activities require follow-up actions or continuing periodic maintenance following initial completion.

*The monitoring and review process must be able to satisfy Council that all the works have been completed and performance targets reached and maintained for the life of the VMRP.*

## Monitoring and Review Process

Monitoring is a vital component of any restoration project. It identifies success or failures of conservation measures and allows project managers to implement an adaptive approach.

- Provide specific details of monitoring programs. Indicate method/s to be used and times.
- Include a method of performance evaluation listing target outcomes that must be achieved.
- Provide clear and measurable criteria against which achievement of the outcomes can be assessed.
- Report on deficiencies and any corrective actions taken to ensure targets are met

Monitoring can be as simple as returning to the site every 6 months and taking photos from the same location to show how the project is evolving. Photo monitoring will complement written information provided in your reporting schedule.

## Schedule of works

Provide a table that indicates the proposed schedule of works and the timeline. The need for sequencing should be clearly identified. The schedule of works should provide realistic proposed timeframes for any bushland restoration and/or re-vegetation work.

The Schedule of Works should clearly define:

- All actions proposed
- The sequence in which the actions will be undertaken and completed
- Who is responsible for undertaking the actions
- Methods and times for monitoring works with a schedule of reporting.

Table 3. One example of a Schedule of Works.

Management Zone	Action As per Table 1	Sequencing and Timing of Actions by months												Responsibility	
		1	2	3	4	5	6	7	8	9	10	11	12		
<b>Zone 1</b>	Erect Exclusion Fencing														Owner Contractor
<b>Zone 2</b>	Primary Weeding of herbaceous weeds														Bush Regeneration Contractor
	Secondary Weeding														
	Follow up Weeding														
	Monitor and Review														
<b>Zone 3</b>	Remove Weeds														Bush Regeneration Contractor
	Scarify Soil														
	Lay weed matting														
	Plant Tubestock														
	Maintenance														
	Replenishment plantings														
	Monitor and Review														
	Plant 4 Scribbly Gums ( <i>Eucalyptus haemastoma</i> ) at completion of building works													Landscaping Contractor	
	Provide Progress Report to Council													Owner Contractor	

### Reporting Requirements

Assess monitoring data to determine if performance standards are being met and provide a brief summary on the progress of the project. Council will require a reporting schedule. Dependant on the project, reports should be provided either 6 or 12 monthly for the term of the VMRP.

### References

Biodiversity Conservation Strategy 2006.  
Hornsby Shire Council.

Broadhurst, L (2007)  
*Managing Genetic Diversity in Remnant Vegetation*  
Land and Water Australia. CSIRO Australia.

Department of Environment and Climate Change (NSW) 2005.  
*Recovering Bushland on the Cumberland Plain; Best practice guidelines for the management and restoration of bushland.*  
Department of Environment and Climate Change (NSW), Sydney.

Hunter Catchment Management Trust (2003)  
*Hunter Bushland Resource Kit: a guide to managing Vegetation on private land in the Hunter Catchment.*  
Hunter Catchment Management Trust, Tocal, NSW.

Schneider, G (2007)  
*Where land meets water resource kit: a guide to riparian management in the Hunter Valley.*  
Hunter-Central Rivers Catchment Management Authority, Tocal, NSW.

## Who can prepare a suitable vegetation management plan?

Undertaking an ecological assessment and preparing a suitable VMRP requires specialised knowledge and skills. If a consultant is not suitably qualified or experienced they may not provide ecologically sound, accurate or specific enough information for Council to adequately access the report. This may delay the assessment process of a development application or compliance order. It is important to engage an independent consultant or company that meets the minimum requirements as listed below:

### General criteria checklist

-  The consultant/contractor has suitable qualifications in conservation and land management or restoration ecology; this is preferable but not essential if the rest of the criteria is met
-  The consultant/contractor has relevant practical experience in restoration ecology and a demonstrated understanding of sustainable best practices in natural area management.
-  The consultant/contractor must have experience in field identification of native vegetation and habitats in Hornsby Shire.
-  The consultant/contractor carries relevant insurance. The applicant should request to see the details of relevant insurance policies before engaging the consultant/company to undertake the project.
-  A brief resume outlining qualifications and experience along with an overview of ongoing bushland restoration plans past projects should be provided as an attachment in the final report.
-  The person conducting the VMRP should consider requesting the consultant/contractor to provide referees and examples of reports completed for similar

# Resources and web links

## Hornsby Shire Council Website Links

Hornsby Council's website: [www.hornsby.nsw.gov.au](http://www.hornsby.nsw.gov.au) has information about the shire's planning and environmental policies.

- [Tree planting guidelines](#)
- [Landscape Code](#)
- [Land Modification Awareness Program](#)
- [Development Application Enquiry](#)

Visit [Bushland and Biodiversity](#) for specific information about:

- [Native vegetation communities](#)
- [Biodiversity](#)
- [Bushcare](#)
- [Noxious weeds](#)
- [Gardening with native plants](#)
- [Indigenous planting guide](#)
- [Local threatened forests and fauna](#)

## External Web Links

[Australian Association of Bush Regenerators](#)

[www.aabr.org.au](http://www.aabr.org.au)

[Ecological Consultants Association](#)

[www.ecansw.org.au](http://www.ecansw.org.au)

[NSW Department of Environment and Climate Change](#)

[www.environment.nsw.gov.au](http://www.environment.nsw.gov.au)

[Greening Australia](#)

[www.greeningaustralia.org.au](http://www.greeningaustralia.org.au)

[FloraBank](#)

[www.florabank.org.au](http://www.florabank.org.au)

[Catchment Management Authority](#)

[www.cma.nsw.gov.au](http://www.cma.nsw.gov.au)

[Department of Lands](#)

[www.lands.nsw.gov.au](http://www.lands.nsw.gov.au)

[CSIRO Land and Water](#)

[www.clw.csiro.au](http://www.clw.csiro.au)

[Department of the Environment Water, Heritage and the Arts](#)

[www.environment.gov.au](http://www.environment.gov.au)

[Department of Natural Resources](#)

[www.dnr.nsw.gov.au](http://www.dnr.nsw.gov.au)

[Department of Water and Energy](#)

[www.dwe.nsw.gov.au](http://www.dwe.nsw.gov.au)

[Native Vegetation Management in NSW](#)

[www.nativevegetation.nsw.gov.au](http://www.nativevegetation.nsw.gov.au)

[Department of Primary Industries](#)

[www.dpi.nsw.gov.au](http://www.dpi.nsw.gov.au)

[Landcare NSW](#)

[www.landcare.nsw.gov.au](http://www.landcare.nsw.gov.au)

[CRC for Australian Weed Management](#)

[www.weeds.crc.org.au](http://www.weeds.crc.org.au)

[Weeds Australia](#)

[www.weeds.org.au](http://www.weeds.org.au)

[Australian Government Natural Heritage Trust](#)

[www.nht.gov.au](http://www.nht.gov.au)

[NSW Rural Fire Service](#)

[www.bushfire.nsw.gov.au](http://www.bushfire.nsw.gov.au)

## Useful Resources

Broadhurst, L (2007)

*Managing Genetic Diversity in Remnant Vegetation*  
Land and Water Australia. CSIRO Australia.

Brodie, L (1991)

*Bush regenerators Handbook*  
National Trust of Australia (NSW)

Davies, P., Dixon, P (2003)

*Bush Regeneration: A Practical Guide to Contract Management*  
Environment Protection Authority (NSW)

Dept. of Environment and Climate Change (NSW) 2005.  
*Recovering Bushland on the Cumberland Plain; Best practice guidelines for the management and restoration of bushland.*  
Department of Environment and Climate Change (NSW), Sydney.

Hunter Catchment Management Trust (2003)

*Hunter Bushland Resource Kit: a guide to managing Vegetation on private land in the Hunter Catchment.*

Hunter Catchment Management Trust, Tocal, NSW.

NSW Rural Fire Service (2006)

*Planning for Bushfire Protection*

Schneider, G (2007)

*Where land meets water resource kit: a guide to riparian management in the Hunter Valley.*

Hunter-Central Rivers Catchment Management Authority, Tocal, NSW.

Society for Ecological Restoration International

*Guidelines for Developing and Managing Ecological Restoration*

*Projects, 2 Edition.* Andre Clewell<sup>1</sup>, John Rieger<sup>2</sup>, and John Munro<sup>3</sup>. December 2005. [www.ser.org](http://www.ser.org) and Tucson: Society for Ecological Restoration International

*Sustainable Water Best Practices (1997)*

Hornsby Shire Council

*Managing Urban Stormwater: Soils and Construction*

*(Fourth edition, March 2004)*

Landcom

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Council's Bushland and Biodiversity Team offer pre- development application advice which may assist developers to identify, minimise and avoid sensitive environments when planning a development proposal.

There is a fee of \$88 per hour including GST for this service.

Ring Environment Customer Service 9847 6853 for more information.