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vegetation management plan

project – stage 10 outlook

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date:	6-11-17
project no:	9496.5
site	Minmi Road, Fletcher
council:	City of Newcastle
proposal:	Residential Subdivision

vegetation management plan

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REFERENCED DRAWINGS

L01	Site Plan
L02	Extent of Weeds
L03	Management Zones
L04	Suggested Plant Species

REV NO	DESCRIPTION	DATE
E	DA	06.11.17

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1. INTRODUCTION AND BACKGROUND

This Vegetation Management Plan (VMP) has been prepared by Terras Landscape Architects to provide details on the management of existing and proposed vegetation associated with the gully lines and existing mature trees within the proposed development footprint, with particular emphasis applied to the Stage 10 component of The Outlook subdivision. The subject site is located on Minmi Road, Fletcher and extends north toward Hexham Swamp. This VMP is an update to the VMP prepared by Moir Landscape Architecture (2006) as requested by Newcastle City Council due to the modification of Stage 10 of the Outlook Subdivision.

This VMP provides the detail for vegetation management with regards to the issues outlined below:

- Extent of existing vegetation to be retained and protected.
- Existing vegetation affected by the development.
- Undesirable plant species and removal techniques to be employed to enhance existing vegetation remnants.
- Native plant species proposed to be used for revegetation and landscape works.
- Details of the proposed revegetation work.
- Vegetation maintenance, establishment, monitoring and reporting.
- Staging for restoration to be undertaken.

Vegetation Management Plans

A VMP is a site-specific document that provides guidelines for the management and rehabilitation of native vegetation communities within that site while taking into consideration vegetation communities adjoining the site, whether or not they are threatened communities. The document describes the strategic and management objectives of the plan and the existing condition of the site with respect to the natural resources available. It details the management guidelines in relation to a list of issues applicable to the land, e.g. biodiversity conservation, vegetation and weeds, fauna, bushfire, streams and stormwater management, recreation, works and infrastructure, pollution control and education and community involvement.

A schedule of works details the implementation of the plan, the duration and priority. The plan is supported by maps, diagrams and plant species lists to describe the existing vegetation, management zones, constraints, vegetation and natural features to be retained, proposed vegetation, minor sediment and erosion control and stabilisation works to be undertaken, etc.

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1.1 SITE CHARACTERISTICS

Terminology:

"Development Site" refers to the entire subdivision.
"The Site" refers to the Stage 10 the proposed subdivision.

The site has frontage to Minmi Road, Fletcher and extents north to the southern edge of Hexham Swamp. The site has previously been used for grazing.
A residential subdivision is located to the south across Minmi Road of Stage 10 with the exception of a small area of bushland interface on the extreme western edge of Stage 10.
To the west of Stage 10 are previously constructed stages of The Outlook subdivision.
To the east is a pocket of bushland and the Sanctuary subdivision.
The majority of the sites vegetation consists of pasture with scattered trees. The gully lines still retain remnant vegetation although heavily infested with Lantana.

Vegetation communities identified in the Flora and Fauna Assessment by Environmental Appraisal and Planning Pty Ltd (2003)

- Tall Dry Sclerophyll Forest. (Now a woodland)
- Dry Rainforest – within gully lines
- Tall Wet Sclerophyll Forest – within gully lines

No threatened flora species were identified on site.

1.2 PROPOSED DEVELOPMENT

The proposed development (stage 10) comprises of a 112 residential + 2 super lot subdivisions and 2 lots proposed as open space/park. A number of stages further to the west of stage 10 have been constructed.

It is proposed that the revegetation works be divided into 3 vegetation zones reflective of existing vegetation as well as the level of inundation:

- Zone 1: Pasture grass with existing tree cover
- Zone 2: Open pasture grass
- Zone 3: Gully area (Riparian Zone)

1.3 OBJECTIVES

- to control water quality and flow as well as minimise the spread of weeds from site;
- to be maintain creek lines with appropriate plant species as specified on the attached plans (9496.5 VMP-01-02) Prepared by Terras Landscape Architects, and
- to ensure creek lines continue to function in accordance with the design.

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2. VEGETATION MANAGEMENT

The proposed vegetation management includes:

1. Retention of existing native vegetation;
2. weed removal, suppression and ongoing control;
3. Maintaining bank stability and minimising erosion potential;
4. Planting of native vegetation including trees, shrubs and grasses both within the riparian corridor and in areas channelling water into the corridor with native vegetation. Planting and establishment methods are to be used to ensure survival rates are adequate;
5. limiting the transportation of weed seeds into the riparian zone, and
6. monitoring and maintenance of vegetation, weeds and over planting.

2.1 WEED REMOVAL

Table 1: Main Weed Species Identified On-Site to be Removed.

SCIENTIFIC NAME	COMMON NAME	NOXIOUS WEED CLASS
Lantana camara	Lantana	4 / WONS
Ligustrum sinense	Small-leaf Privet	
Rubus fruticosus	Blackberry	4 / WONS
Senecio madagascariensis	Fireweed	WONS
Class 4: Defined under the Noxious Weeds Act 1993 as: Plants that pose a potentially serious threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area. WONS / Weeds of National Significance: Defined under the Noxious Weeds Act 1993 as: These weeds are regarded as the worst weeds in Australia because of their invasiveness, potential for spread, and economic and environmental impacts. **Note:** *Lantana camara* is not declared within the Newcastle LGA.		

The main weed species have been identified as occurring within the site outlined in Table 1. The removal and monitoring of these species is essential to enable the long term viability of the proposed vegetation and prevention of further infestation. Follow-up weed control will be required over the maintenance period to ensure the eradication of weed species and will occur at regular intervals as specified. 8.2 describes accepted weed removal techniques in further detail for specific species and type of weeds.

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2.2 THE RETENTION OF EXISTING NATIVE VEGETATION

As existing vegetation is almost always affected adversely by most types of development, it is highly desirable that the remaining remnant vegetation on the site is identified and protected. This will require the early identification and control of any potential factors that may cause damage to existing vegetation communities on site. Awareness of all significant remnant vegetation areas is crucial to ensure protection measures are carried throughout to coincide the various stages of construction.

Correct protection, initial weed removal and maintenance procedures are central to the successful retention of the vegetation located within the Development Site's boundaries, in particular areas adjacent to civil construction works.

Individual trees, groups of trees or vegetation remnants to be retained are exposed to many direct and/or indirect threats as a result of development. These threats can have adverse effects on both the health and long-term viability of any vegetation that is to be retained within the Development Site. These may include:

- damage to retained trees or other vegetation by machinery and engineering processes during the course of construction;
- alterations to site hydrology and previous drainage patterns;
- damage to roots and root zones due to excavation required for benched sites, roads, trenches etc.;
- compaction of soil by heavy machinery within close proximity of mature trees
- erosion and sedimentation caused by clearing for development;
- exposure of retained trees to wind loading following the removal of neighbouring trees and other vegetation previously providing shelter, and
- damage from future land management and activities, impacts due to residents, weed infestation and bushfire management.

2.3 REVEGETATION

The proposed revegetation and bushland management shall be undertaken in association with the development of the estate. Revegetation is to take place primarily within the vegetated riparian zone (VRZ), incorporating tree and shrub planting to be undertaken in accordance with City of Newcastles DCP, 2015, No revegetation is to take place within the dripline of existing trees to ensure minimal damage to established root systems. Additional tree planting shall be undertaken within and outside of the VRZ to compensate for trees removed in construction of the subdivision.

Revegetation using competitive native species that will maintain sufficient ground cover will aid in preventing the return and establishment of problem weed species. Native species planted in suitable positions as selected and listed below will create shade essentially out-competing undesirable weed species. Cover of fast-growing native species shall be achieved and maintained. It is essential that weed control occurs throughout native seedling establishment. Having revegetation coinciding with certain seasons will also ensure a competitive advantage over weed species can be achieved.

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2.4 ACCESS

Access to management areas and storage of materials on site during the development and construction phases requires appropriate planning to ensure protection of native remnant vegetation throughout the duration of construction works.

Access to the revegetation area during construction will be restricted as part of the site management plan. Under these operations, access issues include preventing the unnecessary movement of people and equipment through vulnerable/protected areas of the site. Suitable protective fencing shall be erected by the civil contractor as discussed further in this report where required to prevent access. The briefing of contractors shall be undertaken to ensure protection of all required areas as identified in this report.

MANAGEMENT STRATEGIES

2.5 THE RETENTION OF EXISTING NATIVE VEGETATION

The protection and enhancement of the existing native and indigenous vegetation will be undertaken using a variety of management strategies. These will include:

- Identification of existing native vegetation to be retained.
- Implementation of vegetation protection guidelines where required (civil contractor, fencing contractor) .
- Revegetation.
- Weed control.
- Ongoing site maintenance, monitoring and reporting.

All weed removal and site preparation is to be undertaken by a qualified and experienced bush regenerator. The successful contractor will be required to provide proof of qualifications and details of experience to the client's agent.

Prior to any works being undertaken on site the head contractor shall fence and protect any trees and native vegetation remnants to be retained in locations where adjoining civil works are to occur. Tree and vegetation protection shall be coordinated during construction. (Refer to drawing number 9496.5 VMP-01-02, Terras Landscape Architects).

To ensure ongoing protection of retained vegetation, protection measures are to remain in place throughout the relevant development and construction phases as required. Protection measures such as these prevent the accidental disturbance or removal of desired native vegetation from the site during construction.

As all trees within the revegetation zone are to be retained, the following guidelines shall be followed for any trees that are located within potential construction areas:

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2.6 TREE PROTECTION

- Earthworks around subject trees are to be undertaken in the presence of a qualified arborist or ecologist who may provide additional on-site advice.
- Machine digging within the root mass of the subject tree be minimised and where possible hand digging be undertaken.
- Any exposed roots of the subject tree should be wrapped and protected during exposure and be replaced in a similar position prior to disturbance.
- Inspection of retained trees by a qualified person should be conducted at 6 and 12 months after development completion of works

Existing vegetation will require removal where conflict exists with the construction of the subdivision and associated engineered batters with protection provided to trees in close proximity, not affected by construction. The Civil Contractor shall fence off trees/vegetation to be retained and protected where required prior to any construction work being undertaken. Refer to drawing number 9496.5 VMP-01-02 Prepared by Terras Landscape Architects

Protective fencing offsets shall be determined using AS 4970-2009 Protection of Trees on Development Sites. Generally fencing shall be offset the radial distance from the trunk calculated at 12 x the trunk diameter when measured at 1.4m high.

There shall be no stockpiling of materials or machinery entering identified vegetation protection zones.

Approved tree removal operations in the vicinity of retained trees are to be undertaken in a manner that avoids canopy damage, root damage to retained vegetation and soil compaction.

2.7 WEED REMOVAL

Effective weed removal and control is necessary both to protect and preserve existing vegetation and to allow long-term establishment of proposed native vegetation to be planted on site.

Weed control shall include:

- the use of herbicides;
- mechanical removal and clearing;
- weed matting and mulching; and,
- increasing the density of surrounding native vegetation.

All weed control will be carried out using minimal disturbance techniques. Details of weed control techniques to be used are provided in section 8.2. The use of these best management practice techniques will aim to maintain and enhance the integrity of the existing native indigenous vegetation.

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2.8 INITIAL WEED REMOVAL

While all weeds as identified in Table 2 shall be removed throughout the site, the primary focus shall be the removal of Lantana and Blackberry to its listing on the City of Newcastles Noxious Weed List for their potential to spread through the landscape.

An integrated weed management approach utilising a variety of control methods is desirable to eradicate most weed species. The below mentioned techniques have been selected for application in this situation due to suitability to this site. The below mentioned points shall be taken into consideration by the bush regeneration contractor at all times when undertaking weed removal:

- Weed removal and associated techniques are undertaken at the correct times of the year to ensure optimum results are achieved. Correct timing reduces cost and effort in the long term and improves eradication results dramatically. Where this cannot be done, additional visits may be required to remove regrowth.
- The revegetation team shall take all due care to minimise disturbance to existing desirable vegetation and surrounding land.
- Mulch shall be placed to all disturbed areas of ground due to weed removal. This will aid in preventing re-colonisation of weed species throughout disturbed areas. Steep eroded areas may require regrading & jute mesh/erosion control matting to be pinned down and placed over mulch to prevent soil runoff.
- The contractor shall keep records of all herbicide applications and use only registered and accepted herbicides.
- Appropriate herbicide training shall be undertaken ensuring all safety precautions are adhered to at all times.
- The contractor shall ensure any spray drift is kept to an absolute minimum.
- Herbicide control shall be undertaken when weeds are actively growing.
- The contractor shall take all care not to poison existing desirable vegetation when undertaking herbicide control methods.
- If required, the contractor shall be required to make good in areas where spray drift and/or wrong applications have resulted in the loss of desirable vegetation.
- The correct herbicide shall be selected and used appropriately to ensure effective results on all weeds.
- Do not undertake herbicide control when weed species are under stress, e.g. periods of extreme hot or cold weather.
- All herbicide spraying is to be undertaken using only the knap-sack spray apparatus. All other methods of herbicide application are not to be used onsite unless discussed and approved in writing by the client's agent.
- Herbicide control is not to be used within or near watercourses unless approved. The contractor shall obtain all required permits prior to use of suitable herbicides near any watercourse.
- Weed removal shall be carried out as described below and utilising weed removal techniques outlined in section 8.2 of this report.
- Should the contractor feel that techniques selected in this report will prove un-effective or inefficient; the contractor shall notify the client's agent nominating alternative procedures for review and discussion. Approved changes shall be issued in writing by the client's agent to the contractor.

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3. SCOPE OF WORKS

3.1 SITE PREPARATION

Site preparation shall include the removal and control of all problem weeds identified on-site. The bushland revegetation contractor shall visit the site and make themselves familiar with the extent of works.

Revegetation using applicable native species, as suggested on the attached drawings prepared by Terras Landscape Architects (9496.5 VMP-01-02) is required as soon as possible or after weed infestations are removed. The use of competitive native species that will maintain sufficient ground cover will aid in preventing the return and establishment of problem weed species seedlings. Native species located in suitable positions as selected and listed below will create shade essentially out competing undesirable weed species. Cover of fast-growing native species shall be achieved and maintained. It is essential that weed control occurs throughout native seedling establishment and subsequent management period.

3.2 SPECIES AND STOCK SELECTION

A list of native, indigenous vegetation selected for revegetation at this site is provided on the attached drawings prepared by Terras Landscape Architects (9496.5 VMP-01-02) It is preferred that plant material is sourced from local provenance seed and propagated for future revegetation. The use of local provenance plant material may not be possible throughout the initial stages of revegetation. All planting shall generally be undertaken utilising tube-stock (i.e. forestry tubes or equivalent with appropriately developed root systems capable of sustaining above ground vegetative material.)

3.3 PLANTING TECHNIQUES

Prior to any revegetation planting, all initial weed removal and engineering activity such as erosion stabilisation must be undertaken and completed. Planting shall commence as soon as practicable and where applicable upon completion of initial weed removal.

3.4 ONGOING WEED CONTROL

Ongoing monitoring, maintenance and weed control shall be undertaken in accordance with this plan and as required to further reduce and eradicate weed populations throughout the site. All areas found to have weed infestation shall be monitored and treated thoroughly for a minimum of 2 years and until such time as a maximum of 5% weed cover is achieved. Newly exposed or disturbed areas (due to initial weed removal or construction works) will be subject to new weed growth and shall require continued weed removal procedures, monitoring and maintenance throughout this period. Replenishment of mulch may be required to further reduce the possibility of weed re-infestation.

The contractor shall undertake weed removal as required on a regular basis in order to maintain a weed free environment.

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3.5 ONGOING MONITORING, MAINTENANCE AND PLANT ESTABLISHMENT

Ongoing monitoring and plant establishment is important to establish and retain high quality, successful vegetation cover and minimise weed re-colonisation. The contract shall include a plant establishment period of 12 months and a management period of 4 years and until such time as 80% survival rate of each species is achieved. During this period the plants shall be checked for pests and disease, fauna damage and general health and vigour. Plants found to be dead or dying shall be progressively replaced under general maintenance.

Where plants are failing they shall be replaced with suitable substitutes as recommended by a registered landscape architect, ecologist or bush regenerator. Where erosion occurs, re-stabilise using mulch, followed by replanting to minimise long term maintenance issues. Weeding shall occur as outlined in previous sections. Steep eroded areas may require jute mesh/erosion control matting to be pinned down and placed over mulch to prevent soil runoff.

Maintenance activities shall include weeding, spot spraying, watering, monitoring of plant losses from heat or other factors, poor growth, animal, construction damage, and unsuitable species.

3.6 PLANT ESTABLISHMENT AND PROTECTION

Initial protection of all individual tree and shrub plantings shall be undertaken using protective biodegradable tree sleeves held with bamboo stakes. Locations shall be mulched with bark or a weed mat product to provide the best opportunity for plant establishment.

3.7 CONTROL OF ACCESS

All areas under going planting shall be fenced/marked off to ensure that machinery, stockpiling of materials, access tracks, service layouts and general construction activity is prevented from accessing these areas. Protective fencing shall remain erected until construction works are complete for that particular stage.

It is often difficult to enforce this over large sites with numerous parties working on the site, however with the proper fencing, site supervision and site meetings/induction will ensure the best method to ensure the protection of these areas. The use of the Gro-tube protective sleeving will ensure visibility of revegetation areas generally. Gro-tubes also provide a secure micro-climate for new plantings to establish well in.

Fencing to restrict cattle entering the area shall be erected in order to prevent damage to naturally regenerating native species as well as newly planted trees, shrubs and grasses.

3.8 EROSION AND SEDIMENTATION CONTROL

Many factors that occur on site throughout construction phases have the potential to contribute to erosion and unnecessary damage to both the site itself and adjoining

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land. Factors that may cause adverse effects can include; storage of fill, removal of selected trees and surrounding grass cover in open areas and to a lesser extent, weed control and revegetation of remnant patches. It is important to understand the adverse effects caused due to erosion and sedimentation. In some cases areas some distance from the initial disturbance may be affected by actions else where on site.

Soil stabilisation works will be implemented as per the *Managing Urban Stormwater: Soils and Construction* commonly known as *The Blue Book* (Landcom, 2006) and local council requirements. It is a standard requirement for construction activity to provide sediment control where required. Erosion zones shall be planted with suitable fast-growing native grass species immediately to reduce the potential for any further erosion or weed infestation to occur. Establishment and maintenance of cover is essential to ensure erosion areas do not amplify in size. Steep eroded areas may require jute mesh erosion control matting to be pinned down and placed over 75mm thick mulch to prevent soil runoff.

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4. MANAGEMENT ACTIVITIES

4.1 GENERAL

The time allocated to maintenance shall be varied according to the stage of the development. Initial establishment of the reworked dams and detention basins shall be given additional time to ensure the proper establishment and function of the system.

The landscape management schedule includes but is not limited to the prescribed instructions. The contractor shall perform additional tasks should they be required.

4.2 REQUIRED VEGETATION MANAGEMENT ACTIVITIES

Construction of the proposed stormwater control devices will be undertaken in various stages. Vegetation management including the activities outlined below are to coincide with the main civil construction stage.

TASK		DESCRIPTION	ACTIVITY
01	Protection of native vegetation where required	Areas to be fenced and protected Where required.	Civil Contractor, Landscape Architect – Site Supervisor.
02	Collect native indigenous seed from site and propagate stock to provide tube-stock for revegetation of the remnants and other areas undergoing rehabilitation.	Source and collect seed for propagation	Bush Regeneration Team (Seed collection and propagation may not be possible depending on germination periods and construction schedules)
03	Weed removal	Weed removal by bush regeneration methods or manual spraying with approved herbicides.	Bush Regeneration contractor. Landscape Architect
04	Erosion control.	Erosion control undertaken where required, monitor and maintain Planting of suitable fast growing native grass species undertaken Pin jute matting on batters to stabilise batters	Civil contractor , Bush Regeneration Team, and Site supervisor
05	Revegetation of disturbed areas	Soil stabilisation and revegetation undertaken.	Project Ecologist supervising a Bush Regeneration contractor.
06	Ongoing site monitoring, maintenance (including plant watering, weed control, plant replacement, protection and fuel load reduction), sediment control fencing decommissioning.	Soil stabilisation, weed control, and native vegetation establishment.	Bush Regeneration contractor. Landscape Architect contractor-site supervisor.
07	Reporting	Follow up reports including images to ensure the processes and activities have been completed with recommendations for additional works	Bush Regeneration contractor.

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4.3 COMMISSIONING

1. Inspect the revegetation area as required
2. Monitor and ensure the proper function of the stormwater control devices during the initial establishment of the planting works.
3. Monitor and repair any erosion and replace all lost macrophyte plantings as required
4. Remove any rubbish within the wetland area throughout the maintenance period

4.4 LITTER AND REFUSE

1. Ensure the litter trap for the collection of gross pollutants is maintained in a functional condition at all times.
2. Removal of accumulated litter from the area is required. Discard all litter and other refuse material. All trash, litter, leaves, etc. shall be collected and deposited off site to approved waste areas or as otherwise directed by the superintendent

4.5 OPERATION

1. Provide routine monitoring and maintenance activities as outlined and specified in this maintenance plan.
2. Do not let any plants above the permanent water level dry out. Water when required as specified

4.6 FLOOD MANAGEMENT

1. Inspect the site after storm events to ensure that any plant damage is repaired.
2. Remove litter and waste after storm events and dispose off site in an environmentally responsible manner.
3. Replace any lost or missing plants causing minimal disturbance to existing planted areas.

4.7 PEST AND WEED CONTROL

1. Undertake adequate weed control measures on any non-desirable plants or weeds as required. Hand removal is required for weeds situated in close proximity to the water level whilst approved glyphosate can be used on weed species situated on elevated areas.
2. Check that the vegetation is not adversely affected by wildlife (predation).
3. Regularly remove, by hand, rubbish and weed growth that may occur throughout the basin area and dispose of in a suitable manner.
4. The maintenance contractor must keep records of each chemical application. Details are to include location, target identification, operators name, treatment date and time, risk assessment including prevailing conditions and product and equipment used and application rates.

4.8 WATERING

It is the contractor's responsibility to ensure that all plants receive adequate water regardless of weather conditions. Planted areas situated above the permanent water line are to be kept moist at all times throughout the establishment period. The maintenance contractor shall ensure all macrophyte planting receives adequate water for successful establishment when required.

4.9 SEDIMENT ACCUMULATION

1. Ensure any excess sedimentation accumulated on site is removed.

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2. Sediment shall be disposed of in accordance with the '*Waste Minimisation and Management Act' 1995.* And with the approval of the Cessnock City Council.

4.10 TIMING FOR MAINTENANCE ACTIVITIES

Refer to the Landscape Management Schedule (Section 8.1) for the timing of recurrent maintenance activities.

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5. SITE SUPERVISION, MONITORING AND REPORTING

5.1 SITE SUPERVISION

- A copy of the bushland contractor's works specification is to be submitted to Newcastle City Council, An initial site inspection is to be undertaken in the company of an appointed Newcastle City Council representative prior to undertaking and work identified in this VMP, if requested.

- The bush regeneration contractor shall be responsible for over-seeing the appropriate methodology, location, maintenance, monitoring and reporting of all rehabilitation works. Submissions and reporting shall be undertaken and provided as outlined in Section 6.2 below.

- An engineer shall be responsible for the supervision of any erosion or sediment control works undertaken, if applicable. This person shall ensure all environmental guidelines are adhered to during all operations.

- Any excavation works and/or fill placement are to be undertaken by an experienced excavator contractor, proficient in the use of the machinery and an ability to carry out minimal disturbance.

- All weed control, revegetation and maintenance works will be undertaken by an experienced and certified bush regeneration contractor.

- The contractor shall report to the client's agent for any clarifications or issues encountered throughout the program.

5.2 MONITORING, MAINTENANCE AND REPORTING

Monitoring, maintenance and reporting shall be undertaken on a regular basis to ensure the successful establishment of all plantings, monitoring of weed regrowth and stabilisation success. Regular monitoring shall be undertaken by the contractor for a minimum of 2 years and until such time as 80% survival rate of each species and a maximum of 5% weed cover is achieved. Monitoring sessions shall also address the performance criteria as outlined below. The sessions will need to be more frequent in the early stages following planting, the frequency decreasing with time.

- The contractor shall submit annual reports detailing works undertaken, the results of that work, identifying future works programs and making and necessary recommendations to enhance the VMP, if requested.

The frequency and duration of monitoring should be flexible, and re-assessed following each session. However, as an initial guide, monitoring is likely to be required:

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- Monthly for the first 6 months,
- Once every 3 months for the following 18 months,
- Subsequent years if required. Frequency to be discussed. At this time a decision could be made as to whether monitoring can be discontinued.

If it is necessary to increase or decrease monitoring at any given time the contractor shall discuss options with the landscape architect.

Monitoring sessions would indicate the specific maintenance requirements for the site. Such maintenance is likely to involve (but not necessarily be restricted to):

- Control of weeds,
- Watering as required,
- Control of pests or diseases,
- Correction of any significant nutrient deficiencies,
- Replacement of failed plantings,
- Correction of any bank/slope instability or erosion problems, and
- Any other unanticipated problems.

Biannual reports are to be prepared by the contractor to record the results and actions identified throughout each monitoring and maintenance session. Reports shall be submitted to the clients agent. Reports are to be inclusive of but not be limited to; up to date photographs of areas treated, current progress or issues encountered, providing viable options for the remedy of any such issues, an outline of future maintenance and monitoring activities, any recommended amendments to the proposed program and reason for proposed amendments.

5.3 CHECKLISTS AND LOGS

A landscape management schedule is made part of this specification. The contractor shall review this schedule as required and complete all applicable items on the list in intervals as specified.

The contractor shall keep a log of all maintenance undertaken on site. Details included within the log shall include date, time, work undertaken and any relevant responses/recommendations with respect to work undertaken. Submit log records to the site superintendent within 24 hours of being requested to do so.

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5.4 VEGETATION MANAGEMENT TIMING

GOAL	ESTIMATED PERIOD OF TIME	ACTIVITY
SHORT TERM **(Major eradication and revegetation works to be undertaken within the maintenance period)**	0-2 years	• Native Seed collection (provenance seed) and propagation by bush regeneration contractor. • Tree and vegetation protection where required. • Erosion control measures undertaken where required. • Initial weed removal undertaken using specified techniques. • Secondary weed removal undertaken using specified techniques. • Revegetation of nominated areas preferably with plants propagated from provenance seed collection. • Monitoring of weed re-infestations and removal as required. • Replacement of any lost, stolen or any dead plants • General maintenance and replacement of plant stock as required to ensure effective competition with weed species. • Maintenance and replacement of revegetation plant species as required. • Ongoing monitoring and maintenance for 2 years and until an 80% survival rate for each species and a maximum weed cover of 5% is achieved. • Self sustaining vegetation remnants with little or no weed infestation.
LONG TERM **(Minor Monitoring & Maintenance Activities + Desired Outcomes)**	2-20 years	• Self-sustaining native seed bank and natural recolonisation of native species occurring • Minor monitoring and maintenance activities to be undertaken as required. • Nil weed infestation. • Weeds species eradicated from the native remnants site. • Self sustaining native vegetation remnants.
***Note**: Activities/goals listed under the long term category are intended as desired outcomes due to successful establishment and maintenance throughout the initial short term period (for 2 years and until an 80% survival rate for each species and a maximum weed cover of 5% is achieved). Although self-sustaining, monitoring should be undertaken periodically throughout the long term period to monitor the success of weed eradication and revegetation. Should additional work be required throughout this period it shall be undertaken as approved by the clients agent.*		

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6. REFERENCES

Department of Primary Industries, Office of Water (2012) *Guidelines for Riparian Corridors on Waterfront land.*

Landcom (2006) *Managing Urban Stormwater : Soils and Construction.*

Environmental Appraisal and Planning Pty Ltd (2003) *Flora and Fauna Assessment*

Standards Australia (2009) AS 4970-2009 *Protection of Trees on Development Sites.*

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7. APPENDICES

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7.2 ACCEPTED WEED REMOVAL TECHNIQUES

Weeds to be removed. The following techniques are recommended by the [NPWS] National Trust, NSW National Parks and Wildlife Service and Australian Association of Bush Regenerators.

WOODY WEED REMOVAL TECHNIQUES
Removal Techniques: • Cut and Paint (Woody weeds to 10 cm basal diameter] • Stem Injection • Frilling or Chipping **Notes** • Plants should be actively growing and in good health; • Deciduous plants should be treated in spring and autumn when leaves are fully formed; • For multi-stemmed plants, inject or chip below the lowest branch or treat each stem individually; and • Herbicides must be injected immediately before plant cells close (within 30 seconds) and translocation of herbicide ceases.
SMALL HAND-PULLABLE PLANTS
Removal Techniques: • Hand removal **Notes** • Leave weeds so roots are not in contact with the soil e.g. hang in a tree, remove from site or leave on a rock.
VINES AND SCRAMBLERS
Removal Techniques: • Hand removal **Notes** • Take hold of one runner and pull towards yourself; • Check points of resistance where fibrous roots grow from the nodes; • Cut roots with a knife or dig out with a trowel and continue to follow the runner; • The major root systems need to be removed manually or scrape/cut and painted with herbicide; • Any reproductive parts need to be bagged. **Removal Techniques:** • Stem Scraping **Notes** • Scrape 15 to 30 cm of the stem with a knife to reach the layer below the bark/outer layer; and immediately apply herbicide along the length of the scrape.

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WEEDS WITH UNDERGROUND REPRODUCTIVE STRUCTURES
Removal Techniques: **HAND REMOVAL OF PLANTS WITH A TAPROOT** • Remove and bag seeds or fruits; • Push a narrow trowel or knife into the ground beside the tap root, carefully loosen the soil and repeat this step around the taproot; • Grasp the stem at ground level, rock plant backwards and forwards and gently pull removing the plant; and • Tap the roots to dislodge soil, replace disturbed soil and pat down.
CROWNING • Remove and bag stems with seed or fruit; • Grasp the leaves or stems together so the base of the plant is visible; • Insert the knife or lever at an angle close to the crown; • Cut through all the roots around the crown; and • Remove and bag the crown.
STEM SWIPING • Remove any seed or fruit and bag; and • Using a herbicide applicator, swipe the stems/leaves.
HERBICIDE TREATMENT • Isolated spray with 'Glyphosate'.

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7.3 MAINTENANCE SCHEDULE

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MAINTENANCE SCHEDULE STAGE 10 OUTLOOK

THE FOLLOWING ACTIVITIES ARE TO BE UNDERTAKEN ON A RECURRENT BASIS TO ENSURE THE HEALTH AND VIGOUR OF THE REVEGETATION AREA.

	ACTIVITY	1ST TWELVE MONTHS								SUBSEQUENT MONTHS				AS REQUIRED
		1	2	3	4	5	6	9	12	15	18	21	24	*
1	**STORM AND FLOOD MANAGEMENT**													
1.1	INSPECT AND ASSESS SITE FOR STORM DAMAGE.													☑
1.2	REMOVE ANY RUBBISH OR DEBRIS.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	
1.3	REPAIR ANY AREAS AFFECTED BY EROSION CAUSED BY STORM DAMAGE/HIGH FLOW RATES.													☑
1.4	REPLANT ANY AREAS WHERE PLANTS HAVE BEEN DAMAGED OR WASHED AWAY. VARY SPECIES IF REQUIRED.													☑
1.5	REMOVE ANY EXCESSIVE SEDIMENTATION OCCURRING WITHIN AREA.													☑
2	**PLANT MANAGEMENT AND WEED CONTROL**													
2.1	INSPECT AND ASSESS SITE FOR ANY PLANT LOSSES OR WEED INFESTATIONS.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	
2.2	REPLACE LOST PLANTS WITH EITHER SAME SPECIES OR MORE APPROPRIATE SPECIES.													☑
2.3	UNDERTAKE WEED CONTROL, BY HAND, REMOVING COLLECTED MATERIAL FROM SITE.													☑
2.4	IF WEED SOURCE OCCURRING FROM ADJOINING AREAS, APPROACH OWNERS TO SEEK MORE SUITABLE CONTROL.													☑
2.5	APPLY SLOW RELEASE FERTILISER IN SPRING (VARY TO SUIT).			☑						☑				
2.6	INPECT PLANTS FOR MOISTURE STRESS.	☑☑	☑☑	☑	☑		☑		☑					
3	**LITTER MANAGEMENT**													
3.1	INSPECT AND ASSESS SITE FOR ANY BUILD UP OF LITTER AND/OR DUMPING.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	
3.2	REMOVE ANY LITTER OR DEBRIS.													☑
3.3	IF DUMPING IS RECURRING, LOCATE SOURCE (IF POSSIBLE) AND REPORT TO COUNCIL.													☑
4	**PEST CONTROL**													
4.1	INSPECT AND ASSESS PLANT MATERIAL FOR PESTS AND OR OTHER DISEASE.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	
4.2	CONDUCT PEST/PREDATION CONTROL IF AFFECTING PLANT VIGOUR USING ENVIRO. SENSITIVE METHODS.													☑
5	**MANAGEMENT OF SEDIMENT AND BIOACCUMULATION**													
5.1	INSPECT AND ASSESS SITE FOR BUILD-UP OF SEDIMENTATION AND BIO-MASS.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	
5.2	CAREFULLY REMOVE SEDIMENTATION ENSURING PLANTS ARE LEFT INTACT.													☑
5.3	REMOVE BUILD-UP OF BIO-MASS WHERE THERE IS A RISK OF CONGESTED FLOWS.													☑

	NOTES
*	INDICATES MAINTENANCE ACTIVITIES TO BE UNDERTAKEN AS REQUIRED AS A FOLLOW-UP TO UNDERTAKING INSPECTIONS. (E.G. MAJOR STORM EVENT [I.E. GREATER THAN 1 IN 10] OR DURING ROUTINE INSEPECTIONS).

7.4 DRAWINGS VMP-01

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outlook stage 10

01

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LEGEND

- EXISTING TREE RETAINED
- EXISTING TREE REMOVED
- PROPOSED STREET TREE (*Acmena smithii*)
- PROPOSED STREET TREE (*Xythanstemon chrysanthus*)
- PROPOSED STREET TREE (*Syzygium australe*) CONTINUATION OF PLANTING FROM WEST ALONG MINMI RD.
- ASSETT PROTECTION ZONE
- FUEL MANAGED ZONE
- RIPARIAN ZONE
- PARKLAND
- RESIDENTIAL LOTS
- LANDSCAPED BATTERS

site details:
MINMI ROAD, FLETCHER
client:
NORTHWEST RESIDENTIAL
date:
NOV 2017
job number:
9496.5
scale:
1-2000 @ A3
drawn:
SGK / RDS
rev. number:
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7.5 DRAWINGS VMP-02

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02

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7.6 DRAWINGS VMP-03

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03

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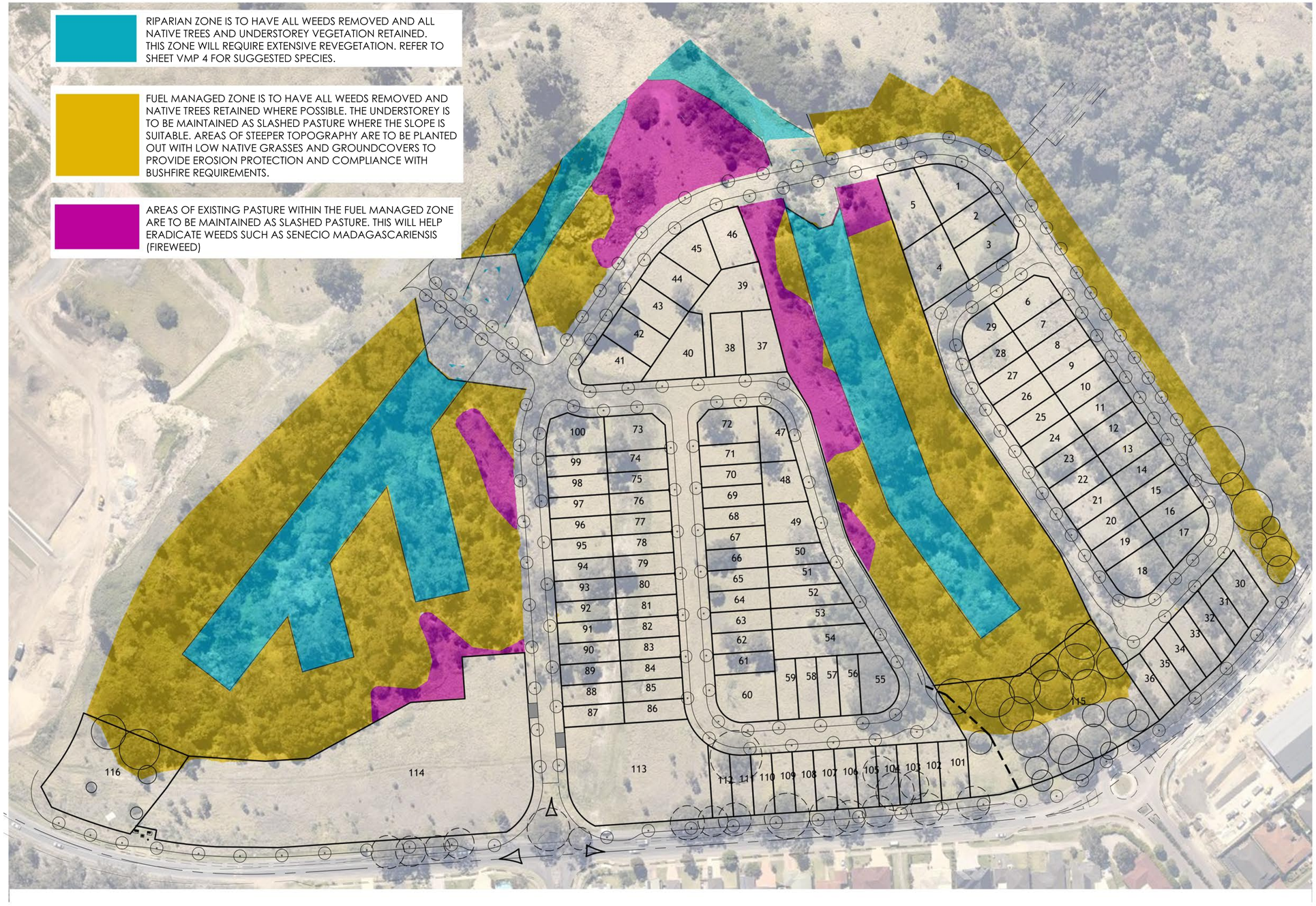

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7.7 DRAWINGS VMP-04

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vegetation management plan | 04

outlook stage 10 | NOV 2017

Suggested re-vegetation species

Botanical Name	Common Name	Pot Size
Trees		
Alphitonia excelsa	Red Ash	2.5 litre
Eucalyptus grandis	Flooded Gum	2.5 litre
Eucalyptus saligna	Blue Gum	2.5 litre
Glochidion ferdinandi	Cheese Tree	2.5 litre
Syncarpia glomulifera	Turpentine	2.5 litre
Syzygium australe	Brush Cherry	2.5 litre
Xanthonstemon chrysanthus	Golden Penda	2.5 litre
Shrubs		
Acacia falcata	Wattle	tubestock
Breynia oblongifolia	Coffee Bush	tubestock
Ficus coronata	Sandpaper Fig	tubestock
Hibiscus heterophullus	Native Rosella	tubestock
Melaleuca linariifolia	Snow in Summer	tubestock
Melaleuca stypheloides	Prickly Paper Bark	tubestock
Polyscias sambucifolius	Elderberry Panax	tubestock
Groundcovers and Grasses		
Carex appressa	Tussock Sedge	tubestock
Cissus antarctica	Kangaroo Vine	tubestock
Commersonia fraseri	Brush Kurrajong	tubestock
Cymbopogon refractus	Barbed Wire Grass	tubestock
Dianella caerulea	Flax Lily	tubestock
Kennedia rubicunda	Dusky Coral Pea	tubestock
Hardenbergia violacea	Native Sarsparilla	tubestock
Hibbertia scandens	Twining Guinea Flower	tubestock
Imperata cylindrica	Blady Grass	tubestock
Lomandra longifolia	Spiny Matt-Rush	tubestock
Themeda australis	Kangaroo Grass	tubestock
Viola hederacea	Native Violet	tubestock

Alphitonia excelsa (Red Ash)

Eucalyptus grandis (Flooded Gum)

Glochidion ferdinandi (Cheese Tree)

Syncarpia glomulifera (Turpentine)

Carex appressa (Tall Rush)

Kennedia rubicunda (Dusky Coral Pea)

Lomandra longifolia (Spiny Matt-Rush)

Hibbertia scandens (Twining Guinea Flower)

Hardenbergia violacea
(False Sarsparilla)

Hibiscus heterophyllus
(Native Rosella)

site details:
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7.8 SITE IMAGES

The following images are intended to act as a reference and document the condition of the site's vegetation at the time fieldwork was undertaken.

Image 1.
Lantana camara forms an impenetrable barrier around the perimeter o9f the gullys.

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Image 2.
Pasture areas around the gully.

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Image 3.
Many of the trees along Minmi Road have a short Useful Life Expectancy.

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Image 4.
Lantana infestation in upper slope areas.

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Image 5.
A number of trees have germinated since grazing has ceased.

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