VEGETATION/HABITAT MANAGEMENT PLAN

for a proposed
Seniors Living Development

at

Lot 141 DP 1225076
Lot 8 DP 855275
Mount Vincent Road

EAST MAITLAND
NSW

DRAFT

Prepared by: WILDTHING Environmental Consultants
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Job No. 12350 ***Draft September 2018***

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ABN: 41 003 509 215

Project Name	Vegetation/Habitat Management Plan for a proposed Seniors Living Development at Lot 141 DP 1225076 and Lot 8 DP 855275 Mount Vincent Road, East Maitland.	
Project Number	12350	
Prepared By	Dr Kylie Bridges BEnvSc Hons PhD Ecologist	
Reviewed By	Daryl Harman BEnvSc Senior Ecologist	
Status	Draft 2 - 17 September 2018	

Disclaimer

This report has been prepared in accordance with the proposal provided by the Client and outlined within this report. All findings, conclusions or recommendations contained within this report are based upon the data and results collected under the times and conditions specified in the report and are only applicable for the proposal considered within this report. This report has been prepared for use exclusively by the Client. No responsibility for its use by any other party is accepted by WILDTHING Environmental Consultants.

CONTENTS

1.0 INTRODUCTION

Wildthing Environmental Consultants has prepared this Vegetation/Habitat Management Plan (VMP) for the construction of a seniors living development (Hunter Grange Lifestyle Village) at Lot 8 DP 855275 Wilton Drive and Lot 141 DP 1225076 Mount Vincent Road, East Maitland NSW (Figure 1). The VMP has been requested by Maitland City Council as a component of the Development Application. The VMP provides: a description of native vegetation on site; a breakdown of the site into management zones; a schedule of works detailing the sequence and duration or works necessary for revegetation and maintenance works for each management zone; weed infestation locations and removal techniques; vegetation species composition, planting layout and densities based on natural vegetation communities occurring in the locality; and the removal of habitat trees from the development zone and subsequent nest box installation program.

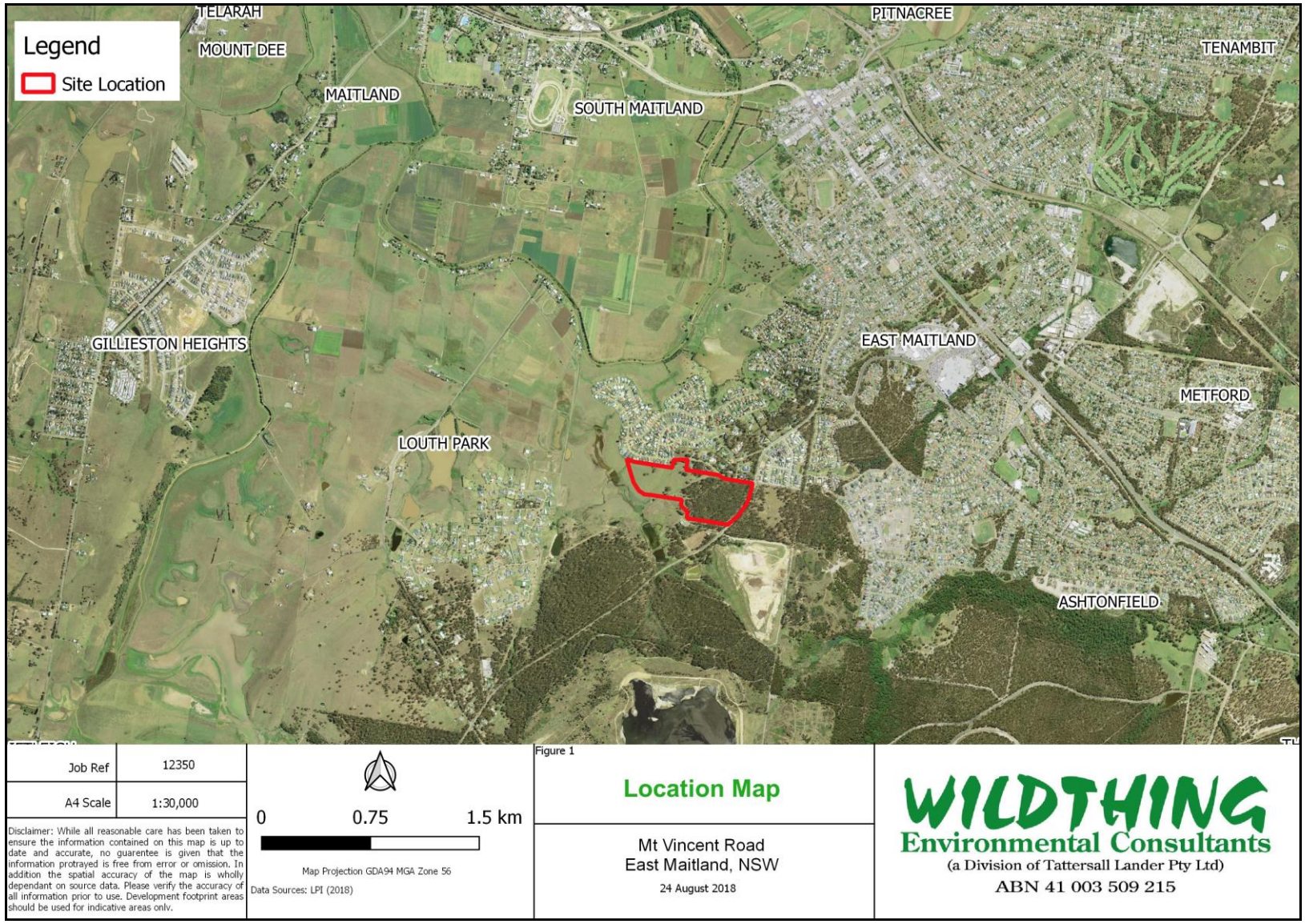
1.1 OBJECTIVE OF THE VEGETATION MANAGEMENT PLAN (VMP)

The objectives of the VMP include:

- To ensure the ongoing ecological viability of the retained areas of vegetation by protecting the ecological biodiversity and habitat values of the land;
- To improve and increase the quality and extent of a degraded Threatened Ecological Community – Lower Hunter Spotted Gum - Ironbark Forest.
- To provide compensatory habitat with the installation of nest boxes;
- To retain and protect indigenous heritage within the site;
- To provide improve the quality of the Drainage and Stormwater Detention Area (Constructed Dam and drainage line) as per the Landscaping Management Plan.

The VMP will include:

- The condition of the existing vegetation;
- Description of proposed environment;
- Protection of native vegetation;
- Weed management techniques;
- Vegetation removal;
- Planting methods;
- Nest box installation, and monitoring and maintenance program;
- Monitoring and reporting;
- Costs.


Legend
Site Location
TELARAH
MOUNT DEE
MAITLAND
SOUTH MAITLAND
PITNACREE
TENAMBIT
GILLIESTON HEIGHTS
EAST MAITLAND
METFORD
LOUTH PARK
ASHTONFIELD
Job Ref
12350
A4 Scale
1:30,000
Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarentee is given that the information protrayed is free from error or omission. In addition the spatial accuracy of the map is wholly dependant on source data. Please verify the accuracy of all information prior to use. Development footprint areas should be used for indicative areas only.
0
0.75
1.5 km
Map Projection GDA94 MGA Zone 56
Data Sources: LPI (2018)
Figure 1
Location Map
Mt Vincent Road
East Maitland, NSW
24 August 2018
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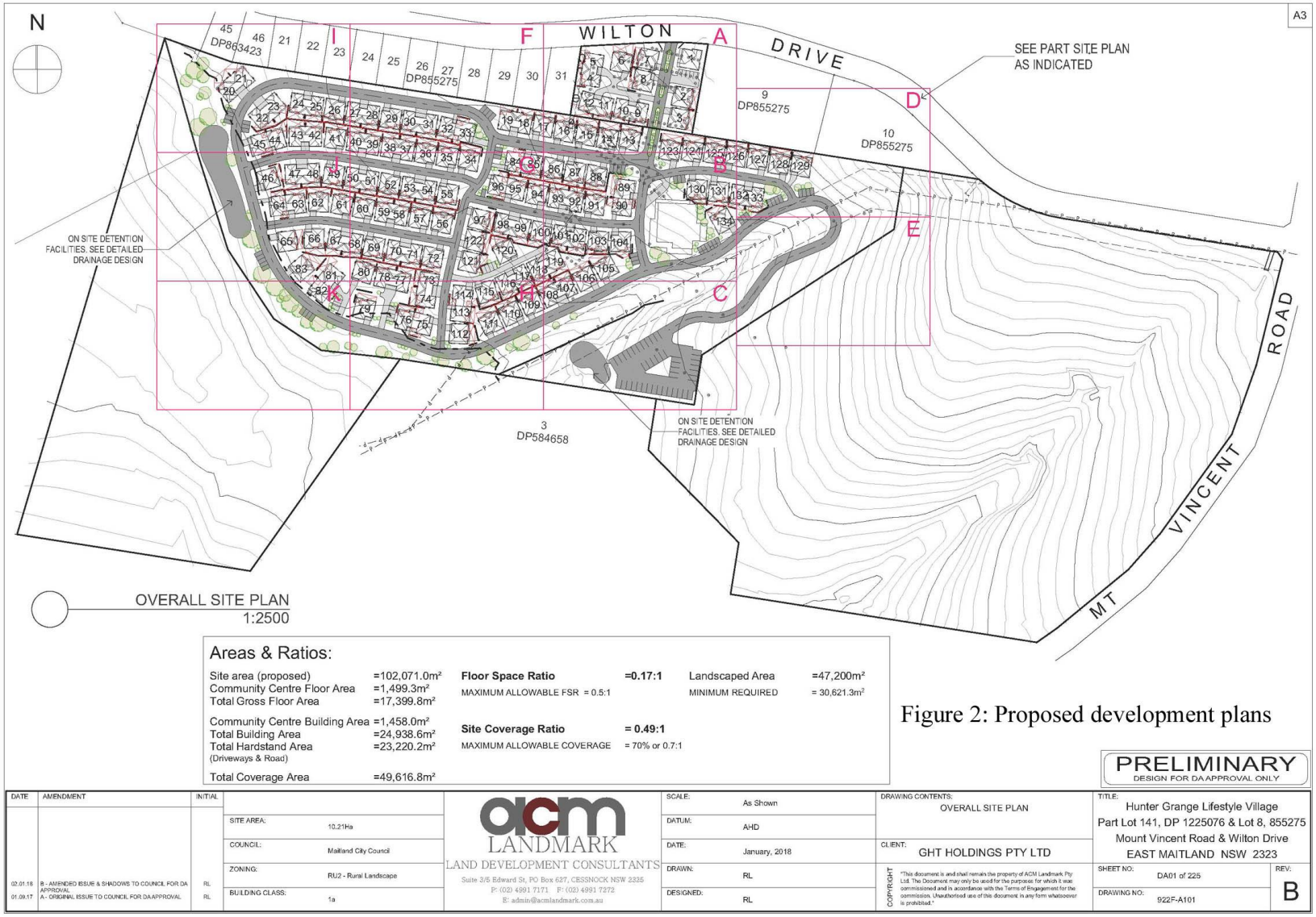

Figure 2: Proposed development plans

1.2 DOCUMENTATION USED IN VMP

The VMP has considered the information contained within the following documentation:

- GKs Garden Creation (2017) *Landscape Management Plan*. GHT Holdings Pty Ltd. March 2017.
- Peak Land Management (2016) *Bushfire Threat Abatement Report for Proposed Seniors Living Lot 42 DP 846326 Mount Vincent Rd, East Maitland.* MBK Holdings Pty Ltd. August 2016.
- Wildthing Environmental Consultants (2016a). Updated Statement of Effect on Threatened Flora and Fauna for a proposed Seniors Living Development – Wilton Drive and Mt Vincent Road, East Maitland. Updated July 2016. GHT Trust Pty Ltd.
- Wildthing Environmental Consultants (2016b). Response to Council: Lot 42 DP 846326 & Lot 8 DP 855275 Wilton Drive and Mt Vincent Road, East Maitland NSW. September 2016.

2.0 SITE DESCRIPTION

2.1 SITE LOCATION

The VMP covers an area that is 21.60ha and is located on the corner of Mount Vincent Road and Wilton Drive, East Maitland and north of Maitland Fire Control Centre.

2.2 DESCRIPTION OF DEVELOPMENT

It is proposed that a seniors living development (Hunter Grange Lifestyle Village) be constructed within Lot 8 DP 855275 Wilton Drive and Lot 141 DP 1225076 Mount Vincent Road, East Maitland NSW. The proposed development contains 134 detached dwellings, as well as roads, a community facility, parking lot, recreational space and a detention basin (Figure 2). A large portion of the development will be positioned within the area of cleared pasture/grassland in the west of the site however approximately 0.27ha of a larger 12.06ha fragment of Lower Hunter Spotted Gum – Ironbark Forest an Endangered Ecological Community including a number of scattered and clumped remnant native trees will be required to be removed (Wildthing Environmental Consultants, 2016).

2.3 TOPOGRAPHY & HYDROLOGY

The site occurs on undulating topography which sloped downwards toward the south and west. The underlying geology consists of Permian sediments of the Tomago Coal Measures composed of shale, mudstone, sandstone and coal (Matthei, 1995). The site is located in the Wallis Creek catchment. A small constructed dam was present within the south of the centre of the site and a prescribed drainage line was present from the drainage line extending to the north of the site.

2.4 VEGETATION

The Pre-1750 vegetation map produced for the for the Lower Hunter Central Coast Regional Environment Management Strategy (2003) shows the 27.44ha site was most likely dominated by Lower Hunter Spotted Gum – Ironbark Forest on the higher ground in the east and Tall Alluvial Moist Forest on the lower ground in the west. Fieldwork found a large portion of the Lower Hunter Spotted Gum – Ironbark Forest to be present however due to past clearing and agricultural practices there was no evidence of Tall Alluvial Moist Forest present on site. This area had primarily been replaced by cleared pasture with clumped remnant trees and a disturbed wetland assemblage within the drainage line.

A total of four vegetation communities were delineated within the site:

- Lower Hunter Spotted Gum – Ironbark Forest (12.06 ha)
- Cleared Open Pasture with scattered remnant trees (9.78 ha)
- Freshwater Dam Vegetation (0.03 ha)
- Planted Native Trees (0.09 ha)

The distribution of the vegetation communities has been indicated in Figure 3*. A general description of the flora assemblage identified on site is given below in Table 1. A full list of the flora species recorded during fieldwork is listed in Appendix A.

*Note on Vegetation Community Distribution Map. A map of vegetation of any area seeks to describe the distribution of the plant species in that area by defining a number of vegetation units (assemblages or communities), which are relatively internally homogenous. Whilst such mapping is a convenient tool, it greatly oversimplifies the real situation. Plants rarely occur in defined communities with distinct boundaries. Accordingly vegetation units used for the accompanying map should be viewed as indicative of their extent rather than being precise edges of communities.

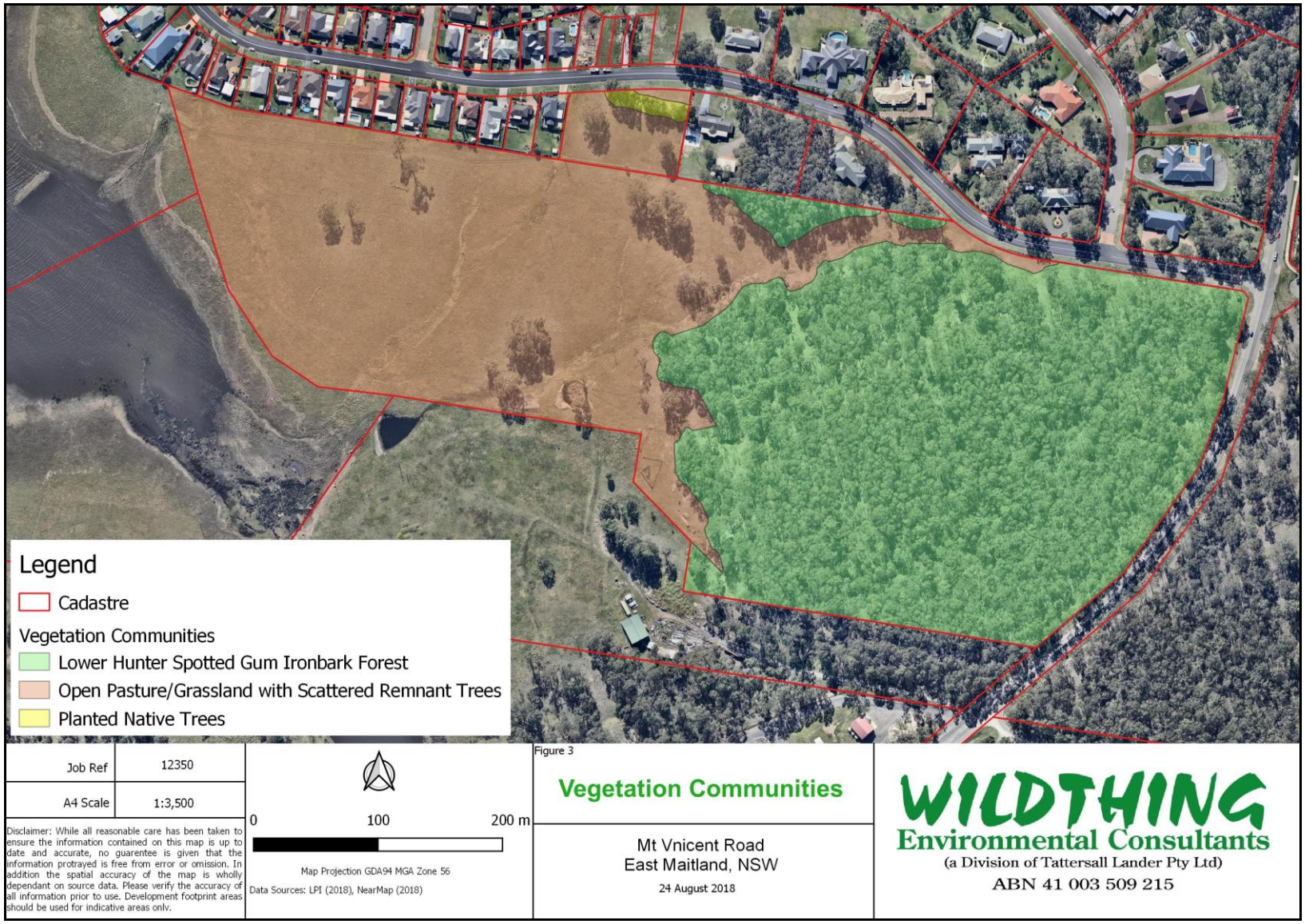
Legend
Cadastre
Vegetation Communities
Lower Hunter Spotted Gum Ironbark Forest
Open Pasture/Grassland with Scattered Remnant Trees
Planted Native Trees
Job Ref 12350
A4 Scale 1:3,500
Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarentee is given that the information protrayed is free from error or omission. In addition the spatial accuracy of the map is wholly dependant on source data. Please verify the accuracy of all information prior to use. Development footprint areas should be used for indicative areas only.
0 100 200 m
Map Projection GDA94 MGA Zone 56
Data Sources: LPI (2018), NearMap (2018)
Figure 3
Vegetation Communities
Mt Vnicent Road
East Maitland, NSW
24 August 2018
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Table 1: Descriptions of vegetation communities located within the site.

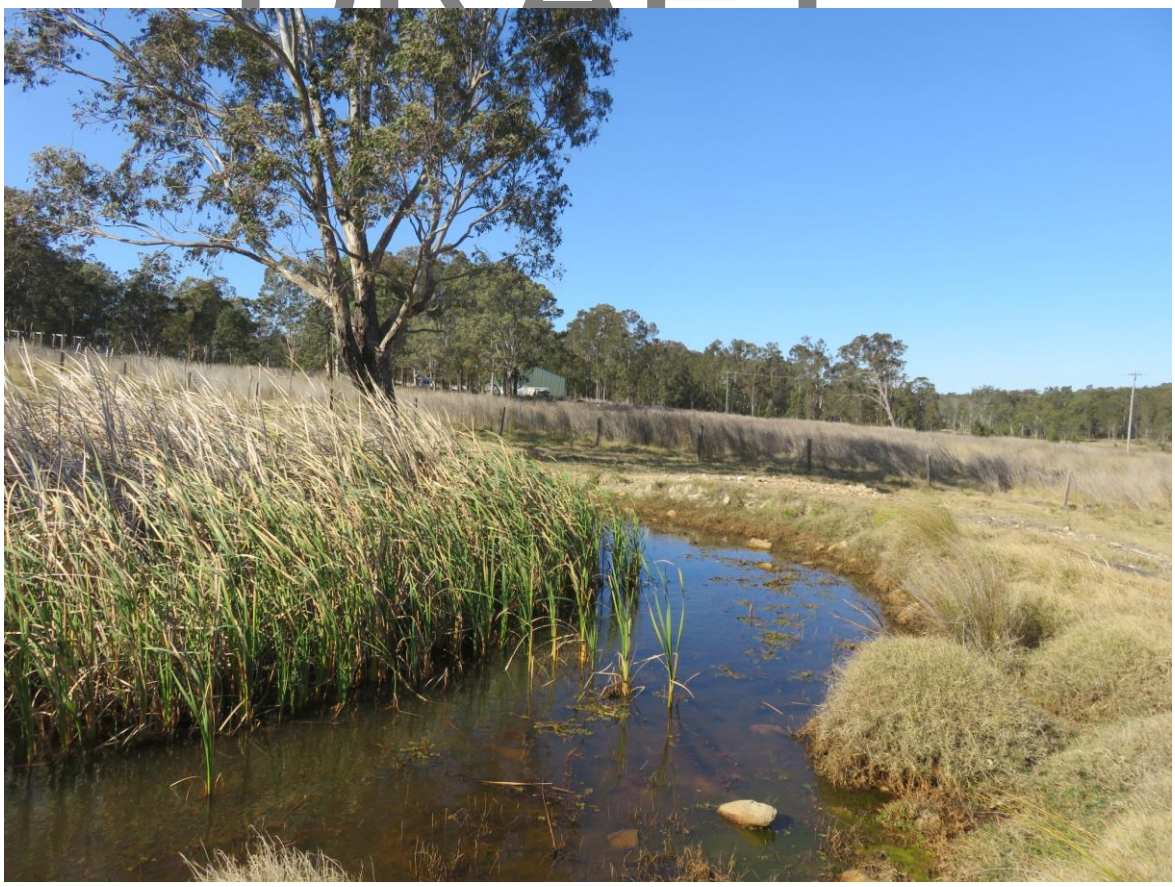
Lower Hunter Spotted Gum – Ironbark Forest	
Vegetation Formation	Dry Sclerophyll Forests (Shrub/grass sub-formation)
Vegetation Class	Hunter-Macleay Dry Sclerophyll Forests
Vegetation Community Type (PCT) No.	PCT -1592
PCT Name	Spotted Gum - Red Ironbark - Grey Gum shrub - grass open forest of the Lower Hunter
Extent	12.06ha
Species present	*Corymbia maculata, Eucalyptus fibrosa, Eucalyptus punctata, Pultenaea villosa, Persoonia linearis, Breynia oblongifolia, Bursaria spinosa, Leucopogon juniperinus, Daviesia ulicifolia, Pandorea pandorana, Microlaena stipoides, Themeda australis, Imperata cylindrica, Cymbopogon refractus, Aristida vagans, Pratia purpurascens, Vernonia cinerea, Dianella caerulea, Lomandra multiflora, Lepidosperma laterale, Cheilanthes sieberi, Goodenia rotundifolia.*
Condition	This area was found to be in generally good condition despite disturbances such as past vegetation clearance, weed infestation and grazing by cattle. The eastern periphery of the assemblage and two outlying isolated areas were also affected by edge effects resulting in an increase in introduced grass species such as *Cenchrus clandestinum* (Kikuyu Grass) within the understorey.
TEC Status	This PCT has a species composition consistent with that of the Threatened Ecological Community - Lower Hunter Spotted Gum-Ironbark Forest in the Sydney Basin Bioregion.
Similar Vegetation Types	Map Unit 17 Lower Hunter Spotted Gum – Ironbark Forest as described within the 'Vegetation Survey, Classification and Mapping, Lower Hunter and Central Coast Region' (NPWS, 2000).

Examples of PCT 1592 on site.

Open Pasture/Grassland with scattered remnant trees	
Vegetation Formation	n/a
Vegetation Class	n/a
Vegetation Community Type (PCT) No.	n/a
PCT Name	n/a
Extent	9.78 ha
Species present	*Eucalyptus tereticornis Cymbopogon refractus, Cynodon dactylon, Cenchrus clandestinum, Sporobolus africanus, Plantago lanceolata, Senecio madagascariensis*
Condition	Cleared pasture constituted the majority of the western portion of the site and was primarily composed of grasses and low introduced herbaceous species
TEC Status	Not listed
Similar Vegetation Types	n/a

Example of Open Pasture/Grassland with scattered remnant trees on site.

Freshwater Aquatic Vegetation (Constructed Dam)	
Vegetation Formation	n/a
Vegetation Class	n/a
Vegetation Community Type (PCT) No.	n/a
PCT Name	n/a
Extent	12.06ha
Species present	*Typha orientalis, Azolla pinnata, Ludwigia peploides, Juncus usitatus*
Condition	
TEC Status	Not listed
Similar Vegetation Types	n/a



Examples of Freshwater Aquatic Vegetation (Constructed Dam) on site

Open Pasture/Grassland with scattered remnant trees	
Vegetation Formation	n/a
Vegetation Class	n/a
Vegetation Community Type (PCT) No.	n/a
PCT Name	n/a
Extent	0.09 ha
Species present	*Callistemon salignus, Corymbia maculata, Melaleuca quinquenervia*
Condition	Older native planting was present within the northern portion of Lot 8 DP 855275 adjacent to Wilton Road. The plantings consisted of three rows. The northernmost row was composed of specimens of *Callistemon salignus* (Weeping Bottlebrush), the centre row *Corymbia maculata* (Spotted Gum) and the southern row *Melaleuca quinquenervia* (Broad-leaved Paperbark).
TEC Status	Not listed
Similar Vegetation Types	n/a

Example of Open Pasture/Grassland with scattered remnant trees on siteg

2.4.1 ENDANGERED ECOLOGICAL COMMUNITIES AND THREATENED FLORA

Based on the vegetation assessment (Wildthing Environmental Consultants, 2016), the Threatened Ecological Community (TEC) Lower Hunter Spotted Gum - Ironbark Forest was confirmed to be present in the east of the site. One very small clump of remnant trees in the centre of the site was likely to be identified as the TEC Hunter Lowlands Red Gum Forest as it was comprised of *Eucalyptus tereticornis* (Forest Red Gum). No other Endangered Ecological Communities were considered to be present within the site.

2.5 PRIORITY WEEDS AND WEEDS OF STATE AND NATIONAL SIGNIFICANCE

The impact of weeds on site is considered to be a threat to the long-term survival of the area of native vegetation within the site. Six priority weed species listed under the Biosecurity Act 2015 were identified on site and are listed below in Table 2. The site lies within the Hunter Regional Weed Committee (HRWC).

Table 2: Priority Weed species found within the subject site.

WEED SPECIES	LEGAL REQUIREMENTS	ADDITIONAL SIGNIFICANCE
Lantana camara Lantana	General Biosecurity Duty Prohibition on dealings	N & T
Opuntia stricta var. *stricta* Prickly Pear	General Biosecurity Duty Prohibition on dealings	N
Olea europaea subsp. *cuspidate* African Olive	General Biosecurity Duty Regional Recommended Measure	T
Senecio madagascariensis Fireweed	General Biosecurity Duty Prohibition on dealings	N
Bryophyllum delagoense Mother-of-millions	General Biosecurity Duty Regional Recommended Measure	
Emex australis Spiny Emex	General Biosecurity Duty	

T – Listed as a Threatening Process under the NSW BC Act 2016.
N –Weed of National Significance.

***Priorities under the Biosecurity Act 2015**

General Biosecurity Duty - any person dealing with plant matter must take measures to prevent, minimise or eliminate the biosecurity risk (as far as is reasonably practicable).

Prohibition on dealings - Must not be imported into the State or sold

Regional Recommended Measure - Land managers mitigate the risk of the plant being introduced to their land. Land managers reduce impacts from the plant on priority assets. Land managers prevent spread from their land where feasible. The plant or parts of the plant are not traded, carried, grown or released into the environment

Information on the control of these species as contained within the NSW DPI *Noxious and environmental weed control handbook* (2014) is included in Appendix B. Other weed species recorded in the riparian corridor or its immediate vicinity included:

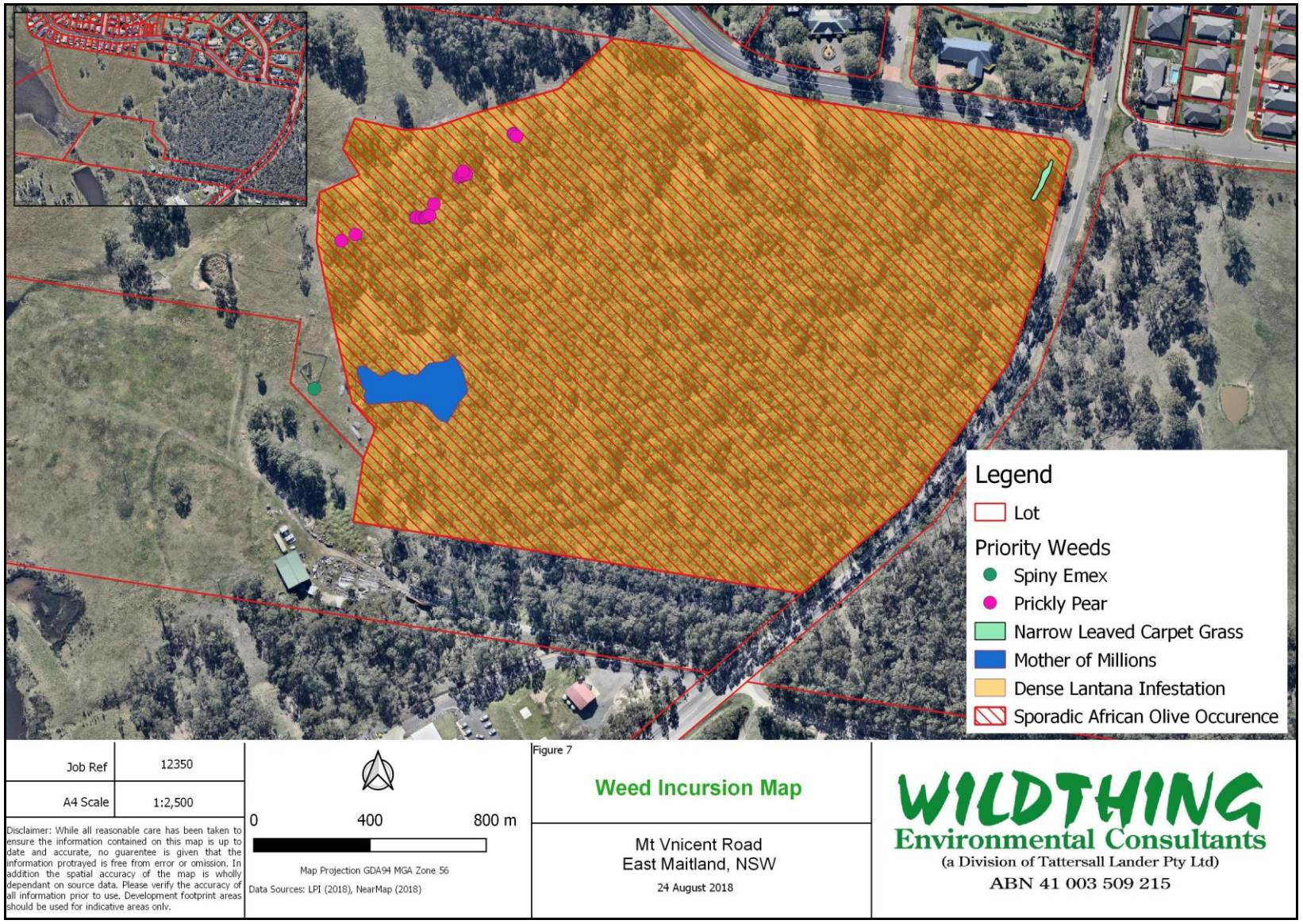
Ageratina adenophora	Crofton Weed
Bidens pilosa	Cobblers Pegs
Cirsium vulgare	Spear Thistle
Coreopsis lanceolata	Coreopsis
Facelis retusa	Annual Trampweed
Hypochaeris radicata	Cat's Ear
Sonchus oleraceus	Common Sowthistle
Tagetes minuta	Stinking Roger
Cerastium glomeratum	Mouse-ear Chickweed

Trifolium repens	White Clover
Vicia sativa	Vetch
Cinnamomum camphora	Camphor Laurel
Sida rhombifolia	Paddy's Lucerne
Ligustrum sinense	Small-leaved Privet
Plantago lanceolata	Plantain
Rumex crispus	Curled Dock
Lysimachia arvensis	Scarlet Pimpernel
Solanum mauritianum	Wild Tobacco Bush
Aloe vera	
Chlorophytum comosum	Spider Plant
Solanum nigrum	Blackberry Nightshade
Verbena bonariensis	Purple Topped Verbena
Romulea rosea	Onion Grass
Juncus cognatus	
Andropogon virginicus	Whisky Grass
Axonopus fissifolius	Narrow-leaved Carpet Grass
Briza maxima	Quaking Grass
Cortaderia selloana	Pampas Grass
Ehrharta erecta	Panic Veldtgrass
Paspalum urvillei	
Cenchrus clandestinus	Kikuyu
Setaria parviflora	Slender Pigeon Grass
Sporobolus africanus	Parramatta Grass

The incursion of priority weeds and a patch of *Axonopus fissifolius* (Narrow-leaved Carpet Grass) within the LHSGIF is shown in Figure 7. Where practical these species should be controlled during primary weed control to assist the establishment of planted species in the disturbed areas of the riparian corridor.

2.6 FAUNA

Dry Eucalypt Woodland within the site provided suitable habitat opportunities for frugivorous, nectivorous, granivorous and insectivorous birds and microchiropteran bat species. Hollow-bearing trees would provide some potential nesting and roosting sites for a variety of avifauna and other hollow dependant species such as arboreal mammals and tree-roosting bats. Open areas of grassy habitat that occupied the majority of the site would provide opportunity for a variety of avifauna, including predominantly terrestrial species preferring open spaces, seed eating birds and several birds of prey, which may hunt over this area in search of potential prey species. Macropods may also frequent such areas whilst grazing. Some species of bats may also forage over this cleared area for insects. The aquatic habitat within the site would provide habitat for a range of waterbirds, frogs, reptile and fish species, as well as providing a fresh water drinking resource for other native fauna.


Legend
Lot
Priority Weeds
Spiny Emex
Prickly Pear
Narrow Leaved Carpet Grass
Mother of Millions
Dense Lantana Infestation
Sporadic African Olive Occurence
Job Ref 12350
A4 Scale 1:2,500
Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarentee is given that the information protrayed is free from error or omission. In addition the spatial accuracy of the map is wholly dependant on source data. Please verify the accuracy of all information prior to use. Development footprint areas should be used for indicative areas only.
0 400 800 m
Map Projection GDA94 MGA Zone 56
Data Sources: LPI (2018), NearMap (2018)
Figure 7
Weed Incursion Map
Mt Vnicent Road
East Maitland, NSW
24 August 2018
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3.0 DESCRIPTION OF PROPOSED ENVIRONMENT

Weeding and rubbish removal will be undertaken across the site. The Lower Hunter Spotted Gum – Ironbark Forest within the east of the site will be enhanced with natural regeneration. The development will require the removal of approximately 0.27 ha of LHSGIF. A compensatory area of 0.48 ha will be planted with species and densities consistent with LHSGIF within the south east of the site. Due to the disturbed nature of this area natural regeneration would not be feasible. Note that a cleared area within the north of the Lower Hunter Spotted Gum – Ironbark Forest is unable to be planted as it is an electrical easement. The condition of the drainage line and dam will be restored and enhanced in accordance with the Landscaping Management Plan. Nest boxes will be installed within the LHSGIF away from artificial lighting to compensate for hollows removed for the proposed development.

3.1 VEGETATION REHABILITATION AND ENHANCEMENT

Three main approaches to vegetation rehabilitation to be used are:

- Natural Regeneration;
- Assisted natural regeneration;
- Revegetation.

3.2 NATURAL REGENERATION

A portion of the rehabilitation will utilise the in-situ resilience of the remnant by allowing the existing native seed bank and propagules to establish.

3.3 ASSISTED NATURAL REGENERATION

Assisted Natural Regeneration will involve the following stages to control weeds and facilitate native regeneration:

- **Weed control –** targeting the removal of invasive species. Species to target include *Lantana camara* (Lantana). This will involve the use of mechanical and/or chemical approaches as discussed in Section 4.3.
- **Revegetation** - Planting of locally endemic native species. Suitable species and techniques have been suggested in Section 4.5.

3.4 REVEGETATION

Revegetation will be required in Management Zone 2 where natural regeneration is unable to occur within the scope of works. This will involve planting of locally endemic native species consistent with Lower Hunter Spotted Gum – Ironbark Forest.

4.0 VMP IMPLEMENTATION

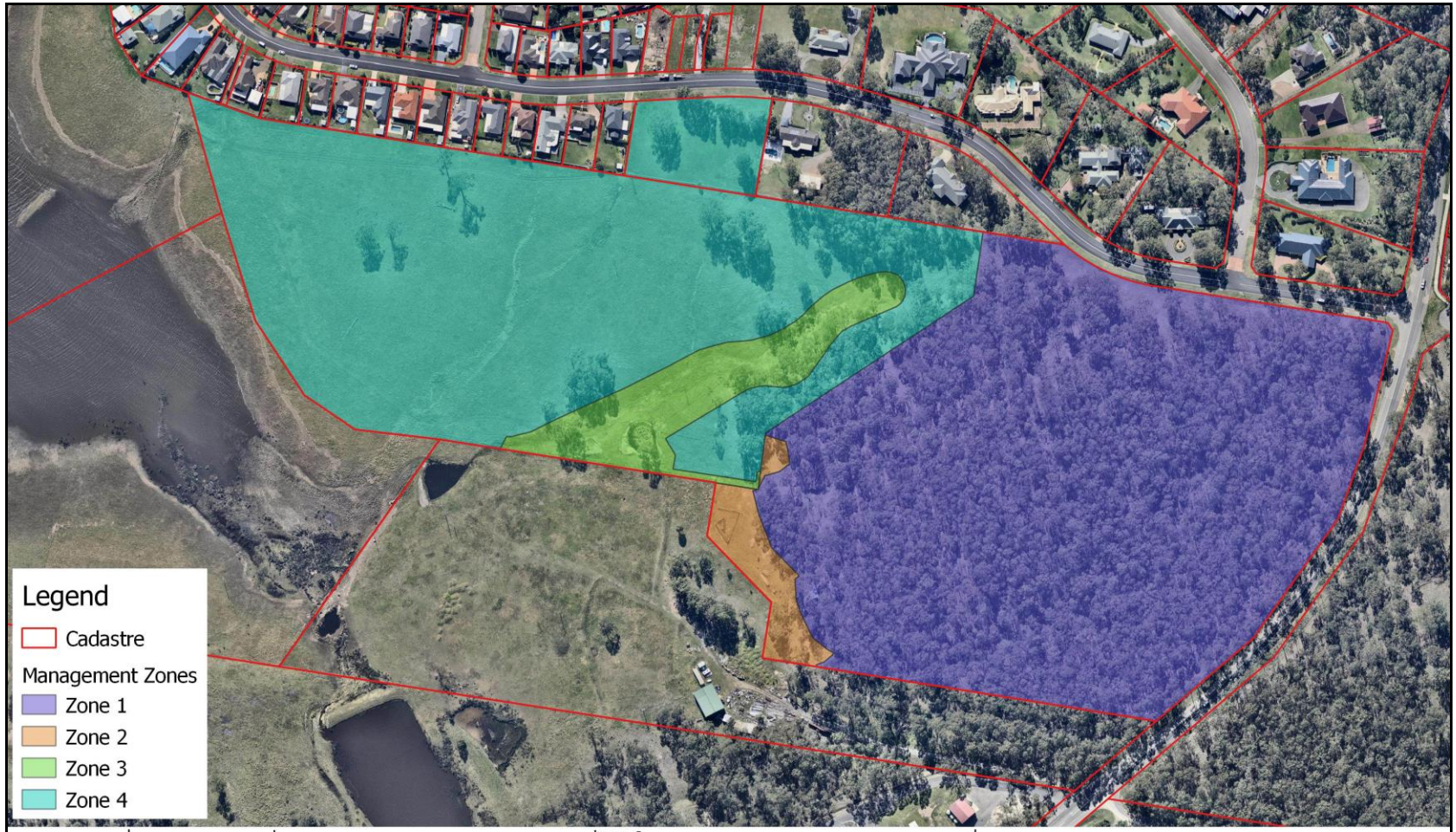
The implementation of the VMP will include:

- Management Zones
- Site Protection
- Weed Control
- Vegetation Removal
- Revegetation Plantings
- Nest Box Installation
- Maintenance, including nest boxes
- Monitoring and Reporting

4.1 MANAGEMENT ZONES

To ensure the success of the VMP and to protect the native vegetation that is already present, the site has been broken down into several management zones (Figure 5). These zones include:

- Management Zone 1: Lower Hunter Spotted Gum - Ironbark Forest (10.88 ha);
- Management Zone 2: Lower Hunter Spotted Gum - Ironbark Forest Regeneration (0.48 ha);
- Management Zone 3: Drainage and Stormwater Detention Area (Constructed Dam and drainage line) (1.20 ha);
- Management Zone 4: Seniors Living Development Footprint (9.04 ha)



Job Ref	12350
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0 100 200 m

Map Projection GDA94 MGA Zone 56

Data Sources: LPI (2018), NearMap (2018)

Figure 5

Managaement Zones

Mt Vnicent Road
East Maitland, NSW

24 August 2018

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The following sections provide a description of the management activities to be undertaken in each of these zones:

4.1.1 ZONE 1 - LOWER HUNTER SPOTTED GUM - IRONBARK FOREST

The 10.88 ha Lower Hunter Spotted Gum/Ironbark Forest area is located in the east of the site. Management actions within this area will largely be in the form of weed control and natural regeneration.

Required actions:

- Retention of existing native trees, shrubs and groundcovers;
- Control of weeds;
- Removal of lose barbed wire;
- Removal of rubbish;
- Exclusion of cattle;
- Relocation of dead wood and hollows from Zone 4;
- Installation of nest boxes.

4.1.2 ZONE 2 – LOWER HUNTER SPOTTED GUM - IRONBARK FOREST REGENERATION

The 0.48 ha Lower Hunter Spotted Gum/Ironbark Forest Regeneration area is located in the southeast of the site. Required actions:

- Control of weeds;
- Assisted revegetation;
- Exclusion of cattle;
- Removal of rubbish and redundant structures.

4.1.3 ZONE 3 – DRAINAGE AND STORMWATER DETETNTION AREA (CONSTRUCTED DAM AND DRAINAGE LINE)

This 1.20 ha area is to be protected and enhanced. Management actions within this area will be based on the Landscaping Management Plan (Figure 6).

Required actions:

- Control of weeds;
- Revegetation in accordance with Landscape Management Plan (GKs Garden Creation, 2017).

4.1.4 ZONE 4 – SENIORS LIVING DEVELOPMENT FOOTPRINT

The 9.04 ha of Seniors Living Development area is located to the west and centre of the site.

Required actions:

- Removal of Hollow-bearing Trees;
- Relocation of dead wood to Management Zone 1;
- Control of weeds.

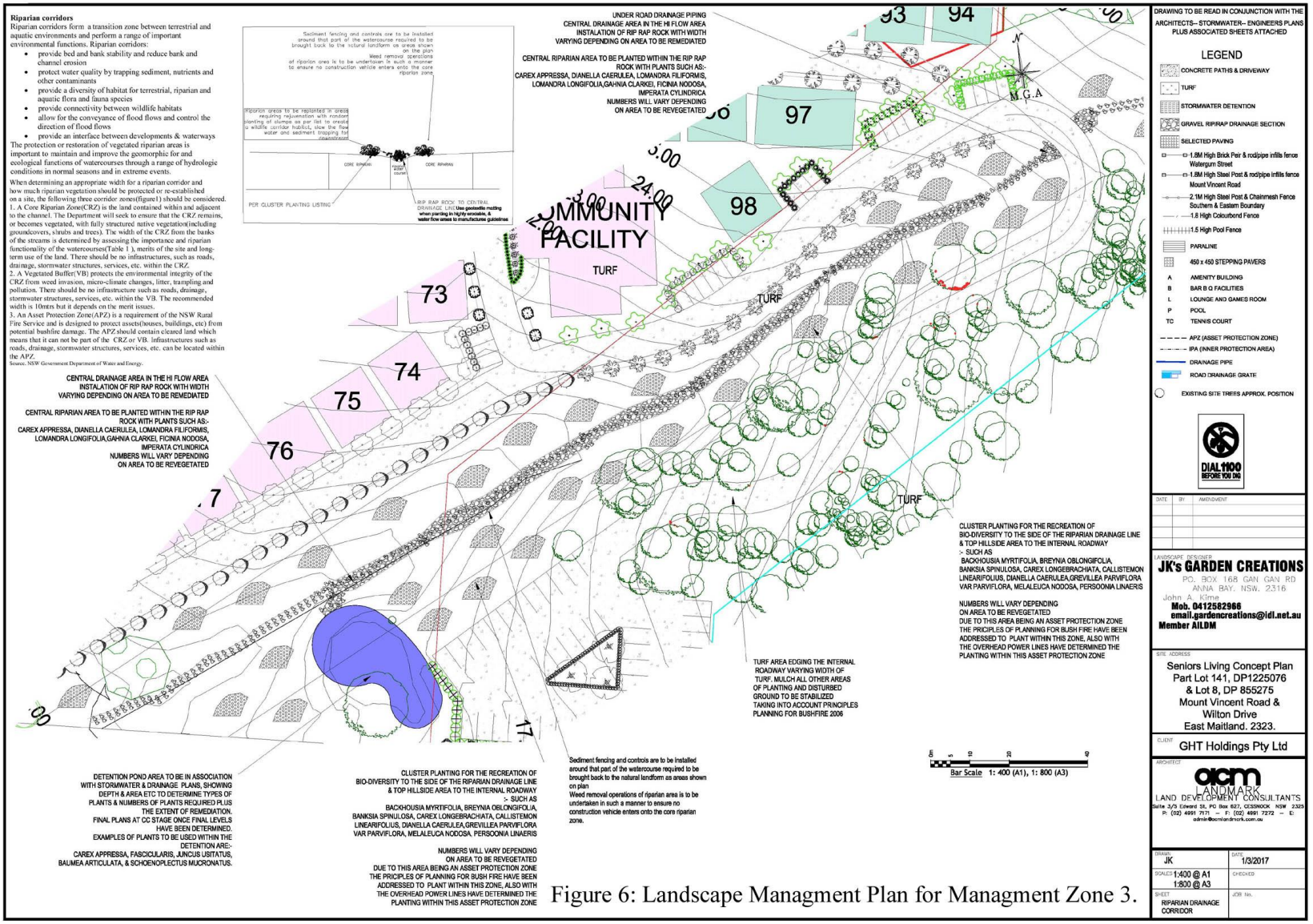

Figure 6: Landscape Managment Plan for Managment Zone 3.

4.2 SITE PROTECTION

Prior to the commencement of vegetation clearing a defined clearance zone is to be clearly marked along the LHSGIF clearance boundary using flagging tape, ensuring no machinery can enter the Threatened Ecological Community. Also, prior to any earthworks occurring, silt fencing is to be erected around the drainage line to ensure no excess sediment will enter this habitat. Trees requiring removal are to be clearly marked with surveyors tape so no unnecessary tree removal occurs. Hollow-bearing trees requiring removal are to be clearly marked with an 'H' using spray paint.

4.3 WEED CONTROL

Noxious weeds and a number of additional weed species are to be treated within the site in a targeted weed control program prior to revegetation work. Control of weeds within the drainage reserve will aid in the natural regeneration of the site and give established native vegetation and plantings the best chance of survival.

Weed control is proposed for the entire drainage reserve and will involve the following stages:

- **Primary weed control -** target removal of noxious weeds and other most invasive species.
- **Follow-up weed control** - following on from primary weed control to treat regenerating weed species. To be carried out during general maintenance visits.

Weed control will involve the use of mechanical and/or chemical approaches. The suggested control of individual weed species is contained in Appendix B of the VMP.

4.4 VEGETATION REMOVAL

Areas of vegetation within the site are required to be removed within the scope of the development. A total of 8 hollow-bearing trees will require removal. Hollow-bearing trees are to only be removed during Summer and Autumn (December-May) to avoid the breeding season in Spring and hibernating season in Winter. An ecologist is required to supervise the removal of the hollow-bearing trees to ensure any fauna present is safely relocated. As Whistling Kites were observed breeding within a tree marked for removal (No. 76), it is recommended a pre-vegetation clearance survey is conducted and if Whistling Kites are observed breeding within the nest the tree must remain *in-situ* until the young have fledged the nest.

4.5 REVEGETATION PLANTINGS

Revegetation plantings are required within the scope of the development. Compensatory plantings for the removal of Lower Hunter Spotted Gum – Ironbark Forest (LHSGIF) for the proposal are required to be planted within management zone 2, riparian zone revegetation plantings are required in management zone 3, as per the Landscape Management Plan (GKs Garden Creation, 2017). Species planted are to include those native to the site and surrounding area and to be consistent with species associated with LHSGIF. The revegetation plantings are to be implemented following the completion of the site protection, rubbish removal and primary weed control activities.

4.5.1 SPECIES COMPOSITION

The recommended species composition for Management Zone 2 is shown below in Table 3. Species recommended for management zone 2 are representative of species characteristic of LHSGIF, were already present on site, and are to compensate for vegetation removal required for the proposed development.

Table 3: Management Zone 1: Recommended species list for the revegetation works and the source of plant material (Species characteristic of LHSGIF)

Plant Species	Source of plant material
Canopy Species	
Corymbia maculata (Spotted Gum)	Tubestock
Eucalyptus fibrosa subsp. *fibrosa* (Broad-leaved Ironbark)	Tubestock
Eucalyptus crebra (Narrow-leaved Ironbark)	Tubestock
Eucalyptus punctata (Grey Gum)	Tubestock
Shrub Species	
Acacia parvipinnula	hiko or enviro cells
Bursaria spinosa (Blackthorn)	hiko or enviro cells
Acacia elongata	hiko or enviro cells
Daviesia ulicifolia	hiko or enviro cells
Leucopogon juniperinus (Bearded Heath)	hiko or enviro cells
Ground Species	
Themeda australis (Kangaroo Grass)	hiko or enviro cells
Entolasia stricta	hiko or enviro cells
Cymbopogon refractus	hiko or enviro cells
Aristida vagans (Three-awn Speargrass)	hiko or enviro cells
Microlaena stipoides (Weeping Grass)	hiko or enviro cells
Goodenia rotundifolia	hiko or enviro cells
Cheilanthes sieberi (Mulga Fern)	hiko or enviro cells

4.5.2 SOURCE NATIVE TUBESTOCK

The required plants should be sourced from a suitably experienced plant production nursery. Species will be required to be of local providence, and will likely involve seed collection and propagation. Plants will be planted as tubestock and hiko or enviro cells.

4.5.3 PLANTING METHODS

It is recommended that manual planting be carried out within Management Zones 2 & 3. Planting will involve preparing the ground by such means as ripping and auger holes. All tubestock will be required to be suitably guarded to prevent herbivory. Plantings are to be well watered on installation.

4.5.4 ESTIMATED COSTINGS AND PLANTING DENSITIES

The cost per plant is estimated at:

- Tubestock - $2.50
- Hiko or enviro cell - $1.50

MANAGEMENT ZONE 2 –Lower Hunter Spotted Gum/Ironbark Forest regeneration

Planting densities were calculated by using vegetation densities already present within better quality LHSGIF present within the site as well as benchmark foliage cover indicative of this vegetation community as per Peake (2006) and PCT 1600.

It is recommended that species be planted at the following densities:

- Canopy species - 1 plant per $4m^2$;
- Shrub species – 1 plant per $2m^2$;
- Ground cover species – 2 plant per $1m^2$

See Table 4 for the number of plants required and the estimated costing for Management Zone 2.

Table 4: Management Zone 2: Recommended species list for the revegetation works and the source of plant material

Plant Species	Number required	Estimated Total Cost
Canopy Species		
Corymbia maculata (Spotted Gum)	450	$1125.00
Eucalyptus fibrosa subsp. *fibrosa* (Broad-leaved Ironbark)	450	$1125.00
Eucalyptus crebra (Narrow-leaved Ironbark)	150	$375.00
Eucalyptus punctata (Grey Gum)	150	$375.00
Shrub Species		
Bursaria spinosa (Blackthorn)	650	$975.00
Daviesia ulicifolia	650	$975.00
Leucopogon juniperinus (Bearded Heath)	400	$600.00
Acacia elongata	350	$525.00
Acacia parvipinnula	350	$525.00
Ground Cover Species		
Entolasia stricta	2500	$3750.00
Themeda australis (Kangaroo Grass)	2000	$3000.00
Microlaena stipoides (Weeping Grass)	2000	$3000.00
Cymbopogon refractus	750	$1125.00
Aristida vagans (Three-awn Speargrass)	750	$1125.00
Goodenia rotundifolia	500	$750.00
Cheilanthes sieberi (Mulga Fern)	500	$750.00

MANAGEMENT ZONE 3 – Drainage and Stormwater Detention Area (Constructed Dam and drainage line)

Plantings are to be in accordance with Landscape Management Plan (Figure 6) (GKs Garden Creation, 2017).

4.6 PERFORMANCE TARGETS

Quantifiable performance targets for native species cover (canopy, mid-storey and groundcover) and exotic cover for the primary, secondary and maintenance phases of the VMP have been given in Table 5.

Table 5: Quantifiable performance targets for native species cover and exotic cover for the primary, secondary and maintenance phases of the VMP.

Management Zone	Primary phase			Secondary Phase			Maintenance Phase		
All zones excluding Zone 4	Proportion of exotic canopy species no greater than 5%	Proportion of exotic mid-story species no greater than 60%	Proportion of exotic groundcover species no greater than 80%	Proportion of exotic canopy species no greater than 2%	Proportion of exotic mid-story species no greater than 30%	Proportion of exotic groundcover species no greater than 40%	Proportion of exotic canopy species no greater than 0%	Proportion of exotic mid-story species no greater than 5%	Proportion of exotic groundcover species no greater than 5%
All zones, excluding Zone 4	A demonstrated increase in native cover and diversity and a demonstrated decrease in exotic cover and diversity by the end of year 5								
Zone 2 & 3	A minimum of 85% survival rate of all revegetation (canopy, mid-storey and groundcover)								

4.7 NEST BOX INSTALLATION AND MONITORING PROGRAM

A total of 8 hollow-bearing trees are required to be removed within the scope of the proposed development. These habitat trees were considered to be significant as a result of their large size, variety and number of hollows they contained and visible scratch marks. Within these trees, 25 hollows will be removed as a result of the development. Tree 71 was also removed during previous clearing and contained 5 hollows, giving a total of 30 hollows removed for the development from Lot 141 DP 1225076 and Lot 8 DP 855275.

Compensatory nest boxes at a ratio of 2:1 (2 nest boxes per hollow removed) are required to be installed at least 3 weeks prior to the removal of hollow-bearing trees from the site. A total of 60 nest boxes are required. Nest boxes will be installed within Management Zone 2. Nest boxes are to be designed to accommodate locally occurring fauna species such as the threatened *Petaurus norfolcensis* (Squirrel Glider) and Microchiropteran Bats.

The following 60 nest boxes are to be installed within the site:

- 2 Kookaburra Box.
- 10 Brushtail Possum Boxes;
- 6 Ringtail Possum Boxes;
- 10 Parrot Boxes;
- 10 Sugar Glider Boxes;
- 6 Feathertail Glider Boxes;
- 8 Squirrel Glider Boxes; and
- 8 Microbat Boxes.

Nest boxes are to be installed at least 3 weeks prior to the removal of hollow-bearing trees. Hollow-bearing trees are to only be removed during Summer and Autumn (December-May) to avoid the breeding season in Spring and hibernating season in Winter. Nest boxes are to be constructed out of 17mm CD plywood (or higher grade), galvanised screws and exterior grade acrylic paint. The nest boxes will be installed into suitable trees at least 5m off the ground. This is a safe height from terrestrial predators and will enable easy access for monitoring/servicing by ladder. They will be positioned to avoid extreme conditions such as mid-day summer heat, prevailing weather and to minimise visibility, noise and light sources from outside. Each nest box will be clearly numbered using non-toxic paint and located on a map. The location of each installed nest box will be documented and mapped with their individual GPS coordinates given. A letter will be provided to council detailing the location, details of the tree the nest box is installed on (DBH, height and species), and type of all nest boxes installed.

Monitoring of the nest boxes will be conducted to determine the usage of the nest boxes. Maintenance, including any repairs or replacement of nest boxes will also be undertaken during the monitoring period. Monitoring and maintenance is to be carried out once a year in Spring for a period

of five years then reviewed at the end of the five year period. The review for the ongoing maintenance and monitoring of the nest boxes will take into consideration the condition of the nest boxes and occupation rates. A letter will be provided to council detailing the findings of the nest box inspection and any maintenance carried out after the completion of each inspection and any maintenance required.

4.8 MAINTENANCE PROGRAM

4.8.1 GENERAL MAINTENANCE

The completion of the works will be considered as the date of the practical completion of the revegetation and nest box installation and will signal the commencement of six-monthly maintenance program for a period of two years then annually for a further three years. General maintenance will involve monitoring survival rates, installing replacement plants, guards and continued follow-up weeding.

4.8.2 WATERING

All plantings are to be well watered on installation. They will then receive a further two applications of water during the first two months to assist in establishment. Depending on the soil moisture at the time a further watering may be required.

4.8.3 MAINTENANCE WEEDING

Follow-up weed control will be carried out. Noxious weeds and other problem weeds present at the time should be targeted.

4.8.4 INSTALLING REPLACEMENT PLANTS

Plant losses discovered during maintenance visits should be replaced.

4.8.5 INAPPROPRIATE PRACTICES

It is recommended that the following practices are observed to ensure the continued viability of the VMP:

- No lawn clippings are to be discarded within Management Zones 1, 2 & 3;
- No livestock is to be allowed to access Management Zones 1, 2 & 3;
- No rubbish is to be retained/stored within Management Zones 1, 2 & 3;
- The use of barbed-wire shall be avoided given the recorded presence of gliders and bats in the local area.

5.0 MONITORING AND REPORTING

Monitoring for a period of 5 years will be conducted to accurately evaluate the success of the restoration works. A report is to be submitted to Maitland City Council by a suitably qualified ecologist or bush regenerator annually for 5 years.

Monitoring should address the following issues:

- Average plant growth
- Plant losses
- Plant replacement
- Weed regrowth and control measures

Five fixed photo points have been set up to monitor the progress of restoration works within Management Zones 1, 2, and 3. Photo point details such as GPS location and aspect can be found in Table 6 and their locations are shown in Figure 7.

At the end of the 5 year period a final report certifying completion of the VMP is to be submitted to Maitland City Council detailing whether the specific objectives of the plan have been met.

Table 6: Location and direction of each photo monitoring point.

Management Zone	Photo Point GPS Location		Direction
	Easting	Northing	
1	366625	6373269	Facing west
2	366353	6373111	Facing north-east
3	366190	6373237	Facing south-east
4	366136	6373285	Facing south-west
5	366298	6373389	Facing south-west

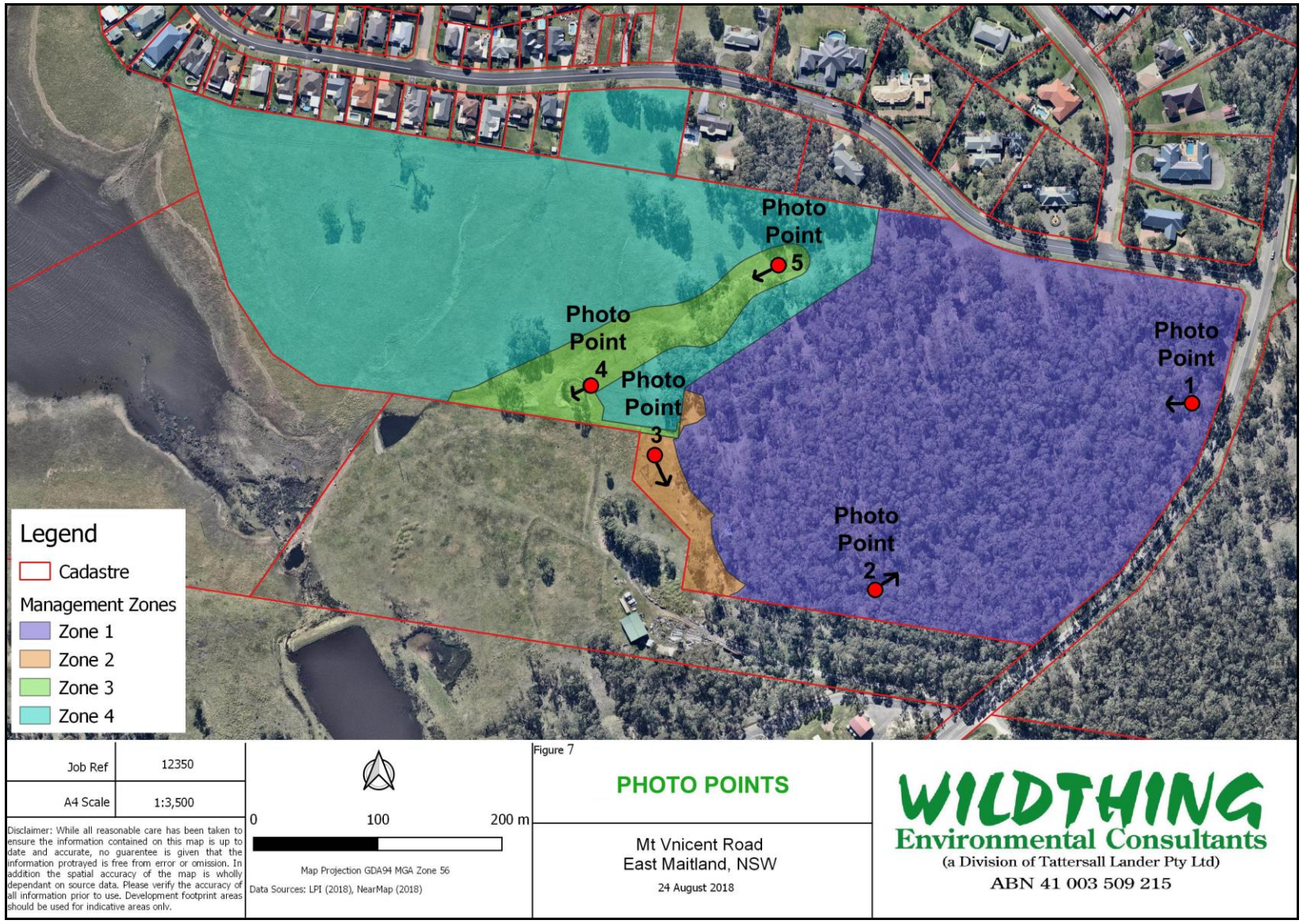
Photo Point 5
Photo Point 4
Photo Point 3
Photo Point 2
Photo Point 1
Legend
Cadastre
Management Zones
Zone 1
Zone 2
Zone 3
Zone 4
Job Ref 12350
A4 Scale 1:3,500
Disclaimer: While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, no guarentee is given that the information protrayed is free from error or omission. In addition the spatial accuracy of the map is wholly dependant on source data. Please verify the accuracy of all information prior to use. Development footprint areas should be used for indicative areas onlv.
0 100 200 m
Map Projection GDA94 MGA Zone 56
Data Sources: LPI (2018), NearMap (2018)
Figure 7
PHOTO POINTS
Mt Vnicent Road
East Maitland, NSW
24 August 2018
WILDTHING
Environmental Consultants
(a Division of Tattersall Lander Pty Ltd)
ABN 41 003 509 215

6.0 IMPLEMENTATION PLAN

The VMP program is detailed in Table 7 and will guide the site's management. Weeding, plantings and the long-term up-keep of the Lower Hunter Spotted Gum – Ironbark Forest and creekline will be undertaken by suitably qualified personnel. Personnel undertaking bush regeneration works must have a Certificate Bushland Regeneration or a Certificate III Natural Area Restoration (or equivalent). Landowners may undertake weed control and rehabilitation work under the guidance/supervision of an appropriately qualified bush regenerator. However, the supervisors must have the relevant Certificate IV or Diploma level qualification in bush regeneration. Restoration works are to be carried out in accordance with these requirements. Technical advice pertaining to the ongoing management of the vegetation, such as information on the plants selected for revegetation and how they are likely to perform can be obtained from a number of agencies and organisations. These providers would include:

- HIP – Hunter Indigenous Plants – Beresfield (02) 4966 0457 hunterindigeplants@aapt.net.au
- Riverdene Nursery – East Gresford (02) 4938 9280 www.riverdenenursery.com.au/
- Muswellbrook Forest Nursery – Muswellbrook (02) 65432622 www.muswellbrookforestnursery.com.au
- Hunter Local Land Services – Paterson (02) 301030 www.hunter.lls.gov.au

7.0 ESTIMATED PROGRAM OF WORKS

An estimated program of works is shown in Table 8.

Table 7: Vegetation/Habitat Management Plan Program

IMPLEMENTATION PLAN – VMP			
Strategy	**Action**	**Responsibility**	**Performance Measure**
Plant procurement	Seed Collection/Propagation	Plant production nursery/owner	Tubestock and Viro-cells ready to plant.
Site Protection	Installation of silt fencing.	Fencing contractor/owner	Fence in place.
	Installation of clearance zone tape and trees for removal clearly marked with tape. Habitat trees for removal clearly marked with a large spray paint 'H'.	Contractor/owner	Clearance zone clearly marked. Trees for removal clearly marked. Habitat trees clearly marked.
Vegetation/Habitat Removal	Help avoid injury/death via supervision of the removal of trees and other native vegetation by a suitably qualified fauna ecologist.	Contractor	Avoidance of injury and death of native fauna.
Weed Control	Noxious weed infestations / occurrences. Other weed/infestations/occurrences.	Weeding Contractor/owner	Site largely cleared of weeds.
Planting	Planting of Tubestock and Viro-cells Water all plantings	Revegetation Contractor/owner	Planting in ground.
Nest Box Installation	Nest boxes are installed on site at a ratio of 2 nest boxes per hollow removed.	Contractor/owner	Nest boxes installed.
Maintenance	Maintain fences and nest boxes Follow-up weed control Replacement of planting losses. Watering if required.	Contractor/owner	Site largely cleared of weeds. Plant losses replaced.
Monitoring	Monitor for - Plant losses - Growth of Plantings - Weed regrowth - Plant replacement - Stream bank erosion - General disturbance to the site.	Contractor/owner	Report sent to Maitland City Council

Table 8: Estimate program of works.

Task	Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Year 1	Year 1.5	Year 2	Year 2.5	Year 3	Year 4	Year 5
Nest Box installation														
Plant procurement														
Primary Weed Control														
Installation of silt fencing														
Vegetation removal														
Planting														
Maintenance visit and secondary weed control														
Nest Box Monitoring and Maintenance														
Reporting														
Final report														

8.0 BIBLIOGRAPHY

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APPENDIX A

FLORA LIST

DRAFT

KEY

Introduced species are indicated by an asterisk ("*").

Species previously identified by Wildthing Environmental Consultants (2009) are indicated by a hashtag ("#").

Species previously identified (Wildthing Environmental Consultants, 2009) and identified in the 2015 (Wildthing Environmental Consultants, 2016) flora surveys are indicated by a hashtag and a caret ("#^").

The following standard abbreviations are used to indicate specific taxa:

subsp. -subspecies
var.- variety
× **-** hybrid between the two indicated species

Threatened Species Conservation Act 1995 (TSC Act)

V Vulnerable
E1 Endangered
E2 Endangered Population
E4A Critically Endangered Population

Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

V Vulnerable
E Endangered
CE Critically Endangered

ROTAP (Rare or Threatened Australian Plants)

Distribution

1. – Known from only one collection
2. – Geographic range in Australia less than 100km
3. – Geographic range in Australia greater than 100km.
+ – Also occurs overseas.

Conservation Status

E. – Endangered. Species at risk of disappearing from the wild within 20 years. Includes populations of 100 or less individual plants.
V. – Vulnerable. Species not presently endangered, but at risk over 20-50 years.
R. – Rare in Australia, but not currently under threat. Includes species within a very restricted area or small populations over a wide range.
K. – Poorly known. Accurate knowledge is inadequate.
C. – Reserved. The species has at least one population within a national park or other reserve.

Size of Reserved Populations

a. – 1000 plants or more known within a conservation reserve.
i. – Less than 1000 plants known within a conservation reserve.
- - Reserved population size not accurately known.
t - Total known population reserved.

National Parks and Wildlife Act 1974 - Schedule 13 Protected Native Plants

1 Group 1
2 Group 2
3 Group 3
4 Group 4
5 Group 5

Regional Significance (Hunter Rare Plants Database – Version 1 2003)

L endemic to Hunter Region
DA disjunct in the Hunter Region, rare or localized (aggregated)
DB disjunct in the Hunter Region, widespread and uncommon (broad)
R rare but extends beyond the Hunter Region
U everywhere uncommon
N at northern distributional limit in the Hunter

E	at eastern distributional limit in the Hunter
S	at southern distributional limited in the Hunter
W	at western distributional limited in the Hunter
T	may be threatened in the Hunter Region
S	Probably secure in the Hunter Region

Table B1: List of flora recorded within the site.

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
FILICOPSIDA (Ferns)	**Adiantaceae**						
	#^Adiantum aethiopicum	Common Maidenhair Fern					
	Azollaceae						
	Azolla pinnata	Ferny Azolla					
	Dennstaedtiaceae						
	#Pteridium esculentum	Common Bracken Fern					
	Dicksoniaceae						
	#Calochaena dubia	Soft Bracken Fern					
	Schizaeaceae						
	#^Cheilanthes sieberi	Mulga Fern					
MAGNOLIOPSIDA: Subclass MAGNOLIIDAE (Dicotyledons-flowing plants)	**Apiaceae**						
	**Hydrocotyle bonariensis*						
	Apocynaceae						
	#^Parsonsia straminea	Monkey Rope					
	Asteraceae						
	*#*Ageratina adenophora*	Crofton Weed					
	#^*Bidens pilosa	Cobblers Pegs					
	#^Calotis cuneata var. *cuneata*						
	#Cassinia aculeata						
	#^*Cirsium vulgare	Black Thistle					
	#Coreopsis lanceolata	Coreopsis					
	#^Cotula australis	Carrot Weed					
	*#*Cotula coronopifolia*	Waterbuttons					
	Cymbonotus lawsonianus	Bears ears					

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
	#^Epaltes australis						
	**Facelis retusa*	Annual Trampweed					
	#^Hypochaeris radicata	Flatweed					
	#^ Lagenophora stipitata	Bottle Daisy					
	#Ozothamnus diosmifolium	Everlasting					
	#^*Senecio madagascariensis	Fireweed					
	**Sonchus oleraceus*	Common Sow Thistle					
	#Tagetes minuta	Stinking Roger					
	#Vernonia cinerea var. *cinerea*						
	Bignoniaceae						
	#^Pandorea pandorana	Wonga Wonga Vine					
	Cactaceae						
	#^*Opuntia stricta	Prickly Pear					
	Campanulaceae						
	#Wahlenbergia communis	Tall Bluebell					
	Caryophyllaceae						
	**Cerastium glomeratum*	Mouse-ear Chickweed					
	Casuarinaceae						
	#Allocasuarina littoralis	Black Sheoak					
	Chenopodiaceae						
	Einadia nutans	Climbing Saltbush					
	Clusiaceae						
	#Hypericum gramineum						
	Convolvulaceae						
	#^Dichondra repens	Kidney Weed					

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
	Crassulaceae						
	**Bryophyllum delagoense*	Mother-of-millions					
	#^Crassula sieberiana	Austral Stonecrop					
	Epacridaceae						
	#^Leucopogon juniperinus	Bearded Heath					
	Euphorbiaceae						
	#^Breynia oblongifolia	Breynia					
	#^Glochidion ferdinandi var. *ferdinandi*	Cheese Tree					
	#Poranthera microphylla						
	Fabaceae (Subfamily Faboideae)						
	#^Daviesia ulicifolia	Gorse Bitter Pea					
	#Desmodium rhytidophyllum						
	#^Desmodium varians	Slender tick-trefoil					
	Glycine clandestina	Love Creeper					
	Glycine tabacina						
	#^Hardenbergia violacea	Happy Wonderer					
	#Pultenaea villosa	Hairy Bush Pea					
	#^*Trifolium repens	White Clover					
	**Vicia sativa*	Vetch					
	Fabaceae (Subfamily Mimosoideae)						
	#^Acacia elongata						
	#^Acacia falcata	Falcate Wattle					W
	#Acacia longifolia	Sydney Golden Wattle					
	#Acacia myrtifolia	Myrtle Wattle					
	#^Acacia parvipinnula	Silver-stemmed Wattle					WN
	#Acacia ulicifolia	Prickly Moses					
	Goodeniaceae						

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
	#Goodenia heterophylla subsp. *heterophylla*	Variable-leaved Goodenia					
	#^Goodenia rotudifolia						S
	Lauraceae						
	#Cassytha pubescens	Common Devils Twine					
	*#*Cinnamomum camphora*	Camphor Laurel					
	Linaceae						
	#Linum marginale	Native Flax					
	Lobeliaceae						
	#^Pratia purpurascens	White Root					
	Loranthaceae						
	#Amyema pendulum						
	#^Dendrophthoe vitellina	Mistletoe					
	Malvaceae						
	#^*Sida rhombifolia	Paddy's Lucerne					
	Myrsinaceae						
	#^Rapanea variabilis	Mutton Wood					
	Myrtaceae						
	#^Backhousia myrtifolia	Grey Myrtle					W
	#Callistemon salignus	Willow Bottlebrush					
	#^Corymbia maculata	Spotted Gum					W
	#Eucalyptus crebra	Narrow-leaved Ironbark					
	#^Eucalyptus fibrosa subsp. *fibrosa*	Broad-leaved Ironbark					
	#^Eucalyptus punctata	Grey Gum					W
	Eucalyptus siderophloia	Grey Ironbark					
	#^Eucalyptus tereticornis	Forest Red Gum					

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
	#Melaleuca nodosa	Ball Honeymyrtle					
	Melaleuca quinquenervia	Broad-leaved Paperbark					(planted)
	Oleaceae						
	#^*Ligustrum sinense	Small-leaved Privet					
	#^Notelaea longifolia	Mock Olive					
	#^*Olea europaea subsp. *cuspidata*	African Olive					
	Onagraceae						
	Ludwigia peploides	Water Primrose					
	Oxalidaceae						
	Oxalis perennans	Oxalis					
	Pittosporaceae						
	#Billardiera scandens	Apple Dumplings					
	#^Bursaria spinosa	Blackthorn					
	#Pittosporum undulatum	Sweet Pittosporum					
	Plantaginaceae						
	#Plantago debilis	Slender Plantain					
	#^*Plantago lanceolata	Plantain					
	Polygonaceae						
	**Rumex crispus*	Curles Dock					
	Primulaceae						
	#^*Lysimachia arvensis	Scarlet Pimpernel					
	Proteaceae						
	#Hakea sericea	Needlebush					
	Ranunculaceae						

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
	#^ *Clematis aristata*	Old Man's Beard					
	Rhamnaceae						
	#^*Alphitonia excelsa*	Red Ash					S?
	Rubiaceae						
	#^*Opercularia hispida*	Stinkweed					
	#^*Pomax umbellata*	Pomax					
	Rutaceae						
	Acronychia oblongifolia						W
	Asperula conferta	Common Woodruff					
	Santalaceae						
	#*Exocarpos cupressiformis*	Cherry Ballart					
	Solanaceae						
	#^**Solanum mauritianum*	Tree Tobacco					
	#^**Solanum nigrum*	Blackberry Nightshade					
	Solanum prinophyllum	Forest Nightshade					
	Stackhousiaceae						
	#^*Stackhousia viminea*						
	Thymelaeaceae						
	#*Pimelea linifolia* subsp. *linifolia*	Rice Flower					
	Verbenaceae						
	#*Clerodendrum tomentosum*	Hairy Clerodendrum					W
	#^**Lantana camara*	Lantana					
	#**Verbena bonariensis*	Purple Topped Verbena					
	Vitaceae						

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
	#Cayratia sp.	Native Grape					
LILOPSIDA (Monocotyledons) Liliidae	**Anthericaceae**						
	Caesia parviflora	Pale Grass Lily					
	Commelinaceae						
	#^Commelina cyanea						
	Cyperaceae						
	#^Bolboschoenus caldwellii						
	#Carex appressa						
	#^Carex longebrachiata						W
	#Lepidosperma laterale	Variable Sword-sedge					
	Schoenoplectus validus						
	Hydrocharitaceae						
	Ottelia ovalifolia	Swamp Lily					
	Iridaceae						
	#^*Romulea rosea	Onion Grass					
	Juncaceae						
	#^*Juncus acutus	Spiny Rush					
	**Juncus cognatus*						
	#^Juncus usitatus	Common Rush					
	Juncaginaceae						
	#Triglochin striata	Streaked Arrow-grass					
	Lomandraceae						
	Lomandra confertifolia	Mat-rush					
	Lomandra filiformis	Wattle Mat-rush					
	#Lomandra glauca	Pale Mat-rush					N

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
	Lomandra gracilis						
	#Lomandra longifolia	Spiny Mat Rush					
	#Lomandra multiflora subsp. *multiflora*						
	Luzuriagaceae						
	Eustrephus latifolius	Wombat Berry					W
	Orchidaceae						
	#^Caladenia catenata	White Fingers					W
	#Dendrobium aemulum	Ironbark Orchid					
	Pterostylis concinna	Trim Greenhood					
	#Pterostylis sp.	Greenhood					
	Phormiaceae						
	#^Dianella caerulea var. *caerulea*	Blue Flax-lily					W
	Poaceae						
	*#*Andropogon virginicus*	Whisky Grass					
	#Anisopogon avenaceus	Oat Speargrass					N
	#^Aristida ramosa	Purple Wiregrass					W?
	#^Aristida vagans	Three-awn Grass					
	#^Axonopus fissifolius	Narrow-leaved Carpet Grass					
	#Briza maxima	Quaking Grass					
	Cenchrus clandestinus	Kikuyu					
	*#*Cortaderia selloana*	Pampas Grass					
	#^Cymbopogon refractus	Barbed Wire Grass					
	#^Cynodon dactylon	Common Couch					
	#Dichelachne micrantha	Plume Grass					
	#^Digitaria parviflora	Smallflower Fingergrass					
	#^Echinopogon caespitosus var. *caespitosus*	Hedgehog Grass					
	#^*Ehrharta erecta	Panic Veldgrass					

CLASS	SCIENTIFIC NAME	COMMON NAME	TSC ACT	EPBC ACT	ROTAP	NPW ACT	REGIONALLY SIGNIFICANT
	#^Entolasia marginata						
	#^Entolasia stricta						
	#^Eragrostis brownii	Browns Love Grass					
	#Imperata cylindrica var. *major*	Blady Grass					W?
	#^Microlaena stipoides var. *stipoides*	Weeping Meadow Grass					
	#^Oplismenus imbecillis	Basket Grass					
	Panicum effusum	Hairy Panic					
	#Panicum simile	Two Colour Panic					
	#Paspalum distichum	Water Couch					
	*#*Paspalum urvillei*						
	#^Rytidosperma tenuius	Wallaby Grass					
	#^*Setaria parviflora	Slender Pigeon Grass					
	**Sporobolus africanus*	Parramatta Grass					
	#^Themeda australis	Kangaroo Grass					
	Smilacaceae						
	#Smilax glyciphylla	Native Sarsaparilla					
	Typhaceae						
	Typha orientalis	Cumbungi					

APPENDIX B
WEED CONTROL MEASURES FOR SPECIFIC SPECIES

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SPECIES	LEGAL REQUIREMENTS	CONTROL MEASURES			
		Comment/occurrence on site	Physical	Chemical	Comments
Lantana camara Lantana	General Biosecurity Duty Prohibition on dealings	Covering the Lower Hunter Spotted Gum – Ironbark Forest in various densities.	Grub out small isolated occurrences. Place removed branches off ground to prevent root formation. Pull out small seedlings.	Spot Spray larger occurrences with a registered herbicide.	Common throughout site.
Opuntia stricta Prickly Pear	General Biosecurity Duty Prohibition on dealings	Clumped and isolated individuals.	Grub out occurrences.	Spray with a registered herbicide.	Plants should be able to be mechanically removed.
Senecio madagascariensis Fireweed	General Biosecurity Duty Prohibition on dealings	Isolated individuals.	Hand removal.	Spot Spray with a registered herbicide.	
Olea europaea subsp.*cuspidata* African Olive	General Biosecurity Duty Regional Recommended Measure	Isolated occurrences	Hand dig/pull juvenile plants.	Cut stump, stem scrape or injection, saplings or large trees and shrubs with a registered herbicide.	
Bryophyllum delagoense Mother-of-millions	General Biosecurity Duty Regional Recommended Measure	Clumped within the south-western extent of the LHSGIF.	Small infestations can be removed by hand ensuring to bag all plants. Care must be taken as plantlets may detach from the plant and cause new plants to grow.	Sufficient wetting agent (non ionic surfactant) is used to penetrate waxy outer covering of plant. Plants easiest to see in winter when flowering.	
Emex australis Spiny Emex	General Biosecurity Duty	Located growing on the round yard	Grub out occurrences.	Spot Spray with a registered herbicide.	
Ageratina adenophora Crofton Weed	General Biosecurity Duty	Scattered occurrences.	Hand dig/pull juvenile plants.	Spot Spray with a registered herbicide.	
Bidens pilosa Cobblers Pegs	General Biosecurity Duty	Scattered occurrences.	Carefully bag seed heads. Plants and small infestations should be hand pulled when the ground is soft.	Spot Spray with a registered herbicide.	

SPECIES	LEGAL REQUIREMENTS	CONTROL MEASURES			
		Comment/occurrence on site	Physical	Chemical	Comments
Cirsium vulgare Spear Thistle	General Biosecurity Duty	Scattered occurrences.	Carefully bag seed heads, dig out with mattock.	Spot Spray with a registered herbicide.	
Coreopsis lanceolata Coreopsis	General Biosecurity Duty	Scattered occurrences.	Hand removal.	Spot Spray with a registered herbicide.	
Facelis retusa Annual Trampweed	General Biosecurity Duty	Scattered occurrences.	Dig up plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide.	
Hypochaeris radicata Catsear	General Biosecurity Duty	Scattered occurrences.	Dig up plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide.	
Sonchus oleraceus Common Sowthistle	General Biosecurity Duty	Scattered individuals.	Dig up plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide.	
Tagetes minuta Stinking Roger	General Biosecurity Duty	Scattered individuals.	Dig up plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide.	
Cerastium glomeratum Mouse-ear Chickweed	General Biosecurity Duty	Scattered individuals.	Dig up plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide.	
Trifolium repens White Clover	General Biosecurity Duty	Scattered occurrences.	Dig out isolated occurrences. Spray larger areas before flowering.	Spot Spray with a registered herbicide before flowering.	
Vicia sativa Vetch	General Biosecurity Duty	Scattered occurrences.	Hand dig/pull juvenile plants.	Spot Spray with a registered herbicide.	
Cinnamomum camphora *Camphor Laurel*	General Biosecurity Duty	Scattered occurrences.	Pull out small seedlings.	Cut and Paint using glyphosate. Larger trees drill/frill and add glyphosate.	
Sida rhombifolia Paddy's Lucerne	General Biosecurity Duty	Scattered throughout site.	Carefully bag seed heads, dig out with mattock.	Spot Spray with a registered herbicide	
Anagallis arvensis Scarlet Pimpernel	General Biosecurity Duty	Scattered individuals.	Hand remove isolated plants. Frequent mowing	n/a	

SPECIES	LEGAL REQUIREMENTS	CONTROL MEASURES			
		Comment/occurrence on site	Physical	Chemical	Comments
			and pulling before the buds open are good ways to keep the plants from going to seed.		
Ligustrum sinense Small-leaf Privet	General Biosecurity Duty	Scattered individuals.	Dig up or pull plant with taproot, store any pulled plants with roots away from the ground.	Cut stump, stem injection or basal application with a registered herbicide	
Plantago lanceolata Plantain	General Biosecurity Duty	Scattered individuals.	Carefully bag seed heads, dig up plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide.	
Rumex crispus Curled Dock	General Biosecurity Duty	Scattered individuals.	Dig up or pull plant with taproot, with minimal soil disturbance.	Best control is obtained by foliage application in spring or autumn on young rosette leaves with a registered herbicide.	
Solanum mauritianum Wild Tobacco Bush	General Biosecurity Duty	Isolated occurrences	Small plants may be hand-pulled but mature plants will re-sprout if they are cut down.	Easily killed with herbicides applied as foliar, basal bark (painting herbicide onto the bark) or cut stump applications with a registered herbicide.	
Verbena bonariensis Purple Topped Verbena	General Biosecurity Duty	Scattered throughout site.	Carefully bag seed heads, dig out with mattock.	Spot Spray with a registered herbicide.	
Romulea rosea Onion Grass	General Biosecurity Duty	Scattered individuals.	Carefully bag seed heads, dig up plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide.	
Aloe vera	General Biosecurity Duty	Isolated occurrence in Management Zone 2.	Infestations can be dug out, but will need to be burnt or deeply buried to prevent the plants from taking root	Some herbicides may be effective, but high concentrations are likely to be needed because of the	

SPECIES	LEGAL REQUIREMENTS	CONTROL MEASURES			
		Comment/occurrence on site	Physical	Chemical	Comments
			again. Succulents will remain capable of re-sprouting for long periods after digging up.	waxy coating on the leaves.	
Chlorophytum comosum *Spider Plant*	General Biosecurity Duty	Isolated occurrence in Management Zone 2.	Hand pull/dig, bagging all plant parts and removing from site.		
Solanum nigrum *Blackberry Nightshade*	General Biosecurity Duty	Scattered individuals.	Dig up plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide	
Juncus cognatus	General Biosecurity Duty	Clumped and isolated individuals.	Dig up or pull plant with taproot.	Spray with a registered herbicide for drainage lines.	
Briza maxima Quaking Grass *Ehrharta erecta* *Panic Veldtgrass* *Andropogon virginicus* Whisky Grass *Cortaderia selloana* Pampas Grass *Paspalum urvillei* *Setaria parviflora* Slender Pigeon Grass *Sporobolus africanus* Parramatta Grass	General Biosecurity Duty	Clumped and isolated individuals.	Carefully bag seed heads. Dig up or pull plant with taproot, with minimal soil disturbance.	Spot Spray with a registered herbicide	
Cenchrus clandestinum Kikuyu *Axonopus fissifolius* Narrow-leaved Carpet Grass	General Biosecurity Duty	Dense areas present within site.	Remove isolated plants by hand.	Spot Spray with a registered herbicide	