475 Badgerys Creek Road, Bradfield

Biodiversity Management Plan

Ingham Property Group Pty Ltd

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DOCUMENT TRACKING

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Template 2.8.1

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Abbreviations

Abbreviation	Description
BMP	Biodiversity Management Plan
CPW	Cumberland Plain Woodland
DCP	Development Control Plan
DDP	Dam Dewatering Plan
DPE	Department of Planning and Environment
ELA	Eco Logical Australia Pty Ltd
FFMP	Flora and Fauna Management Plan
ha	Hectares
HBV	High biodiversity value
IPG	Inghams Property Group Pty Ltd
PCT	Plant community type
RFEF	River-flat Eucalypt Forest
SEPP	State Environmental Planning Policy
SOFF	Swamp Oak Floodplain Forest
TAP	Technical Assurance Panel
TEC	Threatened ecological community
VMP	Vegetation Management Plan
WEMP	Weed Eradication Management Plan
Western Parkland City SEPP	*State Environmental Planning Policy (Precincts – Western Parkland City) 2021*
WMP	Wildlife Management Plan
WSA	Western Sydney Aerotropolis
WSI	Western Sydney International Airport

1. Introduction

This Biodiversity Management Plan (BMP) has been prepared by Eco Logical Australia Pty Ltd (ELA) for Ingham Property Group (IPG) for the proposed Masterplan at 475 Badgerys Creek Road, Bradfield. The Master Plan process is provided for under Clause 4.41 of the *State Environmental Planning Policy (Precincts – Western Parkland City) 2021* (Western Parkland City SEPP). The Masterplan must show consistency with the Western Sydney Aerotropolis Phase 2 Development Control Plan (DCP), Masterplan Guidelines (DPIE 2021), and the relevant precinct plan (Western Sydney Aerotropolis Precinct Plan, DPE 2023).

The BMP has been prepared based on the findings of the Ecological Assessment (ELA 2023a), Riparian Assessment (ELA 2023b) and Wildlife Risk Assessment (ELA 2023c). The BMP will be revised and necessary approvals sought if the scope of works change.

The BMP consists of the following sub-plans, which have addressed the requirements of the Western Sydney Aerotropolis Development Control Plan (DCP) Phase 2:

- Flora and Fauna Management Plan (FFMP)
- Wildlife Management Plan (WMP)
- Vegetation Management Plan (VMP)
- Weed Eradatication Management Plan (WEMP)
- Dam Dewatering Plan (DDP)

1.1. Master Plan Proposal

The land subject to this BMP is part of the Aerotropolis Core Precinct within the Western Sydney Aerotropolis and is predominately zoned for ENT (Enterprise) use under the Western City Parkland SEPP.

IPG is currently undertaking the Master Plan pathway with the Technical Assurance Panel (TAP), which is an optional design process established under the Western City Parkland SEPP to amend the Aerotropolis Precinct Plan as it applies to the subject land. IPG is in the process of preparing a Masterplan, as part of a co-design process with the TAP, for the subject land which will be formally lodged to the Department of Planning and Environment (DPE) in accordance with the Western Sydney Aerotropolis Master Plan Guidelines (DPIE 2021).

The IPG Masterplan was informed by a detailed assessment of the site-specific considerations through preliminary site investigations. The Masterplan breaks down the general application of the ENT (Enterprise) zone across the subject land and provides a more granular approach to land use planning with considerations made to the opportunities and constraints of the subject land. The structure plan is made up of four key land uses which include enterprise and light industry, business and enterprise, and employment zone centres.

This BMP has been prepared to support the Master Plan the TAP co-design process.

1.2. Subject Land Location

The subject land comprises a total area of 182 ha along Badgerys Creek Road, Bradfield, strategically located within the heart of the Western Parkland City. Most of the subject land is under the ownership of IPG, with a small portion of land earmarked for the North Bradfield Zone Substation owned by Endeavour Energy. The subject land is largely grassland and is with relatively limited native vegetation, as it is currently being used for agricultural purposes. There is an internal road network within the subject land which had previously connected the now demolished sheds and ancillary structures dispersed across the subject land.

The subject land is situated within the Western Sydney Aerotropolis, with a direct interface with the Western Sydney International Airport (WSI). It is bound by two significant riparian corridors which define Western Sydney, with South Creek to the east and Badgerys Creek to the north-west. The immediate surroundings of the subject land are characterised by large rural landholdings used predominately for agricultural and light manufacturing purposes, all of which will redeveloped in accordance with the Aerotropolis Precinct Plan vision.

The subject land, presented as a solid red border and defined in Figure 1, refers to the entire landholding subject to the Master Plan comprised of property boundary Lots 99 and 100 in DP1287207.

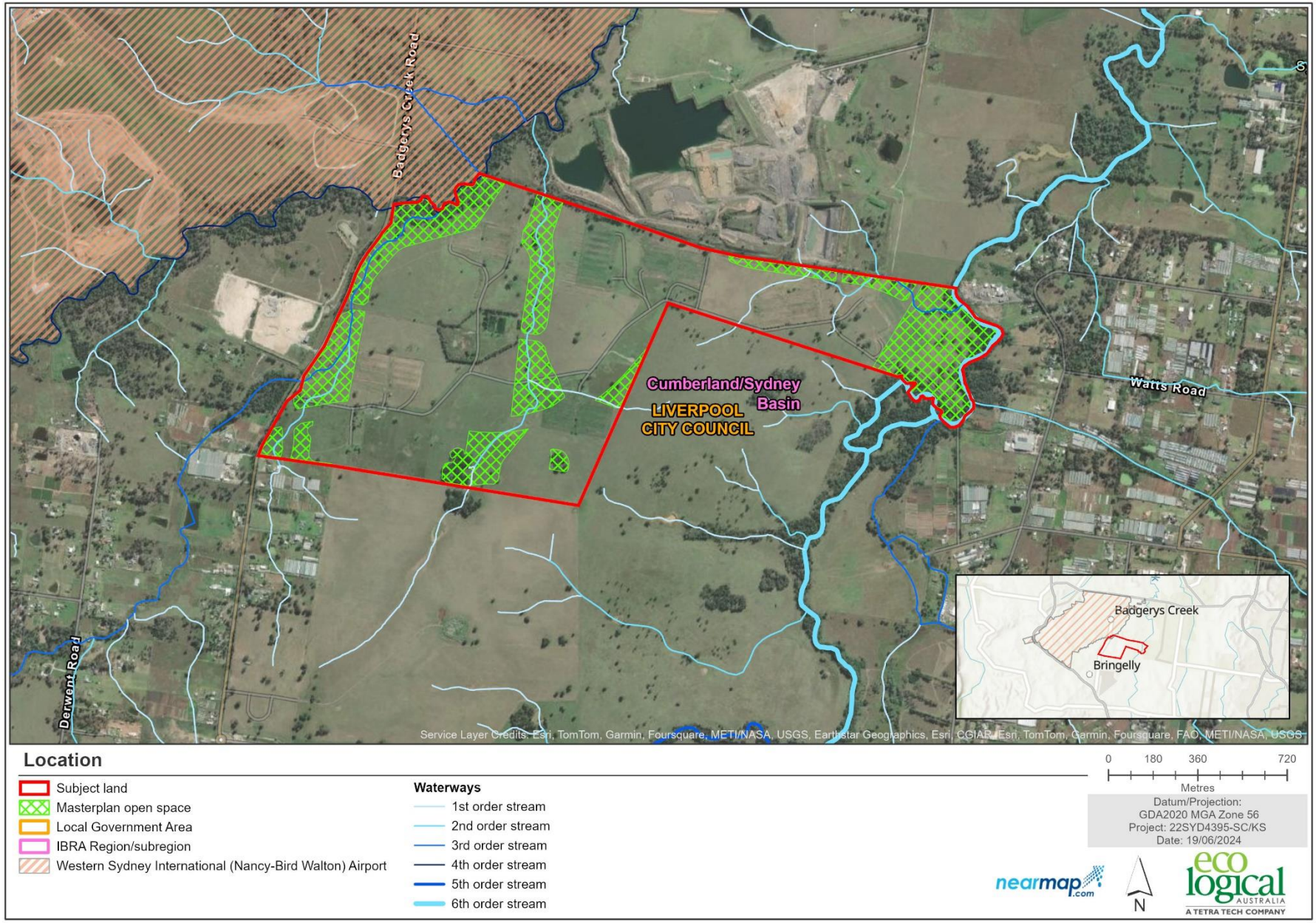

Figure 1: Location of subject land

1.3. Purpose of this Management Plan

This BMP has been developed in accordance with the requirements of the *Western Sydney Aerotropolis Development Control Plan Phase 2* (DPE, 2022) and associated appendices and includes a series of sub-plans as outlined in Table 1 below.

Table 1: Western Sydney Aerotropolis Development Control Plan Phase 2 requirements

Biodiversity Management	DCP Requirement	Section in BMP Addressed
Flora and Fauna Management	**Appendix D.16** Pre-construction surveys prior to removal or disturbance to all human made structures, to ensure roosting habitat for microbat species, including subsurface structures such as mine shafts and storm water tunnels to ensure any individuals are dispersed or relocated as per best practice. A pre-clearance assessment for any native fauna immediately prior to any clearing of native vegetation to ensure that arboreal mammals, roosting and hollow-using birds, bats and reptiles are prevented from accessing any vegetation to be cleared, and are removed if present prior to clearing according to EES' policy on the Translocation of Threatened Fauna in NSW. Incorporation of best practice site hygiene protocols to manage the potential spread of Phytophthora and Myrtle Rust for land adjacent to land zoned E1 National Parks and Nature Reserves, E2 Environmental Conservation or lands managed as a reserve. In accordance with the best practice guideline 'Arrive Clean, Leave Clean: Guidelines (Commonwealth of Australia, 2015). Best practice site hygiene protocols to manage the potential spread of chytrid fungus are to be incorporated along Ropes Creek to maintain local Green and Golden Bell Frog populations. Weed management, site rehabilitation and nest boxes are to be installed on development adjoining land zoned E1 National Parks and Nature Reserves, E2 Environmental Conservation or lands managed as a reserve. A tree-felling protocol is to be implemented to avoid impacts to birds, arboreal mammals and reptiles, raptor nests (almost all large raptors in Wilton are threatened), dreys, dens, hollows and other nests in trees that are to be cleared. If the presence of Green and Golden Bell Frog is confirmed present along Ropes Creek within the Western Sydney Aerotropolis, incorporate best practice site hygiene protocols to manage the potential spread of chytrid fungus and maintain local species populations. Reuse of native plants including, but not limited to seed collection and topsoil from development sites that contain native seed bank.	Appendix A
Wildlife Management	**Appendix D.7**	Appendix B

Biodiversity Management	DCP Requirement	Section in BMP Addressed

	• Applications for the following uses within the 3 km and 8 km wildlife buffers must be accompanied with a Wildlife Hazard Assessment and Wildlife Management Plan that incorporates relevant mitigation and monitoring measures:
	  ○ Agricultural produce industry
	  ○ Agriculture
	  ○ Aquaculture
	  ○ Camping ground
	  ○ Garden Centre
	  ○ Intensive livestock agriculture
	  ○ Intensive plant agriculture
	  ○ Livestock processing industry
	  ○ Plant nursery
	  ○ Recreation facility (outdoor)
	  ○ Recreation facility (major)
	  ○ Recreational area
	  ○ Sewage treatment plant
	  ○ Waste or resource management facility
	  ○ Waste or resource transfer station
	  ○ Water storage facility.
	• Wildlife Hazard Assessment Reports must assess the wildlife attraction risk of the land use, the design of the building and ancillary works including proposed landscaping, water facilities (incl. stormwater infrastructure), waste management, and temporary risks associated with construction activity.
	• The Wildlife Management Plan must respond to the findings and recommendations of the wildlife hazard assessment.
	• Where monitoring is required to be undertaken in accordance with the Management Plan, copies of the report are to be submitted to the airport lessee company within 28 days of completion.
	• A waste management plan for the operation of the use must be submitted for the following uses within the 3 km, 8 km, and 13 km buffer:
	  ○ Agriculture
	  ○ Agricultural produce industry
	  ○ Aquaculture
	  ○ Camping Grounds
	  ○ Eco-tourist facility
	  ○ Food and Drink Premises
	  ○ Garden Centre	

Biodiversity Management	DCP Requirement	Section in BMP Addressed
	○ Hotel ○ Intensive plant agriculture ○ Intensive livestock agriculture ○ Kiosk ○ Livestock processing industry ○ Plant Nursery ○ Recreation facility (outdoor) ○ Recreation facility (major) • Landscaping within the Enterprise Zone and Agribusiness Zone must comply with Appendix B: Western Sydney Aerotropolis Landscape Species List, except where the property is subject to biodiversity certification conditions or identified as one of the key government commitments.	
Vegetation Management	**Section 2.3.1** • Protect and restore native and riparian vegetation to improve the connectivity, ecological condition, and ecological function of ecosystems. • Ensure that development does not adversely affect aquatic fauna. • Effectively manage indirect and ongoing impacts of development adjacent to waterways to ensure vegetation in the riparian area, aquatic fauna, water quality and quantity is protected and maintained. • Reinstate more natural conditions in highly modified waterways and riparian land while not increasing the flood risk.	Appendix C
Weed Management	**Appendix D.48** • A Weed Eradication and Management Plan is required on land adjacent to areas avoided for biodiversity and are to include specific measures to manage the spread of weeds in threatened ecological communities and threatened flora and fauna populations (including land protected by the Cumberland Plain Conservation Plan). • Subdivision design and bulk earthworks must minimise the likelihood of weed dispersion and include measures to eradicate priority weeds in accordance with the Council's weed policy. • The Plan is to be prepared by an ecologist and is to outline the weed control measures during and after construction. • The Plan should include: ○ An inventory of all Weeds of National Significance, Priority and Environmental weeds on the development site and a site plan indicating the weed infestations with reference to the species and degree of infestation or density (i.e., low, medium, high, or expressed as a percentage). ○ A treatment schedule in tabulated form, specifying for each species: ○ The method of treatment (mechanical or herbicide use)	Appendix D

Biodiversity Management	DCP Requirement	Section in BMP Addressed
	○ The rates of application methods of all herbicide treatments ○ The primary control treatment to achieve a minimum 70% kill and a secondary control treatment to achieve a minimum 90% kill. ○ The timing of treatments. ○ An annual weed maintenance program indicating the methods to be implemented to maintain a weed-free site. ○ Details of any methods of disposal of weed material. ○ Details of monitoring and reporting requirements.	
Dam Dewatering	**Appendix D.17** • Applications for removal of artificial waterbodies are to be accompanied by a dam dewatering plan prepared by a suitably qualified ecologist which documents the approach to dam removal including: ○ Aquatic fauna survey and relocation strategy ○ Water quality management plan ○ Silt/sediment waste classification and disposal plan ○ Demolition plan ○ Restoration plan ○ Weed and pest species management ○ Wildlife attraction	Appendix E

2. Existing Biodiversity Values

2.1. High Biodiversity Values (HBV) Areas

The subject land contains areas of High Biodiversity Value (HBV) under the Western Parkland City SEPP. Clearing of native vegetation within HBV areas are not permitted in accordance with Section 4.25A (2) of the SEPP. Two areas of impact to HBV areas are proposed, totalling 0.05 ha, and occur in pasture improved exotic grassland. No native vegetation will be cleared by the minor encroachment into HBV areas.

All HBV areas, except where impacts to exotic grassland occur and are approved under the Master Plan, is to be protected. Delineation of no-go zones using suitable fencing and/or high visibility bunting is required, as detailed in Appendix A, under the direction of the Project Ecologist.

2.2. Vegetation Communities

Vegetation communities present within the subject land are described in the Biodiversity Assessment Report prepared by ELA (2023a). In summary, the following Plant Community Types (PCTs) and condition zones are present:

- PCT 3320 Cumberland Shale Plains Woodland (Low)
- PCT 4023 Coastal Valleys Swamp Oak Riparian Forest (Low and Moderate)
- PCT 4025 Cumberland Red Gum Riverflat Forest (Low and Moderate)

Three (3) Threatened Ecological Communities (TECs) are present in the subject land. PCT 3320 conforms to the TEC Cumberland Plain Woodland (CPW), which is Critically Endangered under both the BC Act and EPBC Act, PCT 4023 to the TEC, Swamp Oak Floodplain Forest (SOFF), which is Endangered under the BC Act, and PCT 4025 is associated with the TEC River-flat Eucalypt Forest (RFEF), which is Endangered under the BC Act and Critically Endangered under the EPBC Act.

While the impacts under the Master Plan are primarily located on biodiversity certified land, or in minor areas (0.05 ha) of HBV areas that does not contain native vegetation, existing vegetation in open space areas should still be protected. Flora and fauna and vegetation mitigation measures are to be implemented in accordance with Appendix A and 0, respectively.

PCTs and associated TECs within the subject land are summarised in Table 2 and shown in Figure 2.

Table 2: Plant Community Types present within the subject land

PCT	Condition	Description	Associated TEC	BC Act	EPBC Ac	EPBC Act Condition (Y/N)
3320: Cumberland Shale Plains Woodland	Low	PCT 3320 (Low) was present as a small patch in south east of the subject land as isolated paddock trees throughout the higher elevation areas of the subject land. In the small patch the canopy consisted of native *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Grey Box). The midstorey was absent. The groundcover was dominated by weed species (> 70% cover) including *Cenchrus clandestinus* (Kikuyu), *Polygonum aviculare* (Wireweed), *Stellaria media* (Chickweed), *Lepidium africanum* (Common Peppercress), *Cirisium vulgare* (Scotch Thistle), *Sida rhombifolia* (Paddy's Lucerne), *Verbena bonariensis* (Purpletop) and *Plantago lanceolata* (Lamb's Tongues). The native species present (< 5% cover) included *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Einadia trigonos* subsp. *Stellulata* and *Portulaca oleracea* (Pigweed). The paddock tree canopy consisted of either a single *Eucalyptus tereticornis* (Forest Red Gum) or *Eucalyptus moluccana* (Grey Box). The midstorey was absent. The groundcover was entirely exotic with pasture improved species including *Cenchrus clandestinus* (Kikuyu), *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Lamb's Tongues), *Sida rhombifolia* (Paddy's Lucerne) and *Echinochloa* spp.	*Cumberland Plain Woodland in the Sydney Basin Bioregion*	CE	CE	No
4023: Coastal Valleys Swamp Oak Riparian Forest	Moderate	PCT 4023 (moderate) was present as a small patch in the southern area of the subject land. The canopy consisted of native *Casuarina glauca* (Swamp Oak), which were identified as regrowth in the ELA 2022 vegetation validation survey. The midstorey was absent. The groundcover was dominated by weed species (>70% cover) including *Cenchrus clandestinus* (Kikuyu), *Polygonum aviculare* (Wireweed), *Stellaria media* (Chickweed), *Lepidium africanum* (Common Peppercress), *Cirisium vulgare* (Scotch Thistle), *Sida rhombifolia* (Paddy's Lucerne), *Verbena bonariensis* (Purpletop) and *Plantago lanceolata* (Lamb's Tongues). The native species present (< 5% cover) included *Microlaena stipoides* var. *stipoides* (Weeping Grass), *Einadia trigonos* subsp. *Stellulata* and *Portulaca oleracea* (Pigweed).	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E		No
4023: Coastal Valleys Swamp Oak Riparian Forest	Low	PCT 4023 (low) was present as a small patch in the southern area of the subject land. The canopy consisted of native *Casuarina glauca* (Swamp Oak). The midstorey was absent. The groundcover was entirely exotic with pasture improved species including *Cenchrus clandestinus* (Kikuyu), *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Lamb's Tongues), *Sida rhombifolia* (Paddy's Lucerne) and *Echinochloa* spp.	*Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions*	E		No

PCT	Condition	Description	Associated TEC	BC Act	EPBC Ac	EPBC Act Condition (Y/N)
4025: Cumberland Red Gum River-Flat Forest	Moderate	PCT 4025 (Moderate) was present as a small patch in northern area just outside the boundary of the subject land. The canopy species present included *Angophora subvelutina* (Broad-leaved Apple), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Grey Box). A native midstory was present and included *Bursaria spinosa* subsp. *Spinosa* (Native Blackthorn) and regenerating *Eucalyptus* spp.. The understorey was mixed native and exotic, the native species present includes *Microlaena stipodies* var. *stipodies* (Weeping Grass), *Glycine microphylla* (Small-leaf Glycine) *Dichondra repens* (Kidney Weed) and *Juncus usitatus* (Common Rush), however is mostly dominated by exotic species including *Tradescantia fluminensis* (Trad), *Cirsium vulgare* (Spear Thistle*), Lolium perenne* (Perennial ryegrass), *Sida rhombifolia* (Paddy's Lucerne), *Solanum* spp., and exotic vines, *Anredera cordifolia* (Madeira Vine) and *Araujia sericifera* (Moth Vine). Cumberland Riverflat Forest was mapped in a low to moderate condition in the northwest (associated with the Badgerys Creek riparian corridor) and east (South Creek corridor) of the site. The eastern portion of the site contained remnant canopy species approximately 30 -40 m from the riparian corridor. These species include *Angophora subvelutina* (Broad-leaved Apple) and *Eucalyptus tereticornis* (Forest Red Gum). The northwest portion of the site also contained *E. tereticornis* and *Eucalyptus moluccana* (Grey Box) and *Eucalyptus eugenioides* (Thin-leaved Stringybark) and a sub-canopy of *Casuarina glauca* (Swamp Oak) and *Melaleuca decora* (White Feather Honey Myrtle). A native midstorey is present and includes *Bursaria spinosa* subsp. *spinosa* (Native Blackthorn) and regenerating *Eucalyptus* spp.. The understorey includes a small presence of native species including *Microlaena stipodies* var. *stipodies* (Weeping Grass), *Glycine microphylla* (Small-leaf Glycine), *Dichondra repens* (Kidney Weed) and *Juncus usitatus* (Common Rush), however is mostly dominated by exotic species including *Tradescantia fluminensis* (Trad), *Cirsium vulgare* (Spear Thistle), *Lolium perenne* (Perennial ryegrass), *Sida rhombifolia* (Paddy's Lucerne), *Solanum* spp., and exotic vines, *Anredera cordifolia* (Madeira Vine) and *Araujia sericifera* (Moth Vine).	*River-Flat Eucalyptus Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (BC Act) *River-Flat Eucalyptus Forest on Coastal Floodplains of Southern New South Wales and Eastern Victoria* (EPBC Act)	E	CE	Yes
4025: Cumberland Red Gum River-Flat Forest	Low	PCT 4025 (Low) was present as a small patches along the degraded drainage lines throughout the subject land. The canopy species present included either *Angophora subvelutina* (Broad-leaved Apple), *Eucalyptus tereticornis* (Forest Red Gum) and *Eucalyptus moluccana* (Grey Box) or *Eucalyptus amplifolia* (Cabbage Gum). The midstory was absent. The groundcover was entirely exotic with pasture improved species including *Cenchrus*	*River-Flat Eucalyptus Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin*	E	CE	No

PCT	Condition	Description	Associated TEC	BC Act	EPBC Ac	EPBC Act Condition (Y/N)
		clandestinus (Kikuyu), *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Lamb's Tongues), *Sida rhombifolia* (Paddy's Lucerne) and *Echinochloa* spp..	*and South East Corner Bioregions* (BC Act) *River-Flat Eucalyptus Forest on Coastal Floodplains of Southern New South Wales and Eastern Victoria* (EPBC Act)			
Native Plantings	N/A	The Native Planted vegetation zone was located along the roads and on the exterior of the previous buildings. This included rows of *Callistemon citrinus* (Crimson Bottlebrush), *Corymbia citriodora* (Lemon-scented Gum), *Casuarina glauca* (Swamp Oak), *Eucalyptus robusta* (Swamp Mahogany). These areas had an exotic groundcover layering including *Cenchrus clandestinus* (Kikuyu), *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Lamb's Tongues), *Sida rhombifolia* (Paddy's Lucerne) and *Echinochloa* spp..	N/A	N/A	N/A	N/A
Exotic / Cleared	N/A	The Exotic vegetation zone includes the exotic vegetation planted along the roads and on the exterior of the previous building sites and within the paddocks. The exotic grassland areas included *Cenchrus clandestinus* (Kikuyu), *Sporobolus fertilis* (Giant Parramatta Grass) *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Lamb's Tongues), *Sida rhombifolia* (Paddy's Lucerne) and *Echinochloa* spp..	N/A	N/A	N/A	N/A

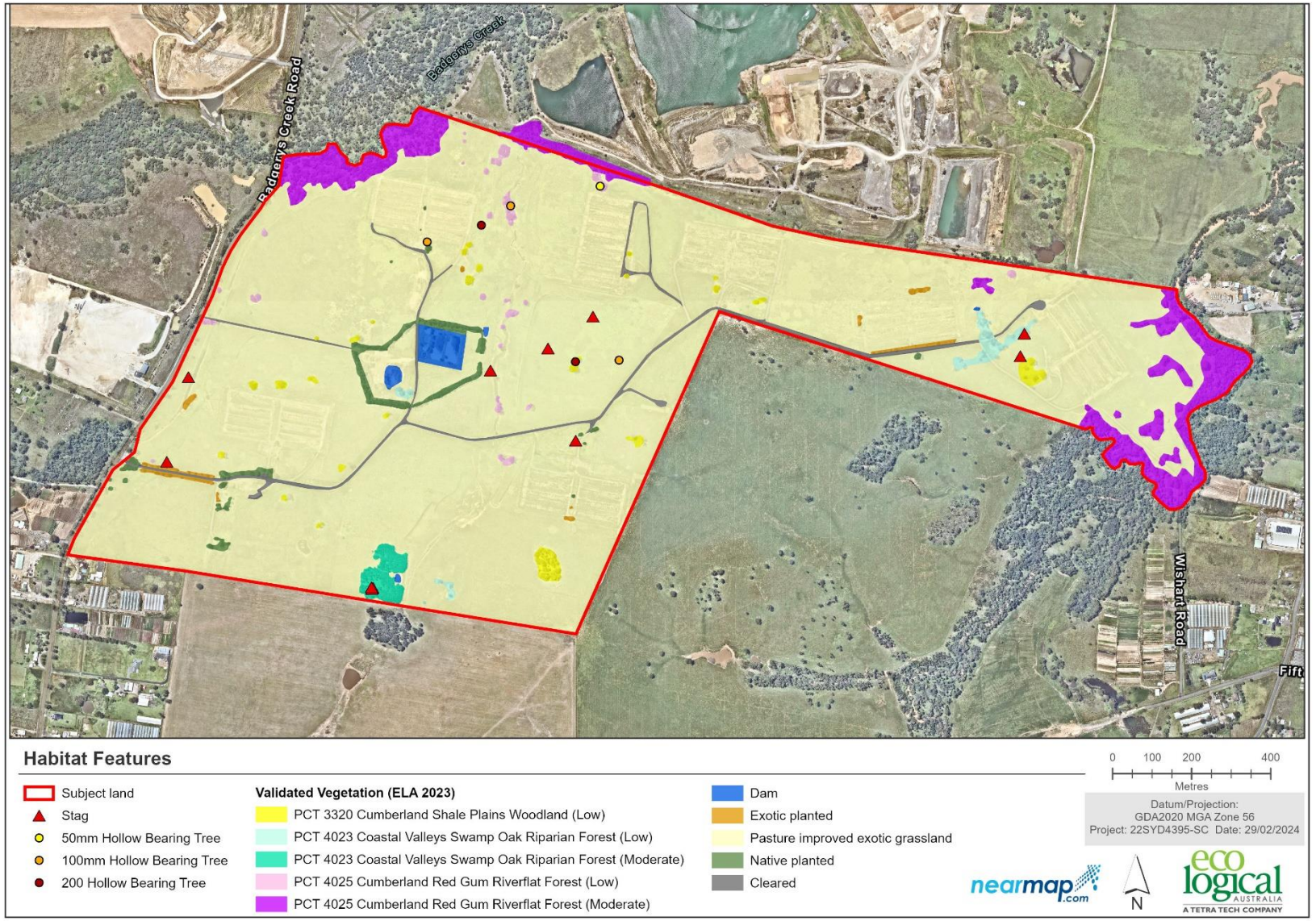

Figure 2: PCTs and habitat features within the subject land

2.3. Fauna Habitat

2.3.1. Hollow-Bearing Trees

Hollow-bearing trees (HBTs) can provide potential roosting and breeding habitat for a range of fauna species, depending on the size of the hollow. A total of six (6) HBTs were recorded within the subject land. Their locations are provided in Figure 2. Hollows ranged in size across the site, from small sized hollows (≤ 20 cm diameter) to medium-large sized hollow (≥ 20 cm diameter). A total of five (5) hollows, (one being ≥ 20 cm), are located within the impact area within wholly biodiversity certified land.

2.3.2. Stags

Stags are dead trees that still provide habitat value as they can contain many crevices and hollows for fauna to utilise. Eleven (11) stags were identified across the subject land, three (3) of which are in the proposed Master Plan retained areas. Eight (8) stags would be impacted by the proposed Master Plan development, three (3) of which are within non-biodiversity certified land.

2.4. Weeds

The exotic grassland areas in the Master Plan development area primarily consist of *Cenchrus clandestinum* (Kikuyu), *Sporobolus fertilis* (Giant Paramatta Grass), *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Lamb's Tongue), *Sida rhombifolia* (Paddy's Lucerne), *Eragrostis curvula* (African Lovegrass), *Echinochloa* sp. and *Senecio madagascariensis* (Fireweed). Fireweed covers approximately 10-15% of the pasture grass.

The existing farm dams have weeds such as *Solanum sisymbriifolium* (Sticky Nightshade), *Cirsium vulgare* (Spear Thistle), *Ranunculus sceleratus* (Celery buttercup), *Modiola caroliniana* (ref-flowered mallow), *Phytolacca octandra* (Inkweed) and *Conyza bonariensis* (Flaxleaf fleabane). A dried-up dam near the south-western boundary of the site (56H 290921E, 6245765N) featured several weeds that have previously been mentioned in addition to *Cyperus eragrostis* (Umbrella Sedge).

Weed species identified included sixteen (16) weeds with State Biosecurity restrictions, four (4) Weeds of National Significance (WoNS), three (3) weeds listed as regional level priority and there were eleven (11) weeds listed as weeds of other regional concern. The weeds present, the associated asset / value at risk and whether they are WoNS or of regional concern are presented in Table 3.

Table 3: A list of priority weeds and WoNS identified within the subject land

Scientific Name	Common Name	WoNS	Regional level priority weeds	Other weeds of regional concern	Priority Weed Category
Anredera cordifolia	Madeira Vine	Yes	No	Yes	Containment/Asset Protection
Araujia sericifera	Moth Vine	No	No	No	Environment
Asparagus asparagoides	Bridal Creeper	Yes	No	Yes	Environment
Cestrum parqui	Green Cestrum	No	Yes	Yes	Asset Protection
Cirsium vulgare	Spear Thistle	No	No	No	Environment
Conyza sp.	Fleabane	No	No	No	Environment
Cortaderia jubata	Pampas Grass	No	Yes	Yes	Asset Protection

Scientific Name	Common Name	WoNS	Regional level priority weeds	Other weeds of regional concern	Priority Weed Category
Cyperus eragrostis	Umbrella sedge	No	No	No	Environment
Eragrostis curvula	African Lovegrass	No	No	Yes	Asset Protection
Ligustrum sinense	Chinese privet	No	No	Yes	Containment
Lycium ferocissimum	African Boxthorn	Yes	No	Yes	Asset Protection / Containment
Olea europaea subsp. *cuspidata*	African Olive	No	Yes	Yes	Containment
Senecio madagascariensis	Fireweed	Yes	No	Yes	Environment, human health
Solanum sisymbriifolium	Sticky nightshade	No	No	Yes	Containment / Eradication
Sporobolus fertilis	Giant Parramatta Grass	No	No	Yes	Eradication / Asset Protection / Containment
Tradescantia fluminensis	Wandering Trad	No	No	No	Environment

2.5. Wildlife Hazard

The Master Plan contains several elements which provide habitat for fauna particularly birds and bats that could pose a risk to airport operations. These include street trees, on-lot landscaping, revegetated riparian corridors, sediment ponds, storage ponds and wetlands. Of these, the riparian corridors and water body's (Figure 3 and Figure 4) pose the most significant risk as species that are attracted to these habitats typically have the highest hazard rankings.

Under the Western Parkland City SEPP, a Wildlife Risk Assessment and a Wildlife Management Plan is required for development which includes water storage facilities and outdoor recreation. The Wildlife Management Plan is to contain incorporate possible risk reduction measures from the Wildlife Risk Assessment.

2.6. Riparian Land and Waterbodies

There are three (3) main riparian corridors present within the subject land (ELA, 2023b):

- Riparian Corridor #1 – Badgerys Creek
- Riparian Corridor #2 – Central watercourse
- Riparian Corridor #3 – South Creek and tributaries

An additional riparian feature is proposed under the Master Plan, being a Riparian Street in accordance with the Precinct Plan and DCP requirements.

Other aquatic features in the subject land include five (5) farm dams (not including three (3) dry dams), subject to dewatering as per the DDP found in Appendix E. The Master Plan proposes to create stormwater features in the form of planted wetlands, storage ponds and sediment ponds (collectively referred to as basins). These features have been assessed for wildlife risk and will be managed for wildlife hazard along with other planted or landscaped areas per Appendix B.

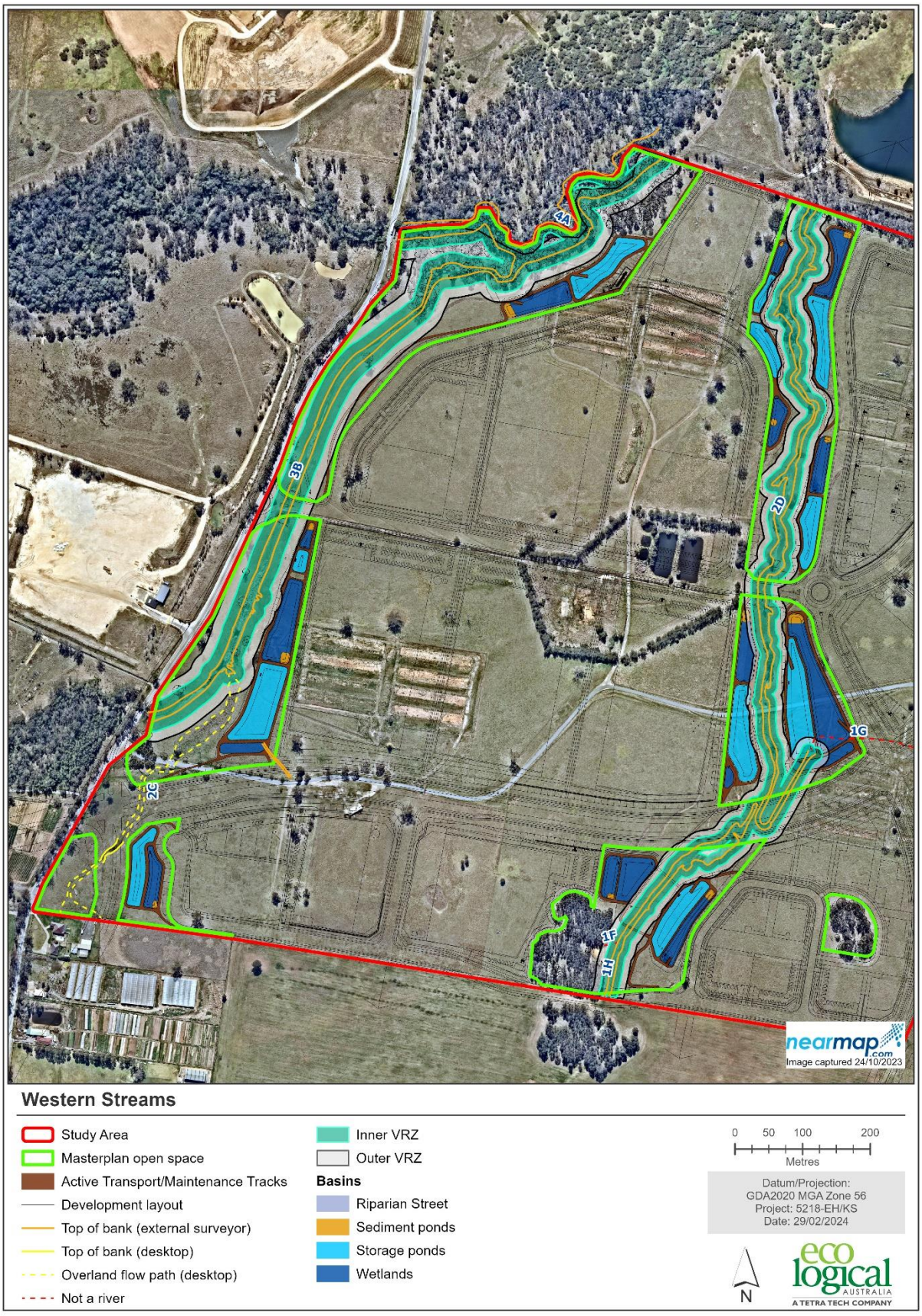

Figure 3: Western riparian land and water bodies within the subject land

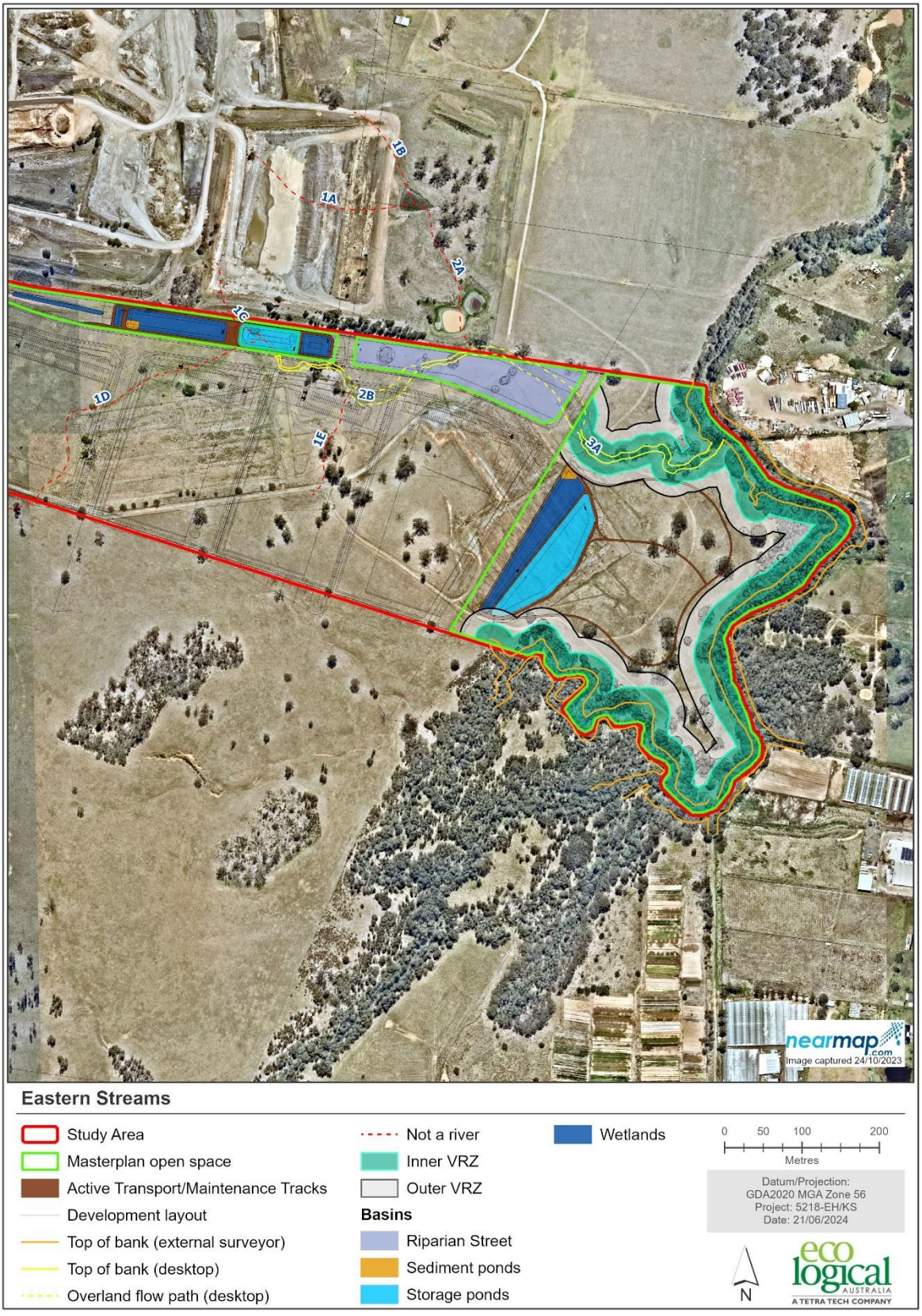

Figure 4: Eastern riparian land and waterbodies within the subject land

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APPENDIX A

Flora and Fauna Management Plan

A1 Introduction

This FFMP has been prepared to satisfy the requirements of Appendix D.16 of the Western Sydney Aerotropolis DCP Phase 2, as outlined in Table 4 below.

This FFMP has also been prepared in accordance with the *Code of Practice for Injured, Sick and Orphaned Protected Fauna 2011* (DPIE 2011) and is based on current best practice.

Table 4: Appendix D.16 DCP requirements

Appendix D.16 DCP Requirement
Pre-construction surveys prior to removal or disturbance to all human made structures, to ensure roosting habitat for microbat species, including subsurface structures such as mine shafts and storm water tunnels to ensure any individuals are dispersed or relocated as per best practice.
A pre-clearance assessment for any native fauna immediately prior to any clearing of native vegetation to ensure that arboreal mammals, roosting and hollow-using birds, bats and reptiles are deterred from accessing any vegetation to be cleared, and are removed if present prior to clearing according to EES' policy on the Translocation of Threatened Fauna in NSW.
Incorporation of best practice site hygiene protocols to manage the potential spread of Phytophthora and Myrtle Rust for land adjacent to land zoned E1 National Parks and Nature Reserves, E2 Environmental Conservation or lands managed as a reserve. In accordance with the best practice guideline 'Arrive Clean, Leave Clean: Guidelines (Commonwealth of Australia, 2015).
Best practice site hygiene protocols to manage the potential spread of chytrid fungus are to be incorporated along Ropes Creek to maintain local Green and Golden Bell Frog populations.
Weed management, site rehabilitation and nest boxes are to be installed on development adjoining land zoned E1 National Parks and Nature Reserves, E2 Environmental Conservation or lands managed as a reserve.
A tree-felling protocol is to be implemented to avoid impacts to birds, arboreal mammals and reptiles, raptor nests (almost all large raptors in Wilton are threatened), dreys, dens, hollows and other nests or habitat such as loose bark in trees that are to be cleared.
If the presence of Green and Golden Bell Frog is confirmed present along Ropes Creek within the Western Sydney Aerotropolis, incorporate best practice site hygiene protocols to manage the potential spread of chytrid fungus and maintain local species populations.
Reuse of native plants including, but not limited to seed collection and topsoil from development sites that contain native seed bank.

SCOPE AND OBJECTIVES

This FFMP has been prepared for the associated construction and operation works for the Masterplan, such that it:

- Identifies measures to protect the environment.
- Defines roles and responsibilities during proposed works.
- Identifies any external approvals needed.
- Identifies consultation and communication needs.
- Describes the monitoring and reporting regime.

A2 Implementation and Operation

Safeguards to manage potential flora and fauna impacts are detailed in Table 5**,** together with who is responsible for their implementation and at what stage of works. Person responsible for implementation: PM – Project Manager; SS – Site Supervisor; SE – Site Ecologist; SAE – Site Aquatic Ecologist; All – All Site Personnel

Table 5: Flora and Fauna Management Plan

Environmental Action	Timeframe	Monitoring	Responsible Person
OBJECTIVE: GENERAL			
All project staff and contractors will be inducted on the biodiversity sensitivities of the work site(s) and relevant safeguards prior to commencement.	Prior to works	Induction Records	PM
Work site will be delineated and 'no-go' zones around the perimeter of validated High Biodiversity Value areas and retained native vegetation will be marked prior to commencement of works under direction of the Project Ecologist. Refer to Figure 5 for indicative fencing locations These are to be confirmed by the Project Ecologist.	Prior to works	Weekly checklist, after rainfall or changed in site conditions	PM, SS
If required, DPE will be notified immediately of any complaints in relation to management of biodiversity issues.	As required	Complaint Register	SS
All general contractor waste is to be disposed of using provided waste bins.	During works	Weekly checklist	SS, All
OBJECTIVE: REDUCE HARM TO BIODIVERSITY			
Future landscaping contractors to undertake an environmental awareness induction prior to commencement of works within the site.	Prior to works	Induction records, weekly checklist	SS, SE
Programming of works should avoid critical life cycle events such as breeding or nursing wherever possible. Impacts to vegetation should be minimised during the spring/summer seasons to avoid disrupting breeding cycles of threatened species.	Prior to works	Weekly checklist	PM, SS, SE
Prior to clearance of the vegetation in the development area, collectable floristic material such as native species seed stock and woody fruit of all native species will be collected for use in landscaping works within the Vegetation Management Plan area, as shown in Figure 5. Refer to Section A11 for further information.	Prior to works	Weekly checklist	PM, SS, SE
Survey efforts identified 5 hollow-bearing trees within the development site (Figure 5). The site ecologist is to be present during removal of identified hollow-bearing trees. Hollow-bearing trees (HBTs) should be removed in the following manner:	Prior to works	Weekly checklist	PM, SS, SE

Environmental Action	Timeframe	Monitoring	Responsible Person
• Discourage fauna first by restricting access to the hollow, deterrence measures (e.g., noise). • Check for fauna in the zone of disturbance before clearing. • Remove all non-hollow bearing vegetation prior to the removal of the habitat trees. • After clearing, re-check to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be safely relocated to nearby habitat. • Leave habitat trees standing for at least one night after clearing of non-hollow bearing trees to allow any fauna the opportunity to remove themselves after site disturbance. • Before felling the habitat tree, engage a climbing arborist to sectionally lop and lower branches one at a time. • Re-check after felling the habitat tree to ensure no fauna have become trapped or injured during clearing operations. Any fauna found should be safely relocated to nearby habitat. • If taking the habitat tree down in stages, the non-hollow-bearing branches should be removed before the hollow-bearing branches are removed. • Take care when moving equipment near vegetation to be retained. • Rather than mulching or burning cleared vegetation, logs from the felled trees should be retained and distributed into the proposed Vegetation Management Plan area where it would not be considered a fire hazard. This would provide additional potential habitat for ground dwelling fauna such as reptiles and small mammals. If native fauna is identified during clearance surveys within the site, the Fauna Rescue and Release Procedure found in Section A8 must be adhered to.			
A short report detailing the pre-clearance and clearance works is to be prepared within 10 days of completion.	During construction	Weekly checklist	PM, SE
The identified hollow-bearing trees should be replaced with the extracted/carved hollow from the tree, an artificial hollow or nest box after removal and/or removed hollows should be placed within the VMP area, as shown in Figure 5. This is to be done under the direction of the Site Ecologist. If further hollows are identified during pre-clearance or clearance surveys and are proposed to be removed, the use of the hollow (extracted from tree) or replacement with artificial hollows or nest boxes will be required.	During construction, completion of works	Weekly checklist	SS, SE
Ensure that no plant, equipment, or stockpiles are positioned under the drip line of retained along the boundary of the development site trees.	During construction	Weekly checklist	SS, All
During any hollow-bearing tree removal, an experienced wildlife handler is to be present to extract and re-locate any displaced fauna that may be disturbed during this activity. Any injured fauna is to be	During construction	Weekly checklist	SS, SE

Environmental Action	Timeframe	Monitoring	Responsible Person
appropriately cared for and released on site where and when appropriate. Refer to Section A8 for further details.			
The Site Ecologist and /or a wildlife handler is to be present during removal of identified hollow-bearing trees to relocate any identified fauna. Native animals are to be relocated from development sites in accordance with the former Office of Environment and Heritage's Policy on the *Translocation of Threatened Fauna in NSW* and Fauna Relocation Management Plan, if required.	During construction	Weekly checklist	All
If fauna is found on the construction site during construction works, stop work – all native fauna is protected. Do not touch the animal,wait for it to leave. If injured fauna is found, a site ecologist training in wildlife rescue is to transport to the nearest local vet and / or call WIRES or a wildlife rescue service.			
If a threatened fauna species is identified, stop works. Refer to Section A8 for further guidance.			
Install sediment barriers and erosion controls to prevent runoff into vegetation outside the impact area, in particular the riparian corridors. Maintain controls throughout construction and complete regular inspections (weekly, before and after predicted heavy rainfall periods). Schedule works outside heavy rainfall periods.	Prior to works and during construction	Weekly checklist	SS, All
To reduce the spread of pathogens and diseases, ensure Arrive Clean, Leave Clean Guidelines (Department of the Environment, 2015) are adhered to: Ensure all clothing, hats, footwear, tools, equipment, machinery and vehicles are free of mud, soil and organic matter before entering and exiting bushland. Ensure any soil, plants or other materials entering the site are certified free of weeds and pathogens. A dedicated washdown location, at the entry/exit of the site is to be determined prior to construction works. If weeds or pathogens are known to be present within the development site, Appendix D must be adhered to.	During construction	Weekly checklist	SS, All
OBJECTIVE: REDUCE HARM TO AQUATIC BIODIVERSITY			
As part of the dam dewatering process, several steps are required to minimise harm to aquatic biodiversity. The aquatic fauna relocation must only be performed by a person with one of the following licenses/approvals: Section 37 *Fisheries Management Act 1994* (for fish) Biodiversity Conservation Licence – *Biodiversity Conservation Act 2016* (for turtles, frogs, wetland birds) Animal Research Authority (issued by the Secretary's Animal Care & Ethics Committee).	Prior to dewatering commencing and during works	Weekly checklist	SS, SAE

Environmental Action	Timeframe	Monitoring	Responsible Person
The Aquatic Ecologist undertaking the aquatic fauna relocation is to notify NSW Fisheries of the activity 48 hours prior to fish relocation (unless an agreement is in place), including locations of dewatered and relocation sites (see regional office contacts https://www.dpi.nsw.gov.au/contact-us/local-office). Fisheries require permits to be carried by the licensed ecologist, who should also display a sign clearly showing licence number (if working in public areas, especially when releasing fauna to local creek). Detailed aquatic fauna handling procedures are included in Appendix E.			
OBJECTIVE: REDUCE SPREAD OF PRIORITY WEEDS			
Wash down equipment and vehicles prior to and after use, to manage the introduction and spread of weed propagules.	Prior to works, during construction	Weekly checklist	All
All weeds are to be treated prior to becoming an environmental threat according to best management practices.	During construction, completion of works	Weekly checklist	SS
OBJECTIVE: REDUCE POTENTIAL LIGHT AND NOISE IMPACTS TO NATIVE FAUNA			
Works will only occur during the following times: Monday to Friday 7:00 am to 5:00 pm, Saturday 8:00 am to 1:00 pm. Works will not operate after sunset to minimise indirect noise and light impacts to fauna species in adjacent retained vegetation.	During construction	Weekly checklist	SS
If practical, avoid simultaneous operation of noisy plant within discernible range of vegetation outside of the development site.	During construction	Weekly checklist	All
Maximise the distance between noisy plant items and nearby residential receivers and potential fauna habitat.	During construction	Weekly checklist	All
Orient equipment such as offensive noise carriers away from residential receivers and potential fauna habitat.	During construction	Weekly checklist	All
Plant used intermittently is to be throttled or shut down when not required.	During construction	Weekly checklist	All
Permanent lighting installed during construction is to be designed as compliant with AS/NZS 4282:2019 *Control of the obtrusive effects of outdoor lighting.*	During and after construction.		PM

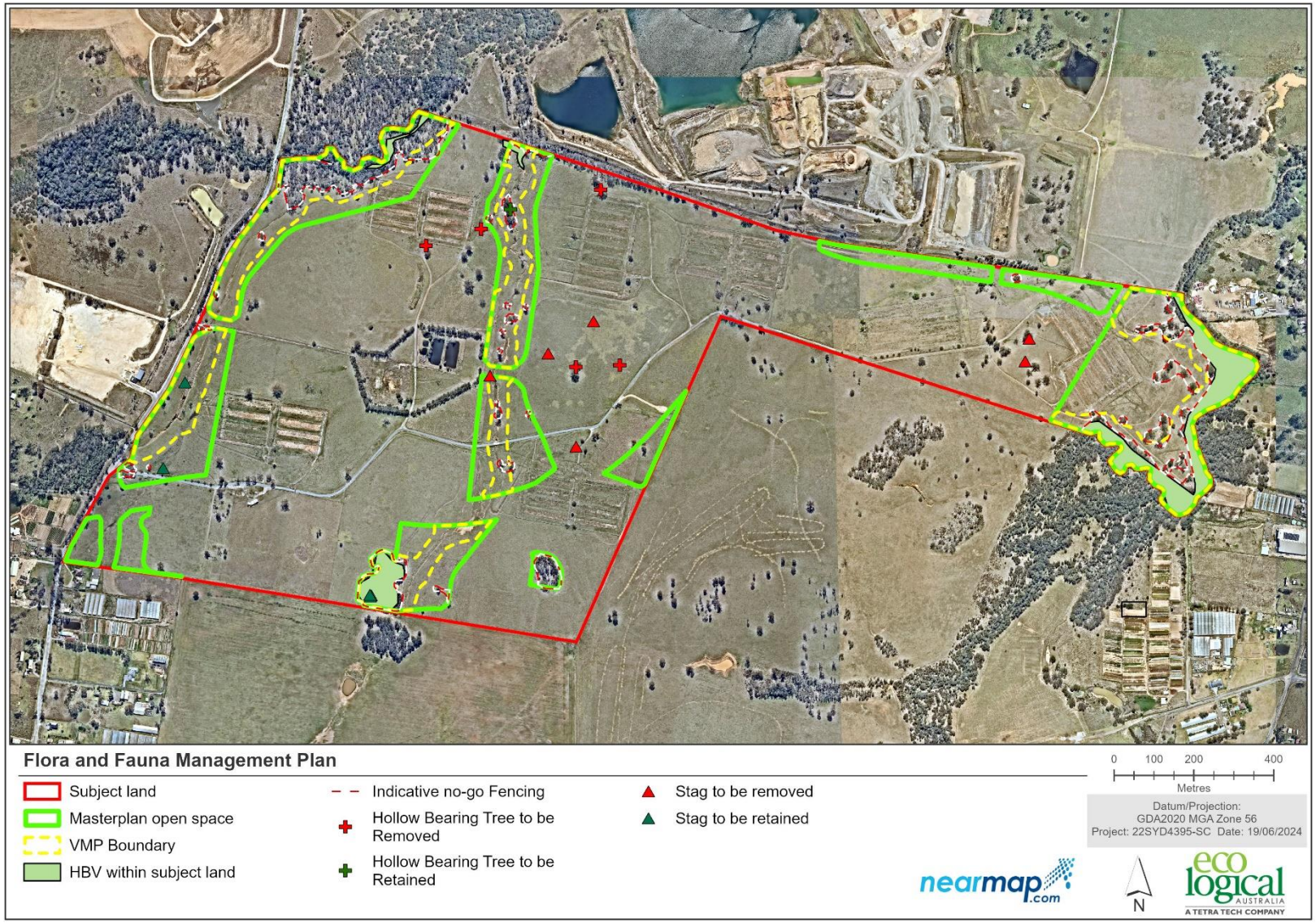

Figure 5: Flora and fauna management plan

A3 Structure and Responsibility

Details of personnel responsibilities are outlined in Table 6. Contact details for these personnel are included in Section A6.

Table 6 Responsibilities of personnel

Role	Name, Position and Company	Responsibility
Project Manager	Name: Position: Company:	• Requires the contractor to adhere to the approved works. • Accountable for contractor's and subcontractor's environmental performance. •
Site Supervisor	Name: Position: Company:	• Issues stop work orders, if required. • Records any community complaints (Section A5) and notifies Project Manager. • Responsible for site management, FFMP compliance, including subcontractors. • Facilitates environmental induction and toolbox talks for site personnel. • Undertakes minimum of weekly environmental inspections (or after environmental conditions change). • Ensures proponent, DPE and community are notified of commencement of works. • Initiates corrective actions. • Reports FFMP non-conformances to the Project Manager. • Reports incidents. • Notifies the Project Manager if the FFMP needs revising.
Staff	Company:	• Comply with the FFMP. • Monitor and maintain controls. • Report breaches of the FFMP and potential / actual incidents to Site Supervisor • Report incidents. • Stop work and reports to Site Supervisor in the event of unexpected finds (e.g., native fauna). • Record any community complaints and notify the Site Supervisor (Section A5).

A4 Team Induction Sign-Off Sheet

The following personnel certify the works will be carried out in accordance with the FFMP.

Name	Position / Company	Signature	Date
	Position: Project Manager **Company:**		
	Position: Site Supervisor / Contractor **Company:**		
	Position: Site Ecologist **Company:**		
	Position: Staff **Company:**		
	Position: Staff **Company:**		
	Position: Staff **Company:**		
	Position: Staff **Company:**		
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	Position: Staff **Company:**		
	Position: Staff **Company:**		

A5 Complaints Recording Template

Date	Received by phone / email / letter	Complaint	Name	Address	Contact	Follow-up Actions	Date Complete

A6 Phone and Emergency Contact List

Organisation	Name	Position	Contact Number
Project Contacts			
		Project Manager	
		Site Supervisor	
		Site Ecologist	
Emergency Contacts			
Emergency Services	-	-	000
Mount Druitt Hospital	-	-	02 9881 1555
Environment Protection Authority	-	-	131 555
SafeWork NSW	-	-	131 050
Fire and Rescue NSW	-	-	02 9265 2999
State Emergency Services (SES)			132 500
WIRES	-	-	1300 094 737
Origin Energy			132 461
Energy Australia			133 466
Transgrid System Operations			1800 027 253 / 9284 300
Police Assistance Line (PAL)			131 444
Gas – Agility			131 909
Poisons Information			131 126
Telstra			132 200
NSW Road and Maritime Services (RMS)			132 213

A7 Site Biodiversity Inspection Checklist (Weekly)

Constructor Details	Site Supervisor - Environmental Checklist	
Site Inspected: 475 Badgerys Creek Road, Bradfield NSW		
Time & Date:	Weather:	
Biodiversity		
All collectable floristic material such as native vegetation seed stock, woody debris and bush rock has been collected for use in landscaping or relocation to Vegetation Management Plan area.		☐
No plant, equipment or stockpiles are positioned under the drip line of retained trees.		☐
The Site Ecologist was present during tree removal and displaced fauna has been relocated.		☐
Aquatic Biodiversity		
Aquatic ecologist has been notified of intention to commence dam dewatering, DPI Fisheries notified of intended dewatering works and aquatic fauna relocation location has been chosen		☐
Erosion and sediment controls downstream of dam water irrigation areas are installed correctly		☐
Aquatic Ecologist completed capture and translocation of aquatic fauna		☐
Priority Weeds		
Equipment and vehicles have been washed down prior to and after use, to manage the introduction and spread of weed propagules and pathogens in accordance with Section A10.		☐
Noise		
Simultaneous operation of noisy plants within discernible range of a sensitive receiver has been avoided.		☐
The distance between noisy plant items and nearby residential receivers and potential fauna habitat has been maximised.		☐
Equipment such as offensive noise carriers have been oriented away from residential receivers and potential fauna habitat.		☐
Plants used intermittently have been throttled or shut down when not required.		☐
Inspected by:	Signature:	
Actions:	By Who:	Date Completed:

A8 Fauna Rescue and Release Procedure

The following Fauna Rescue and Release Procedure has been prepared in accordance with the NSW Department of Planning, Industry and Environment *Code of Practice for Injured, Sick and Orphaned Protected Fauna 2011.*

NATIVE FAUNA ENCOUNTER

If native fauna (including threatened fauna) is encountered during pre-clearance or clearance surveys, the decision tree outlined in Table 7 should be adhered to.

Table 7: Decision tree on how to respond to a native fauna encounter

Is the animal sick, injured, likely to have been injured or an orphan?			
YES		**NO**	
Is death imminent or highly likely regardless of the care available?		Is the animal creating a nuisance for the public or in a dangerous location?	
YES	**NO**	**YES**	**NO**
Arrange for the animal to be humanely euthanised by a suitably qualified person.	Rescue the animal and arrange for a vet or experienced fauna rehabilitator to assess it.	Advise people to avoid the animal or relocate it to a suitable nearby location.	Do not intervene.

RESCUING OF NATIVE FAUNA

If rescuing of the animal is chosen to be the most suitable option, the following must be adhered to:

- Assessment of all risk to fauna from environmental hazards and from capture.
- Confirmation that the correct rescue equipment for the type and size of fauna is at hand.
- Confirmation that enough trained personnel for that species and size are present.
- If the rescued wildlife needs assessment by a vet, wildlife rescuer or rehabilitator, ensure that an organisation such as WIRES has been contacted to ascertain an available person relevant to that species.

TRANSPORTATION OF RESCUED NATIVE FAUNA

When transporting the rescued native fauna to a veterinary surgery, wildlife rescuer, or rehabilitation facility guided by an organisation such as WIRES, the following must be adhered to:

- Ensure transport methods and container sizes are appropriate for the species, size, strength, and temperament of fauna. This may include incorporating padding walls and ensuring no ingestible surfaces are present. Containers must also be designed and positioned so breathing is not restricted.
- Transportation containers are kept as an appropriate temperature for the species (note a range of 25 – 27◦C is appropriate for most species and ages; 31◦C is appropriate for unfurred joeys and 21◦C is appropriate for echidnas, platypuses, and frogs).

- Transportation containers are well ventilated.
- Ensure containers holding snakes and bats include a visible warning label outlining the danger.
- Ensure transportation containers are not left in the back of uncovered utility vehicles or car boots.
- During transportation, adult fauna should not be fed or watered during trips lasting less than a few hours.
- Attain approval by a veterinarian before use of medication to facilitate transport.
- Ensure fauna transport is the sole purpose of the trip.

RELOCATION OF NATIVE FAUNA

If the encountered native fauna does not require rescuing, however, is required to be located outside of the construction site, the following must be adhered to:

- A suitable environment must be identified prior to relocation, this is one that:
    - Contains appropriate habitat and adequate good resources.
    - Is occupied by members of the same species.
    - Does not place the animal at a high risk of injury.
    - Is not outside of an area which the fauna would not normally cross (i.e., brush-tail possums rarely move more than 50 m however; wombats have a radius of approximately 50 km).

A9 Aquatic Fauna Handling Procedures

During dam dewatering, a Site Aquatic Ecologist should be on site to handle aquatic fauna in line with the following procedures (per Appendix E).

CAPTURE

Fish are to be collected by hand nets during the dewatering process. This is most effective when the water is < 0.3 m deep. Dissolved oxygen concentration will drop rapidly as water volume decreases, especially in warm water or if lots of fish are present. Larger bodied fish should be targeted first. Wetland birds will scavenge for small fish in the shallows (e.g., Gambusia). Most small fauna will likely remain uncaptured in the dam until the water becomes very shallow (especially eels and turtles). Eels are best captured by large hand nets in water < 0.3 m deep, although they burrow into mud. When the water is extremely low, turtles and fish may head towards the intake pump (placed in deepest part). This area should be monitored to intercept fauna (e.g., stand in water next to intake). Turtles will burrow into mud and may require observation and rescue the following morning but can also move themselves to suitable nearby habitat if an escape ramp is graded. For safety, at least two people are required when wading and handling heavy tubs of water/fish up banks (excavator can dig access steps/ramp).

TRANSLOCATE/RELOCATE

Native fish healthy enough for translocation or relocation are to be contained and transported in an aerated tub/bucket/tank to an appropriate dam/lake/waterhole/creek. NSW Fisheries advise that the host location should be large enough to accommodate additional fish, especially predatory eels. If many predatory fish such as Longfin Eels are captured during the aquatic fauna relocation process, an additional release point may be required. Tubs should not be overstocked or left in direct sun for extended periods. Aeration can be provided by battery aquarium pumps or manual turbulence if only

stored for a short period. Turtles can be transported in a shaded tub with a wet hessian bag placed inside for moisture and support during transport. Tadpoles and frogs can be transported in small buckets.

RELEASE

Water from the receiving waterbody should be mixed slowly over 5 - 10 minutes with the tank water to allow fish to acclimatise to the new water quality. Care should be taken when releasing fauna not to also transfer weeds or invasive species (e.g., Carp eggs and Gambusia). Animals should be transferred via hand nets, rather than directly pouring them from the tub. Eels can be released on land a few metres from edge and pointed towards the water. The number of each species are to be counted upon release and later incorporated into the summary report.

PESTS

Exotic fish (e.g., Carp, Gambusia, Goldfish, Redfin Perch, Spotted Livebearer) are to be intercepted, euthanised and disposed of in accordance with the ecologist's Animal Research Authority (issued by the Secretary's Animal Care & Ethics Committee). Exotic *Trachemys scripta* (Red-eared Slider Turtle) are to be contained humanly and Department of Planning, Industry and Environment (DPIE) immediately notified (Environment Line - 131 555). They will collect the live turtle from the ecologist. A tally of the number and species of animals euthanised would be recorded and later incorporated into the summary report.

POST-DEWATERING

An escape ramp should be graded to allow trapped fauna to escape overnight. Sediment should be left overnight to allow hidden fauna to emerge unless the ecologist confirms there are no fauna remaining (site-specific assessment). Earthworks staff should notify the appointed aquatic ecologist if stranded fish or turtles are observed post-dewatering.

REPORTING

The Aquatic Ecologist should prepare a summary report within seven days of completing the aquatic fauna relocation works. The report would detail that the works have been completed in accordance with the Dam Dewatering Plan and would include information relating to the location of the dam dewatering works, the licences held by the staff involved in the works, the number and type of native species relocated, location of release point/s for native fauna and the number and type of exotic species dispatched.

A10 Introduction and Spread of Weeds and Pathogens

Construction works on development sites have the potential to introduce and promote the spread of weed species. This procedure is intended to prevent or minimise the spread of priority weed species. During construction, the Project Manager and Site Supervisor should adhere to best practice methods for weed management, which include:

- Mowing or slashing areas infested with weeds before they seed. This may reduce the propagation of new plants.
- Program works from least to most weed infested areas.
- Clean machinery, vehicles, and footwear before moving to a new location.
- Securely cover loads of weed-contaminated material to prevent weed plant material falling or blowing off vehicles.
- Dispose of weed-contaminated soil at an appropriate waste management facility.
- Remove weeds immediately onto suitable trucks and dispose of without stockpiling.

WEED ERADICATION MANAGEMENT PLAN

A Weed Eradication Management Plan has been prepared (Appendix D), which includes:

- Identification and description of weed infested areas within the site.
- Recommendations for managing weeds.
- Weed control methods.
- Measures to prevent the spread of weeds.
- A monitoring program to measure the success of weed management.
- Communication strategies to improve contractor awareness of weeds and weed management.

Pathogens are agents such as bacterium, virus or fungus that cause disease in flora and fauna, which are be spread on footwear, vehicles, or machinery. The four most common pathogens found in NSW include:

- **Phytophthora (*Phytophthora cinnamomi*):** A soil-borne fungus that attacks the roots of native plant species, causing them to rot and eventually die.
- **Chytrid fungus (*Batrachochytrium dendrobatdis*):** A waterborne fungus that affects native frog species.
- **Myrtle rust (*Uredo rangelli*):** An introduced fungus that attacks young leaves, shoot tips and stems of Myrtaceous plants (such as Bottle Brush, Tea Tree, Lilly Pilly and Turpentine), eventually killing the plant.

Construction works on development sites have the potential to promote the spread of pathogens. This procedure is intended to prevent or minimise the spread of pathogens if they have been identified within the development site. If the occurrence of pathogens is known within the locality, a test for presence through soil or water tests should fire be undertaken. If pathogens are present, during construction, the Project Manager and Site Supervisor should adhere to best practice methods for pathogens (Table 8).

Table 8: Best practice hygiene protocols to prevent the spread of pathogens

Pathogen	Best Practice Hygiene Protocols
Phytophthora	• Minimise work during excessively wet or muddy conditions. • Programming of works should always move from uninfected areas to infected areas. • Set up exclusion zones with fencing and signage to restrict access into contaminated areas. • All personnel (including visitors) to be inducted on Phytophthora management measures for the site. Provide vehicle wash down facility. • Restrict vehicles to designated tracks, trails, and parking areas. • Provide parking and turn-around points on hard, well-drained surfaces. • Provide boot wash down facility. • Restrict personnel to designated tracks and trails. • Use a certified supply of plants and soil that is disease-free. • Retain all potentially affected materials within the contaminated area. • Ensure stockpiles of mulch, topsoil and fill material are separated to avoid potential contamination and spread.
Chytrid Fungus	• Minimise work during excessively wet or muddy conditions. • Programming of works should always move from uninfected areas to infected areas. • Set up exclusion zones with fencing and signage to restrict access into contaminated areas. • All personnel (including visitors) to be inducted on chytrid management measures for the site. • Provide vehicle wash down facility. • Restrict vehicles to designated tracks, trails, and parking areas. • Provide parking and turn-around points on hard, well-drained surfaces. • Provide boot wash down facility. • Disinfect with cleaning products containing benzalkonium chloride or 70% methylated spirits in 30% water. • Disinfect hands or change gloves between the handling of individual frogs and between each site. • Only handle frogs when necessary. Use the 'one bag-one frog' approach. • To avoid cross contamination, generally avoid transferring water between two or more separate waterbodies.

Myrtle Rust	• To determine if Myrtle Rust is known within the locality of the development site, the following should be undertaken:
	  ○ Use of The DPI Myrtle Rust Management Zone map (www.dpi.nsw.gov.au/biosecurity/plant/myrtle-rust/zones)
	  ○ Photograph potentially infected plants and send to: biosecurity@industry.nsw.gov.au for confirmation.
	• Programming of works should always move from uninfected areas to infected areas.
	• Set up exclusion zones with fencing and signage to restrict access into contaminated areas.
	• All personnel (including visitors) to be inducted on Myrtle rust management measures for the site.
	• Provide vehicle wash down facility.
	• All vehicles and machinery to be washed with Truck wash (or equivalent).
	• Restrict vehicles to designated tracks, trails, and parking areas.
	• For medium-long term projects, install a concrete wash down bay which will capture the water in a trench or bunded area.
	• Water used for wash downs must not be used for dust control.
	• Personnel working in an infected site should shower and launder clothes (especially hats) before moving to another bushland site.
	• Provide boot wash down facility.
	• Footwear and equipment to be cleaned of soil/mud then sprayed with 70% methylated spirits in 30% water.

Pathogen	Best Practice Hygiene Protocols
	• Use a certified supply of plants and soil that is disease-free (the Australian Nursery Industry *Myrtle Rust Management Plan* (McDonald 2011) provides best practice Myrtle rust management that is to be expected from suppliers). • Plant material should be buried on site if possible. • Do not dispose of waste at another bushland site. • Buried material sites must be mapped to prevent re-exposure, especially if located near utility easements. • If material cannot be buried advice should be sought from Liverpool City Council.

A11 Re-Use of Floristic Material and Native Habitat Features Strategy

COLLECTION OF FLORISTIC MATERIAL

The vegetation within the development site conforms to three (3) TECs (CPW, SOFF and RFEF). Therefore, native seed collection may be required prior to construction to later be used in the Vegetation Management Plan area. If this is the case, the following should be adhered to:

Seed should first be collected from all areas that are to be cleared as part of the project. By selecting a seed source that is from plants growing in similar environmental conditions nearby, the plants should be naturally adapted to local conditions and more likely to survive and prosper in proposed re-use areas.

Carry out all seed collection in accordance with the Florabank Guidelines (Florabank, 2000) and Model Code of Practice (Mortlock, 1998). Experienced and licensed seed collectors should carry out the seed collection.

RELOCATION OF WOODY DEBRIS AND BUSH ROCK

Many native fauna species utilise woody debris and bush rock for shelter, basking to hide from predators, find food and avoid extreme weather. When woody debris and bush rock are required to be removed from a development site, consideration should be given to finding suitable locations for re-use of these important habitat features.

Term	Definition
Woody Debris	Trees and wood, whether living or dead, at least 100 mm in diameter and 500 mm long, including hollows.
Bush Rock	Loose rock occurring on rock or soil surfaces.

Prior to relocation of woody debris found within the development site, consultation should be undertaken with DPE and the Site Ecologist to determine a suitable location for re-use to ensure it does not have a negative impact on the receiving environment. For example, in areas of high-quality bushland, there may already be enough suitable hollows, fallen logs or bush rock and adding more may cause unnecessary disturbance e or create a fire hazard.

If a suitable relocation area (such as the Vegetation Management Plan area) has been agreed upon by DPE and the development proponent, the Project Manager and Site Supervisor should ensure the following best practice methods are undertaken during relocation:

Removal, stockpiling, transportation, and relocation of woody debris and/or bush rock is carried out in a manner that minimises disturbance to native vegetation (including the canopy, shrubs, dead trees, fallen timber and groundcover species) or bush rock.

The spread of any weeds or pathogens that may be in the soil is avoided when relocating woody debris and bush rock from stockpiles.

The Site Ecologist is consulted with to provide advice on positioning woody debris and bush rock in designated relocation areas.

Topsoil disturbance is kept to a minimum and is not heaped up against woody debris or bush rock because of the potential to provide habitat for rabbits.

Woody debris is placed evenly across the site.

Where woody debris is to be mulched the Project Manager and/or Site Supervisor should ensure that weeds are separated from native vegetation.

USE OF NEST BOXES

Nest boxes can be used to provide supplementary breeding habitat and shelter for hollow-dependant fauna where hollows have been removed. If requested by DPE, nest boxes may be required to be installed as a replacement for the removal of the identified hollow-bearing trees. Generally, it is recommended that three (3) nest boxes are installed for every hollow-bearing tree removed. Ideally, nest boxes should replicate the hollows being replaced as close as possible due to specific species requirements as outlined below.

If the installation of nest boxes is required, the following must be considered in consultation with the Site Ecologist:

- The target species.
- The tree hollow preferences of native hollow-dependant fauna known or likely to occur in the locality.
- The sizes, types, and quantities of potential tree hollows to be removed.
- The sizes, types and quantities of tree hollows existing in adjacent areas.
- The design, materials and quantity of nest boxes required.
- Whether the nest boxes are required to fill a short-term gap in the availability of hollows (e.g., during construction) or to compensate for the long-term reduced availability of hollows.
- Monitoring and maintenance of the nest boxes.

APPENDIX B

Wildlife Hazard Management

B1 Introduction

This Wildlife Hazard Management Plan (WHMP) has been prepared to satisfy the requirements of Appendix D.7 of the Western Sydney Aerotropolis DCP Phase 2 per Table 9 below. A Wildlife Hazard Assessment has also been prepared as a separate document (ELA 2023c) to address the DCP requirements. Key findings of the assessment have been summarised below.

Table 9: Appendix D.7 DCP requirements

Appendix D.16 DCP Requirement
Applications for the following uses within the 3 km and 8 km wildlife buffers must be accompanied with a Wildlife Hazard Assessment and Wildlife Management Plan that incorporates relevant mitigation and monitoring measures: • Agricultural produce industry • Agriculture • Aquaculture • Camping ground • Garden Centre • Intensive livestock agriculture • Intensive plant agriculture • Livestock processing industry • Plant nursery • Recreation facility (outdoor) • Recreation facility (major) • Recreational area • Sewage treatment plant • Waste or resource management facility • Waste or resource transfer station • Water storage facility.
Wildlife Hazard Assessment Reports must assess the wildlife attraction risk of the land use, the design of the building and ancillary works including proposed landscaping, water facilities (incl. stormwater infrastructure), waste management, and temporary risks associated construction activity.*
The Wildlife Management Plan must respond to the findings and recommendations of the wildlife hazard assessment.
Where monitoring is required to be undertaken in accordance with the Management Plan, copies of the report are to be submitted to the airport lessee company within 28 days of completion.
A waste management plan for the operation of the use must be submitted for the following uses within the 3 km, 8 km, and 13 km buffer: • Agriculture • Agricultural produce industry • Aquaculture • Camping Grounds • Eco-tourist facility • Food and Drink Premises • Garden Centre • Hotel • Intensive plant agriculture • Intensive livestock agriculture • Kiosk • Livestock processing industry • Plant Nursery • Recreation facility (outdoor) • Recreation facility (major)
Landscaping within the Enterprise Zone and Agribusiness Zone must comply with Appendix B: Western Sydney Aerotropolis Landscape Species List, except where the property is subject to biodiversity certification conditions or identified as one of the key government commitments.*

* ADDRESSED WITHIN THE WILDLIFE HAZARD ASSESSMENT (ELA 2023c).

B2 Background

PURPOSE AND OBJECTIVES

The subject land is located (Figure 1) adjacent to the Western Sydney Airport and is wholly within the 3 km wildlife buffer zone. In accordance with Section 4.19(2)(c) of the Western Parkland City SEPP, development consent must not be granted to relevant development within 13 km of the Airport unless the development will mitigate risk of wildlife to the operation of the Airport, for example by waste management, landscaping, grass, stormwater or removal of food. This WHMP has been prepared in conjunction with a Wildlife Hazard Assessment (ELA 2023c) which assessed the potential risk of wildlife, identifying highest risk species.

Bird strike is a risk firstly for the safety of Airport operations, as well as a threat to biodiversity. There is a double incentive, and a statutory requirement, for all parties involved in development surrounding the Western Sydney Airport to minimise and manage the potential for birds and bat hazards to occur. This report summarises the highest risk species, the types of wildlife habitat available or proposed in the subject land, and a plan for:

- Implementation and induction
- Management Actions (passive management, trigger responses and regular monitoring)
- Reporting requirements
- Review and adaptive management

A key challenge in managing wildlife risk is the inherent conflicts between Airport operations and other requirements of the DCP and Precinct Plan, including Connection to Country and treatment of riparian corridors that can increase the attractiveness of wildlife habitat. It is not feasible to avoid plantings and habitat features such as waterways and wetlands altogether. These are essential for many reasons, not least of which include urban heat management and supporting regional ecosystem health. As such, at the core of this WHMP is a monitoring and reporting regime, supported by ongoing passive management actions, that will require collaboration between Ecologists, DPE and Western Sydney Airport to effectively and humanely any real or anticipated wildlife risk for the life of the Master Plan.

WILDLIFE HAZARD ASSESSMENT – RISK AND HAZARDS

Highest risk species

Species risk rankings by guild or main functional group are presented in Table 10. The main species or groups of species of most concern within the subject land, due to high hazard rankings, include:

- Megabats (Grey-headed Flying-fox, Little Red Flying-fox)
- Waterbirds (Ibis, Masked Lapwing, Cormorants, Egret)
- Pigeons/Doves (Rock Dove, Peaceful Dove, Bar-shouldered Dove)
- Large parrots (Corellas, Galahs, Cockatoos)
- Gulls (Silver Gull)
- Ducks (Chestnut Teal, Grey Teal, Pacific Black Duck, Australian Wood Duck)
- Raptors (Wedge-tailed Eagle, Little Eagle, Nankeen Kestrel)
- Australian Magpie

- Common Starling
- Owls (Eastern Barn Owl)

Thirteen (13) species that were given a high, very high or extreme risk rating and have previously been recorded within or directly adjacent to the subject land.

Megabats, or Flying-foxes, are the highest risk species (Extreme) due to their large size and flocking behaviour, and have several active camps in Western Sydney. These species are also the most recorded for strike at the nearby Sydney Airport and Bankstown Airport. No flying-fox camps are currently known from the subject land.

Other highest risk fauna include large-sized and flocking species – Australian White Ibis, Straw-necked Ibis and Rock Dove.

Lower risk species to consider

Ten microbat species were identified in the Wildlife Hazard Assessment (ELA 2023c) as having the potential to occur and use habitat in the subject land, however have been assigned a low or negligible hazard ranking. This is due to the lower consequence of strike (having smaller body size) and they don't form tight flocks. Microbats should still be considered in implementing this WHMP, considering their moderate to high probability of strike.

Some other commonly reported strike species have been assigned lower risk ratings, again because of the lower consequence score. This includes the Magpie-lark, Nankeen Kestrel, Kites, Welcome Swallow and Fairy Martin – these should still be considered for management in implementing this WHMP.

Habitat types

The subject land contains existing habitat for birds in the form of native vegetation communities and farm dams. Additional habitat proposed under the Master Plan that offers potential wildlife habitat includes:

- Street trees in accordance with Appendix B of the DCP
- On-lot landscaping using majority species from Appendix B of the DCP
- Riparian corridors, to be restored and managed under a VMP (ELA 2024, Appendix C)
- Stormwater infrastructure:
    - 13 x Storage ponds (permanent water source)
    - 19 x Wetlands (ephemeral water source with wetland vegetation)
    - 14 x Sediment basins (stormwater capture and quickly draining)
- Buildings and waste facilities

The locations of the proposed wildlife habitat elements are shown in Figure 6.

Table 10: Summary of hazard rankings for common guilds/functional groups

Hazard Rank	No. of Species	Guilds/Functional Groups																
		Megabat	Waterbird	Pigeon	Parrot	Duck	Gull	Raptor	Bush Bird	Corvid	Owl	Honeyeater	Swift	Swallow	Martin	Kingfisher	Wader	Microbat
Extreme	**5**	2	2	1														
Very High	**4**				2	1	1											
High	**22**		5	3	1	8		2	1	1	1							
Medium	**35**		6	4	7	4		5	1	6	2							
Low	**28**				8	1		6	2	2		4	*	*	2	1	1	1
Negligible	**66**								44	1	1	8	*	*	1	2		9
Total	***160***	***2***	***13***	***8***	***18***	***14***	***1***	***13***	***48***	***10***	***4***	***12***	*****	*****	***3***	***3***	***1***	***10***

Table 11: Species examples per guild/function group

Guild/Functional Group	Examples
Bush birds	Fairy-wrens, Thornbills, Gerygones, Scrubwrens, Weebills, Treecreepers, Pipits, Whistlers, Robins, Starlings, Silvereyes, Pardalotes, Finches, Sparrows, Woodswallows, Cuckoos, Quails.
Corvids	Magpies, Ravens, Currawongs, Butcherbirds, Cuckoo-shrikes, White-winged Choughs.
Ducks	Pacific Black Duck, Australian Wood Duck, Shovelers, Swans, Grebes, Coots, Moorhens, Swamphens.
Gulls	Silver Gull, Kelp Gull
Honeyeaters	Wattlebirds, Spinebills, Noisy Miner, Noisy Friar bird, other Honeyeaters.
Kingfishers	Kookaburra, Sacred Kingfisher, other Kingfishers
Megabats	Grey-headed Flying-fox
Microbats	Free-tailed Bats, Long-eared Bats, Wattled Bats, Little Forest Bat
Owls	Eastern Barn Owl, Southern Boobook, Tawny Frogmouth, other nightjars
Parrots	Cockatoos, Corellas, Galah, Cockatiel, Budgerigar, Lorikeets, Rosellas, other Parrots such as Swift Parrot.
Pigeons	Rock Dove, Peaceful Dove, Bar-shouldered Dove, Wonga Pigeon, Crested Pigeon, Spotted Turtle-Dove, Common Bronzewing.
Raptors	Wedge-tailed Eagle, other Eagles, Goshawks, Kites, Falcons, Kestrels, Hobbies.
Swifts, Swallows, Martins	Welcome Swallow, Fairy Martin, Tree Martin, Fork-tailed Swift.
Waders	Snipe, Stilts, Dotterel
Waterbirds	Ibis, Herons, Egrets, Bitterns, Snipe, Darters, Lapwings, Pelicans, Cormorants, Spoonbills.

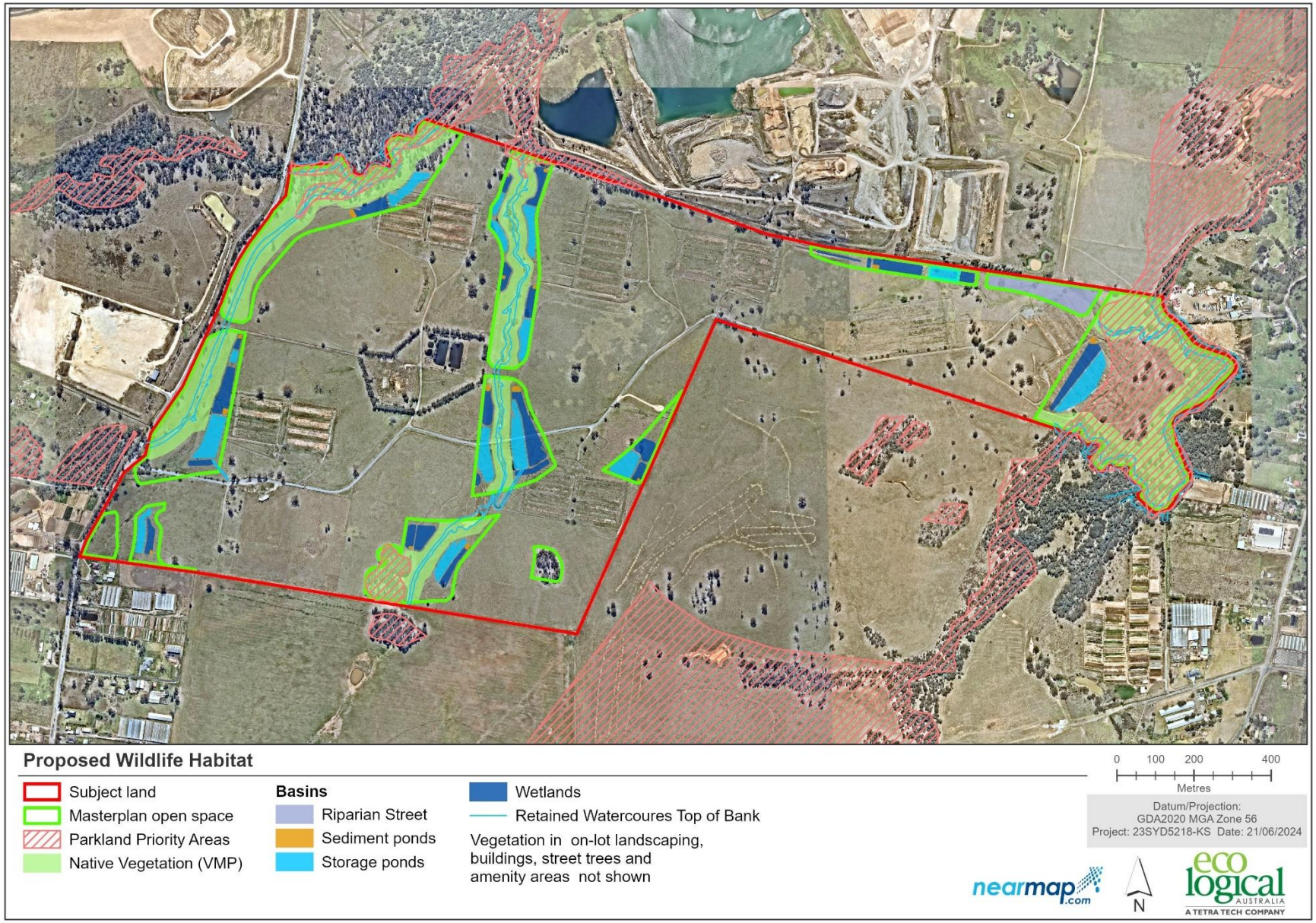


Figure 6: Proposed wildlife habitat under the Master Plan

B3 Implementation

ROLES AND RESPONSIBILITIES

The Master Plan proponent (IPG) is responsible for:

- Developing induction and training modules and records.
- Engaging a suitably qualified Ecologist(s) to complete monitoring works and reporting.
- Maintaining a record of monitoring and reporting.
- Notifying DPE, Western Sydney Airport and/or the Ecologist of hazards and risks as they arise.

Site or building managers are responsible for:

- Implementing training and inducting all staff.
- Ensuring passive management actions are undertaken within their lot/building.
- Notifying the proponent, DPE, Western Sydney Airport and/or the Ecologist of hazards and risks as they arise.

All staff, contractors and visitors are responsible for:

- Notifying the site/building manager of a management need or risk.
- Maintaining familiarity with the requirements of this Plan and the induction process.

INDUCTION AND TRAINING

All staff are to be aware of the potential wildlife hazards on site, and the contents of this WHMP. All contractors and building managers are to be aware of the level of wildlife risk on site, and must have completed an induction that includes:

- Roles and responsibilities
- Passive, trigger and monitoring actions
- An understanding of the risk ratings (Extreme, Very High, High, Medium, Low and Negligible), including what guilds and functional groups occur in each rating
- Highest risk bird/bat species to consider on site
- Lower risk but high strike species to consider
- Reporting responsibilities
- Injured or struck fauna procedures

B4 Management Actions

The WHMP consists of the following management actions:

- **Passive management actions** (Table 12) – to modify habitats or other aspects of the environment to reduce the attractiveness of habitat for risk bird and bat species;
- **Trigger, response and action plan** (Table 13) – recommended actions triggered by wildlife presence or habitat use at any time during the Project life; and
- **Regular monitoring regime** (Table 14) – to monitor and record potential wildlife hazards on a regular recommended schedule.

Passive management is ongoing for the life of the Project and should be completed on a regular basis. The majority of management actions will depend on the severity of the wildlife risk, and would require input from an Ecologist, DPE and Western Sydney Airport for appropriate future actions. Severe measures such as culling should only be considered as a last resort, and it is expected that with a regular monitoring and trigger response cycle hazards can be identified early and culling can be avoided.

Table 13 applies to triggers that may be observed during or outside of the scheduled monitoring activities.

Table 12: Passive management actions

Passive Management Type	Description	Recommended Schedule
Grass management	Regular mowing/maintenance of open space lawn.	Twice monthly
Natural food supply management	Removal of fallen fruit from any fruiting native or exotic plants from public domain street tree and native vegetation areas.	Twice monthly during peak fruiting/flowering season
Food waste management	Ensure all food waste generated by on-lot activities is managed appropriately, with closed bins emptied regularly to discourage scavengers (e.g. Ibis). All waste is to be taken off site.	Ongoing
Other waste management	Ensure waste is disposed of appropriately and bins and other waste storage facilities are maintained with closed lids or other suitable covering wherever practicable.	Ongoing

Table 13: Trigger, response and action plan

Trigger	Response	Explanation	Potential Future Action
More than 5 individuals of high risk strike species (Table 10) are observed using habitat on site. Excludes birds/bats flying over site.	Consult with an Ecologist. Complete monitoring per Table 14, if deemed necessary by Ecologist. Monitoring to be tailored to species identified and its potential habitat usage.	Strike species or high risk birds and bats may occur on site and indicate a potential risk to Airport operations. This must be addressed early to avoid a potentially greater risk if left until the regular monitoring schedule.	Provide outcomes of monitoring in a report to Western Sydney Airport and DPE as soon as practical.
A Flying-fox camp is established in the subject land.	Record approximate numbers, behaviours and species (if possible). Seek ecological advice and liaise with DPE.	Permanent or semi-permanent Flying-fox camps can be established on suitable habitat near water with appropriate food sources. Grey-headed Flying-fox is a high risk species for wildlife hazard and is a threatened species under the BC Act and EPBC Act. Little Red Flying-fox is not a threatened species but is also high risk.	Following consultation with Ecologist and DPE, the following actions may be required: • Removal of food sources to deter camp establishment • Exclusion of individuals and translocation of camp
Large numbers of Flying-fox individuals favour use of habitat in	Record approximate numbers, behaviours and species (if possible). Seek	Flying-fox can forage over large distances (up to 50 km in a night). If large numbers of Flying-fox are	Following consultation with Ecologist and DPE, actions such as removal of food

Trigger	Response	Explanation	Potential Future Action
subject land for foraging at night.	ecological advice and liaise with DPE.	observed using the site, they may pose a risk to aircraft depending on the direction of their travel and number of individuals.	sources may be required to deter Flying-fox foraging behaviours.
Colony-forming birds establish a breeding cycle that relies on habitat in the subject land.	Record approximate numbers, behaviours and species. Seek ecological advice and liaise with DPE.	Colony forming birds that are high-risk (e.g. Ibis) may require action to deter from site. Other lower-risk bird species may not require immediate action and ongoing monitoring may suffice. An Ecologist must assess the potential risk based on hazard rankings for individual species.	Following consultation with Ecologist, the following actions may be required: • Discouragement of colony using deterrents targeted to individual species. • Liaise with stakeholders to reduce availability of food supply such as and not limited to, in waste bins or landfill or by being hand fed.
Ducks (including swans) are observed breeding in ponds in the subject land.	Record species, habitat, breeding behaviour and numbers. Seek ecological advice.	The level of risk will be dependent on the size of the breeding flock. Ducks may not require deterrence or relocation if few are observed and their behaviour is not likely to interfere with aircraft operations.	If risk is deemed high, the following actions may be required on advice from the Ecologist and/or DPE: • Exclusion of ducks and protect ponds using Barriers such as bird balls or netting • Ongoing deterrence using a combination of methods such as light, noise and scare tactics such as predator kites.

MONITORING

The recommended monitoring regime includes surveys designed to establish baseline habitat usage, and identify potential wildlife hazards and trends. All surveys should be conducted in survey seasons Autumn/Winter and Spring/Summer in the same month each survey event over consecutive years. The wildlife hazard monitoring plan is provided in Table 14. The following survey methods are recommended:

- **Diurnal (daytime) 2 ha, 20-minute point search bird survey** – morning and afternoon monitoring and data collection for a minimum three consecutive days, in accordance with the timing in Table 14 for different habitat types.
- **Nocturnal (nighttime) bird surveys** – call back surveying and data collection for target bird species for a minimum of 2 hours over a minimum of two nights.
- **Diurnal Flying-fox** ground counts if deemed present (CSIRO 2011)
- **Deploy electronic recording devices** – Anabats, Songmeters and infrared motion detection cameras to record at target locations over a minimum of three nights.

Monitoring should include collection other data such as and not limited to, date, humidity, temperature, rainfall, wind description and speed, wind direction and other possible influencing factors such as adverse weather events.

Recommended survey points are to be developed by an Ecologist on site. In addition to the recommended monitoring schedule, targeted monitoring (and associated reporting) should be undertaken if and when strike species are identified on the site.

During monitoring, the Ecologist should make note of any general habitat type changes that may have occurred and potentially increased wildlife attraction. For example, a large storm event may cause the falling of branches and logs in wetland areas which provides new perching habitat for birds. Flooding events may result in long-term standing water in wetlands, which have been assumed to drain quickly, therefore changing the habitat type and availability. Findings are to be included in the monitoring repots. Consultation with DPE and/or Western Sydney Airport would provide guidance on any additional approvals or actions required (e.g. removal or dispersal of changed habitat).

Table 14: Wildlife monitoring plan

Habitat Type	Monitoring Schedule	Data Collection	Objective
Street trees	Twice annual diurnal: • bird survey • Flying-fox ground counts (if deemed present)	• Species • Number of individuals • Age for example chicks, juvenile or adult. Male or female • Habitat description (e.g. species, native, mature, flowering tree, establishment of any hollows, fissures, cracks or other habitat such as nests) • Behaviour (e.g. foraging, drinking, nesting, resting, flying, breeding behaviour, flock behaviour if flocking)	To establish and monitor usage of habitat. To establish and monitor increases or decreases in populations of higher risk species To use this data as part of an adaptive management approach to guide the modification of habitats and/or other mitigation measures.
On-lot landscaping	Twice annual diurnal: • Bird survey • Flying-fox ground counts (if deemed present)	• Species • Number of individuals • Age for example chicks, juvenile or adult. Male or female • Habitat description (e.g. species, native, mature, flowering tree, establishment of any hollows, fissures, cracks or other habitat such as nests) • Behaviour (e.g. foraging, drinking, nesting, resting, flying, breeding behaviour, flock behaviour if flocking)	To establish and monitor usage of habitat. To establish and monitor increases or decreases in populations of higher risk species To use this data as part of an adaptive management approach to guide the modification of habitats and/or other mitigation measures.
Warehouse (non-food) and offices	Twice annual: diurnal bird survey	• Species • Number of individuals	To establish and monitor usage of habitat, focusing

Habitat Type	Monitoring Schedule	Data Collection	Objective
	Deploy anabats at targeted buildings	• Age for example chicks, juvenile or adult. Male or female • Habitat description (e.g. Building type, establishment of any building damage, creating access to habitat for resting or roosting, nests, bat maternity roost) • Behaviour (e.g. foraging, drinking, nesting, resting, flying, breeding behaviour, flock behaviour if flocking) • For Anabat data collection include call type (social / foraging)	on waste storage areas and any evidence of roosting in buildings.
Riparian corridors a nd riparian street (approximately 22.59 ha)	Diurnal bird survey: • Once prior to the commencement of riparian restoration. • Twice annually after commencement of riparian restoration. • Infrared motion detection camera – 1 in each corridor Survey locations to be at least one in each corridor.	• Species • Number of individuals • Age for example chicks, juvenile or adult. Male or female • Habitat description (e.g. species, native, mature, flowering tree, establishment of any hollows, fissures, cracks or other habitat such as nests) • Behaviour (e.g. foraging, drinking, nesting, resting, flying, breeding behaviour, flock behaviour if flocking)	To establish and monitor usage of more densely vegetated riparian habitat. To establish and monitor increases or decreases in populations of higher risk species To use this data as part of an adaptive management approach to guide the modification of habitats and/or other mitigation measures.
Stormwater management facility (Wetlands) (approximately 3.47 ha)	Diurnal bird survey: • Once prior to the commencement of pond construction. • Twice annually after construction of wetlands. Electronic surveys: • All electronic equipment deployed – 1 of each type at each waterbody. Survey locations to be at least one in each wetland.	• Species • Number of individuals • Age for example chicks, juvenile or adult. Male or female • Habitat description (e.g. species, native, mature, flowering tree, establishment of any hollows, fissures, cracks or other habitat such as nests) • Behaviour (e.g. foraging, drinking, nesting, resting, flying, breeding behaviour, flock behaviour if flocking)	To establish and monitor usage of ephemeral wetland habitat by birds and bats
Water retention basins (Storage ponds) (approximately 5.65 ha)	Diurnal and nocturnal bird surveys: • Once prior to the commencement of wetland construction.	• Species • Number of individuals • Age for example chicks, juvenile or adult. Male or female	To establish and monitor usage of permanent waterbodies (storage ponds) by birds and bats

Habitat Type	Monitoring Schedule	Data Collection	Objective
	• Twice annually after construction of wetlands. Electronic surveys: • All electronic equipment deployed – 1 of each type at each waterbody. Survey locations to be at least one in each corridor.	• Habitat description (e.g. species, native, mature, flowering tree, establishment of any hollows, fissures, cracks or other habitat such as nests) • Behaviour (e.g. foraging, drinking, nesting, resting, flying, breeding behaviour, flock behaviour if flocking)	
All native and fruiting exotic vegetation (including street trees and riparian zones)	Bat surveys: • Mega bats Diurnal ground counts if deemed present • Microbats – deploy Anabats within most optimal habitat Survey locations to be at least one in each corridor.	• Species • Number of individuals • Age for example chicks, juvenile or adult. Male or female • Habitat description (e.g., species, native, mature, flowering tree, establishment of any hollows, fissures, cracks or other habitat such as nests) • Behaviour (e.g., foraging, drinking, nesting, resting, flying, breeding behaviour, flock behaviour if flocking)	To establish and monitor flying-fox and microbat roosting and foraging behaviours. To use this data as part of an adaptive management approach to guide the modification of habitats and/or other mitigation measures.

B5 Reporting Requirements

REPORTING

Routine reporting ensures site managers are equipped with the information needed to adapt hazard management activities and the WHMP when required. The following reports are to be prepared:

- **Monitoring cycle reports** are to be provided to Western Sydney Airport within 28 days of each survey described in Table 14, in accordance with the DCP.
- **Annual report** describing all monitoring activities relating to wildlife hazard. This report must provide the details of monitoring activities completed in the current period and summarise all previously collected data from previous years so that trends can be identified.
- **Ad-hoc reporting** will be required where hazards are identified in accordance with the trigger, response and action plan. Reports must include the trigger for the action, who was notified (e.g., Western Sydney Airport, Ecologist and/or DPE) and details of any follow-up actions within 2 weeks of the event.

An Ecologist may be required to provide input to the above reports. The proponent is responsible for engaging suitable staff to prepare the reports and must maintain a record of all reporting and activities.

Reporting of immediate wildlife hazard or strike is generally not expected to be required for wildlife observations within the subject land itself, being off-airport. The trigger response action plan should be implemented in this instance (Table 13).

Injured Fauna: If injured or struck fauna are observed in the subject land (regardless of cause), immediately notify the Project Ecologist and WIRES Wildlife Rescue. Even if deceased fauna is found on site, for example in the case of a Grey-headed Flying-fox, WIRES may still attend site to conduct a pup search (young may be alive nearby but unable to fly).

PERFORMANCE INDICATORS

The successful implementation of this plan may not only be measured through the reported statistics or trends. In order to measure the effectiveness of this WHMP, key (primary) performance indicators to be adopted are:

- % of correctly filled wildlife management reports
- % scheduled diurnal surveys completed
- % staff training attendance or induction completion
- % passive management actions completed on schedule

If gaps in the performance indicators are identified, management measures and reporting requirements or templates should be reviewed as often as needed, or as part of the 3-yearly review cycle (below) to ensure ongoing effectiveness.

B6 Review

To ensure the IPG Badgerys Creek WHMP remains effective and is updated to fulfil future requirements, a review of the WHMP will be undertaken at a minimum every three years. If the results of monitoring justify a review prior to this due to the ineffectiveness of mitigation measures, the WHMP will be updated as required.

A major review is recommended be completed after 9-10 years and would involve complete revision and reissue of this document and the Wildlife Hazard Assessment (ELA 2023c). This includes reviewing the likelihood of bird species, updating risk assessments, strike statistics and adaptive management actions to address shortcomings or unsuccessful aspects of this WHMP. It must also ensure compliance with all current legislation and strategic plans and adopt best-practice management actions and knowledge at the time of major review.

APPENDIX C

Vegetation Management

C1 Introduction

This VMP has been prepared to satisfy the requirements of Section 2.3 of the Western Sydney Aerotropolis DCP Phase 2, as outlined in Table 15 below.

This VMP has also been prepared in accordance with *Controlled Activities – Guidelines for Vegetation Management Plans of Waterfront Land* (DPE, 2022), based on current best practice and is consistent with the Department of Planning and Environment (DPE) Water Guidelines, including provision of indicative costs for management actions.

Table 15: Section 2.3 DCP requirements

Section 2.3 DCP Requirement
Protect and restore native and riparian vegetation to improve the connectivity, ecological condition, and ecological function of ecosystems.
Ensure that development does not adversely affect aquatic fauna.
Effectively manage indirect and ongoing impacts of development adjacent to waterways to ensure vegetation in the riparian area, aquatic fauna, water quality and quantity is protected and maintained.
Reinstate more natural conditions in highly modified waterways and riparian land while not increasing the flood risk.

SCOPE AND OBJECTIVES

The overarching objectives of the VMP is to improve ecological health and integrity, maintain and enhance habitat values within the VMP area. This document will address all issues related to the protection of existing vegetation from impacts associated with the undertaking of earthworks and any edge effects as well as undertaking bush regeneration and management actions to improve its extent, condition, and resilience.

This VMP will outline the areas to be revegetated as part of the works and recommend fully structured vegetated areas, where possible, as per *Controlled Activities – Guidelines for Vegetation Management Plans on Waterfront Land* (DPE 2022). The VMP strategy is to maintain native species cover and integrity in the riparian corridor by assisting natural regeneration through active restoration actions such as treating weed species and reintroducing native species (as plant or seed).

Instream works may be required and the VMP is to guide revegetation of disturbed areas.

This VMP covers a five-year maintenance period plus the achievement of the performance criteria. This VMP may either be implemented all at once, or staged by areas (e.g., to correspond with construction stages) as long as each stage follows the full VMP programme.

The objectives for the VMP area are summarised in Table 16.

Table 16: VMP Objectives

Objectives	Approach
Reinstate native vegetation and maintain ecological health (species composition and structure) within the establishment period and 2 year maintenance period.	• Protect existing native vegetation from development pressures • Rehabilitate and revegetate riparian corridor using appropriate native species. • Control weeds and prevent new outbreaks. • Assist in the natural regeneration of native species. • Addition of logs, rocks etc. removed from the development footprint for habitat improvement.

Objectives	Approach
Improve ecological health and integrity.	• Continue to assist natural regenerative processes. • Maintain weed control • Prevent outbreaks of priority weeds • Revegetate using appropriate native species.
Maintain a corridor for the Eastern Pygmy Possum *Cercartetus nanus*	• Protect existing native shrubs along or adjacent to riparian areas from development pressures. • Assist natural regenerative processes. • Contribute to connectivity throughout the landscape.

PREPARATION AND IMPLEMENTATION OF THIS PLAN

This VMP has been prepared and reviewed by Restoration Ecologist/s with over five years' experience in environmental management and a relevant Bachelor of Science degree. The role of the project restoration ecologist, where noted, should be undertaken by a similarly qualified and experienced restoration ecologist or bush regenerator.

Maintenance of this areas is to be carried out by an accredited Bush Regenerator (AABR) or should possess the required qualifications and experience for membership. In addition to this, they should have as a minimum, a Certificate III in Conservation & Land Management or equivalent. The contractor will need to carry out best practice bush regeneration techniques as described by Buchanan (2009).

C2 Preliminary Works

FENCING AND INTERPRETATION SIGNAGE

Temporary fencing

To prevent encroachment of livestock and civil machinery on the VMP area temporary protection fencing will be erected along the interface between the VMP area and the development area prior to bulk earthworks and development being undertaken. Temporary fencing is to be standard temporary construction fencing.

Permanent Fencing

At the end of the construction period the perimeter of the VMP area should be protected from further disturbances using permanent fencing. A standard rural fence using 1.2m high star posts with a minimum four strands of plain wire is recommended, however other fencing that serves the same purpose is acceptable. This fencing must allow for fauna movement but restrict motorised vehicle access into the VMP area.

Signage and Gates

Interpretative signage is recommended to be placed at strategic locations on the perimeter fencing to advise residents of the importance of the bushland area. Suggested text for the interpretative signage is as follows:

> *'The native vegetation within this precinct is of high habitat and biodiversity value and should be protected from damage. Activities such as firewood collection, picking of native flowers and dumping of garden waste or other forms of rubbish are prohibited.'*

Access gates will be required to allow bush regeneration contractors access to the VMP area, including with vehicles if required. Suggested gate access points are for locations where MZs meet.

SOIL AND WATER MANAGEMENT

An Erosion and Sediment Control Plan, preferably as part of a Construction Environmental Management Plan, must be established and implemented prior to the commencement of development works.

Prior to construction commencing, sediment fencing is to be installed at the base of the temporary construction fencing to prevent sediment running into the VMP area and limit the spread of weed propagules in soil sediments during the construction period.

SOIL PREPARATION

Considerable chemical change can occur between soil A and B horizons, with some B horizons highly sodic and prone to deflocculation, erosion, and water logging – which could significantly reduce revegetation works success. For this reason, excavation, shaping and re-levelling activities within the VMP area, if required, should take particular care with the removal, stockpiling and replacement of soil horizons/strata to achieve final soil profiles that are appropriate for plant survival. Works should also have plans in place to minimise and remediate soil compaction where construction works are taking place in the VMP area. Furthermore, environmental hygiene is highly recommended to prevent the introduction or the transfer of pathogens or noxious/WoNS seed. Safe Work Method Statements (SWMS) need to incorporate these measures for machinery and all pedestrians including work teams, reporters etc.

After all construction works are complete and civil construction vehicle movements are excluded then surfaces should be treated with appropriate topsoils, compost, and ameliorants to finished levels, ripped (where necessary) and cultivated to a light friable consistency. It is assumed that the Civil Contractor will undertake the soil preparation works but the exact requirements should be finalised in consultation with the suitably qualified and experienced project restoration ecologist.

For this VMP, it is assumed that earthworks will be required for any areas that will be impacted by any instream works, vegetation removal, drainage works, and other construction works within the VMP area. As such, any impacted areas will require soil preparation works as identified in Table 17, although these specifications may need to be adapted to account for local condition after construction works, soil testing, etc with signoff provided by the project restoration ecologist.

Table 17: Soil preparation work requirements

Task
Form and shape subgrade to 300mm below final levels
Install 225mm of suitable site topsoil consistent with the natural local soils
Install 75mm compost complying with AS4454-2012
Undertake soil testing and install suitable ameliorants depending on the results. An indicative example of what might be required includes: • 100g/m^2 Gypsum • 20g/m^2 microbial soil conditioner (e.g., Bactivate granular or equivalent) • 20g/m^2 quick-release multi-source 5:2:8 NPK organic granular fertiliser (e.g., Terralift TX10 + MYCORRHIZA or equivalent)

Task
• 120g/m^2 slow-release microbial native 14:1:4 NPK granular fertiliser (e.g., Troforte M Native, or equivalent)
Work in topsoil, compost, and ameliorants together at 25% volume (3 parts soil plus 1 part compost)
Install to a depth of 300mm over subgrade
Rip and cultivate until light and friable

VEGETATION CLEARANCE AND EARTHWORKS SUPERVISION

When clearing approved areas of existing native vegetation inside and outside the VMP area during construction activities, earthworks and tree removal should be undertaken with a fauna ecologist or wildlife carer present to capture and release any displaced fauna (i.e., in suitable habitat adjacent to the clearing footprint), and/or to care for injured fauna as needed.

Fallen logs and branches should be retained on-site for use within the VMP area (or potentially were needed in other bushland settings such as public reserves) as ground habitat for native fauna (see Fauna Habitat Enhancement section below). It is highly recommended that where possible, seed, and genetic material (i.e., cuttings or transplants) are collected in advance of clearance in the development footprint for use in the VMP area (as per planting or seeding recommendations). Proper planning, timelines and protocols should be established to facilitate this activity under the guidance and signoff of the project restoration ecologist.

PEST CONTROL

It is the responsibility of the landholder to remove and protect the VMP area from all livestock within the area. Pest control within the VMP area is the responsibility of the landowner, this should be undertaken by suitably qualified contractors and where required, in consultation with relevant authorities (e.g., Local Land Services, Liverpool City Council).

FAUNA HABITAT ENHANCEMENT

During vegetation removal, hollow stems or sections of trees if found, should be cut out and used as habitat in the VMP area. Likewise, large woody material (> 10 cm diameter) removed from within the development footprint/impact area can be used as habitat structures within the VMP area. Woody material provides microhabitat for fauna species, soil stability and nutrients cycling. Exotic vegetation is to be taken off-site and should not be used in habitat enhancement unless specifically advised by the project ecologist. The placement of all fauna habitat augmentation/relocation is to be carried out under the supervision and signoff of the project restoration ecologist.

C3 Vegetation Management Works

VMP MANAGEMENT ZONES

The total VMP (22.59 ha) includes four (4) management zones (MZ) shown in Figure 11 and as follows:

- MZ1 – PCT 4025 Cumberland Red Gum Riverflat Forest – Low flow channel (2.70 ha)
- MZ2 – PCT 4025 Cumberland Red Gum Riverflat Forest – Full revegetation (14.81 ha)
- MZ3 – PCT 4025 Cumberland Red Gum Riverflat Forest – Assisted Regeneration (4.44 ha)
- MZ4 – PCT 4023 Coastal Valleys Swamp Oak Riparian Forest – Assisted Regeneration (1.11 ha)

Management specification in these zones has been detailed in the following sections.

Management Zone 1 – PCT 4025 Low Flow

MZ1 (2.70 ha) comprises of degraded drainage lines within the VMP area. Some small patches of PCT 4025 are present along these drainage lines. Native species *Typha orientalis* (Bullrush) and *Phragmites australis* (common reed) were recorded along these drainage lines with sparse PCT 4025 canopy species such as *Eucalyptus tereticornis* (Forest Red Gum) growing in the bank.

Actions for this zone would focus on the installation of native species, primarily sedges, rushes, and flaxes to form thick erosion resistant root beds. Soil preparation should be undertaken as per the requirements of the Soil Preparation section above. Jute matting will be required on the banks of this zone to stabilise the topsoil and regulate the volume of runoff, in addition to reducing weed invasion.

Weed management in this zone should focus on the treatment of ephemeral weeds by deseeding, hand pulling or spraying with non-selective and non-residual herbicide to accommodate a broad range of aquatic, annual and perennial weeds such as Glyphosate 450 Xtraquatic© herbicide. For more information on specific weed control techniques, see Section C9.

It is assumed that reshaping of these drainage lines is likely to be undertaken and existing native species will be impacted. Based on this assumption 100% of this zone is expected to require revegetation.

In summary, the management aims for MZ1 are to:

- Undertake soil preparation works
- Install jute matting
- Enhance habitat features across the zone (e.g. logs, rocks)
- Install native riparian rushes and sedges
- Irrigate until establishment and ongoing as needed
- Control exotic grasses and other exotic species
- Ongoing monitoring to track progress and identify potential issues.

Figure 7: MZ1 low flow channel current condition

Management Zone 2 – PCT 4025 Full Revegetation

MZ2 (14.81 ha) consists of the batters immediately adjacent to the channel bed. This zone is predominantly pasture-improved exotic grassland with small patches of PCT 4025 along the drainage lines. These areas include exotic species such as *Cenchrus clandestinus* (Kikuyu), *Sporobolus fertilis* (Giant Parramatta Grass) *Chloris gayana* (Rhodes Grass), *Paspalum dilatatum* (Paspalum), *Plantago lanceolata* (Lamb's Tongues), *Sida rhombifolia* (Paddy's Lucerne) and *Echinochloa* spp.

Actions for this zone primarily focus on the removal of exotic grass species through slashing in Spring – Summer prior to seed set and boom spraying soon after, during active regrowth. Additionally, *Senecio madagascariensis* (Fireweed – WoNS), *Sporobolus fertilis* (Giant Parramatta Grass – State Concern) and *Eragrostis curvula* (African Lovegrass – State Concern) are to be treated. For more information on specific weed control techniques to be applied, see Appendix D.

Like Zone 1, this zone is expected to require earthworks to achieve its final form. As such, it is assumed that this zone will require 100% revegetation with appropriate tree, shrub and groundcover species needing to be reinstated.

In summary, the management aims for MZ2 are to:

- Assist natural regeneration through primary and secondary weed control
- Revegetate canopy, mid-storey and groundcovers with tube stock plantings consistent PCT 4025 *Cumberland Red Gum Riverflat Forest* and the Aerotropolis DCP (see Section C9)
- Irrigate until established and ongoing as needed
- Enhance habitat features across the zone (e.g. logs, rocks).
- Control of exotic grasses and other exotic species
- Ongoing monitoring to track progress and identify potential issues

Figure 8: MZ2 current condition

Management Zone 3 – PCT 4025 Assisted Regeneration

MZ3 (4.44 ha) is moderate condition PCT 4025 *Cumberland Red Gum Riverflat Forest*. This zone consists of a native upper and midstory with a mixed native and exotic understorey. The groundcovers are mostly dominated by exotic species, predominantly *Tradescantia fluminensis* (Trad).

Actions for this zone would focus on the removal of groundcover weeds, removal of WoNs *Anredera cordifolia* (Maderia Vine), *Asparagus asparagoides* (Bridal Creeper) and *Lycium ferocissimum* (African Boxthorn) and other Regional Priority Weeds such as *Araujia sericifera* (Moth Vine), *Cestrum parqui* (Green Cestrum), *Cirsium vulgare* (Spear Thistle), *Ligustrum sinense* (Chinese Privet) and *Olea europaea subsp. cuspidate* (African Olive). The removal of these weeds will promote opportunities for natural regeneration.

Primary weed control might include the 'cut and paint' method on woody weeds and hand pulling or stem-scraping vines and creepers. Herbaceous species such as *Tradescantia fluminensis* (Trad) will need to be sprayed with a glyphosate-based herbicide, formulated for use near waterways (e.g., Roundup Biactive®). For more information on specific weed control techniques to be applied, see Appendix D.

It is likely that some natural regeneration will occur following primary and secondary weed control. As such, a nominal revegetation proportion of 50% revegetation but this will need to be assessed at the end of primary weed control.

In summary, the management aims for MZ3 are to:

- Assist natural regeneration through primary and secondary weed control.
- Revegetate canopy, mid-storey, and groundcovers with tube stock plantings consistent PCT 4025 *Cumberland Red Gum Riverflat Forest* and the Aerotropolis DCP (see Section C9).
- Irrigate until established and ongoing as needed.
- Enhance habitat features across the zone (e.g., logs, rocks).
- Ongoing monitoring to track progress and identify potential issues.

Figure 9: MZ3 PCT 4025 current condition

Management Zone 4 – PCT 4023 Assisted Regeneration

MZ4 (1.11 ha) consists of PCT 4023 *Coastal Valleys Swamp Oak Riparian Forest* in moderate condition. The canopy is in good condition consisting of native *Casuarina glauca* however the mid storey was absent and the groundcover is dominated (> 70% cover) by weed species with few native species present (< 5%).

Actions for this zone would focus on the removal or reduction of groundcover weeds *Cenchrus clandestinus* (Kikuyu), *Polygonum aviculare* (Wireweed), *Stellaria media* (Chickweed), *Lepidium africanum* (Common Peppercress), *Cirsium vulgare* (Scotch Thistle), *Sida rhombifolia* (Paddy's Lucerne), *Verbena bonariensis* (Purple top) and *Plantago lanceolata* (Lamb's Tongues), to promote opportunities for native regeneration. The exotic grasses will need to be repeatedly brushcut and sprayed using a non-selective herbicide (e.g. Roundup Biactive©). Care must be taken whilst spraying around non-target natives to avoid accidental overspray. For more information on specific weed control techniques to be applied, see Section C10.

The allelopathic nature of the *Casuarina glauca* means that native growth will be suppressed under its canopy. Therefore, it is not expected that extensive natural regeneration will occur following primary and secondary weed control however, revegetation will also be unlikely to be successful. As such, a nominal planting of 10% of the zone has been allocated, assumed to be required mostly on the edges of the site or to fill in gaps where mature trees die.

In summary, the management aims for MZ4 are to:

- Assist natural regeneration through primary and secondary weed control.
- Revegetate mid-storey and groundcovers with tube stock plantings consistent with PCT 4023 *Coastal Valleys Swamp Oak Riparian Forest* and Aerotropolis DCP (Section C9).
- Enhance habitat features across the zone (e.g. logs, rocks).
- Ongoing monitoring to track progress and identify potential issues.

Figure 10: MZ4 PCT 4023 current condition

PRIMARY AND SECONDARY WEED CONTROL

All weeds, including woody weeds will require treatment. Secondary and maintenance weed control will be required following revegetation. During these works, care must be taken to avoid any off-target damage to the natural regeneration of native species. Care should also be taken around waterways, hand pulling or spraying with a non-selective and non-residual herbicide will accommodate a broad range of aquatic, annual and perennial weeds such as Glyphosate 450 Xtraquatic© herbicide.

Primary weed control is to be undertaken prior to any revegetation works and would include initial treatment of woody weeds, vines, exotic shrubs, and groundcovers. Species which should be a focus for control include WoNS, State Priority and Regional Priority weeds – predominantly Madeira Vine (*Anredera cordifolia*), Bridal Creeper (*Asparagus asparagoides*), African Boxthorn (*Lycium ferocissimum)* and Fireweed (Senecio madagascariensis)). Woody weeds such as African Olive (*Olea europaea subsp. Cuspidata)*, Green Cestrum (C*estrum parqui*) – and African Boxthorn (*Lycium ferocissimum)* can be effectively treated using the 'cut and paint' method. Creeper and climber weed control can vary depending upon the species however for most species' seedlings can be hand removed, while mature plants can be chemically controlled using the stem-scrape method or spot foliage sprays. In addition, other species considered problematic in bushland settings which are present at this site are herbaceous weeds such as wandering trad (*Tradescantia fluminensis)*, flax-leaf fleabane (*Conyza bonariensis)* and fireweed (*Sida madagascariensis).* Where isolated, herbaceous weeds can be hand removed or spot spray ed, they can also be slashed then sprayed when regrowing in areas of higher concentrations.

Annual and perennial grasses where isolated or in low concentrations should be hand removed or spot sprayed. Larger patches of annuals can be slashed after flowering but prior to seed set, and sprayed during the vigorous growth that follows. Perennials (e.g., African Lovegrass *Eragrostis curvula* and Kikuyu grass *Pennisetum clandestinum*) should be slashed prior to seed production in spring or summer, then the regrowth herbicide sprayed 2-3 weeks later when it is actively growing and approximately 10cm in length.

MAINTENANCE

All management zones will require ongoing management for the two VMP maintenance period to treat weed regrowth or weed emergence from the soil seed bank. Maintenance will be undertaken at a higher frequency during peak growing seasons (i.e., spring and summer), and with less frequency during cooler periods (i.e., autumn and winter). Maintenance may also include (where appropriate) actions that assist native regeneration such as through the restriction of excessive grass biomass (e.g., slashing or burning), through niche seeding, or transplanting.

REVEGETATION

All zones are expected to require some level of revegetation. Revegetation works will include planting of native groundcover, grass shrub and canopy species. All revegetation will be using tube stock and Hiko / Viro cells. The revegetation area within each management zone is shown in Table 18.

Propagation material for planting stock should be sourced from pre-clearance collections, nearby locations, or from within the catchment region following current Florabank Guidelines (Harrison et al. 2021). Appropriate planning and timelines for sourcing propagation and planting material should be allowed for. Suggested species in Section C9 should be used as a general guide but other suitable species may be used if required.

Covering of the soil, either by mulch or jute matting, will be required in areas of revegetation to reduce erosion, aid in the suppression of exotic species germination and increase soil organic matter content.

Where required, mulch will should be laid to a depth of 100mm. Where possible it is preferred to use site obtained mulch from the clearance of native vegetation, although if this is not possible mulch can be externally sourced adhering to Australian Standards (i.e., AS4454 (2012): Compost soils conditioners and mulches). In addition, mulch should be comprised of un-composted wood preferably wood waste, with a particle size of about 15 mm to 40 mm with no fines and good air-filled porosity. Mulch should not contain and weed seeds, nor be derived from diseased trees or from any part of the tree lower than 1m above the ground. It is assumed site access will permit the delivery of mulch within 30m of the VMP area and spread via bobcat.

Jute matting will be required in areas of higher inundation of the site during high rainfall periods, particularly within Zones 1 and 2. Jute matting must be comprised of 100% biodegradable jute fibres with a minimum weight of 680g/m2 (~6mm thickness). Jute must be pegged with at least 3x150mm pins per m2 and each roll overlapped by 100mm.

Planting densities for each management zone are provided in . A recommended planting list is provided in Section C9. Revegetation will be done with species consistent with vegetation communities that would naturally occur in Cumberland Red Gum River-Flat Forest. All plantings are to be sourced from local provenance stock as per the Florabank guidelines (Mortlock 2000).

Table 18: Revegetation assumptions

Zone	Sum of Area (m^2)	Revegetation Area (%)	Revegetation Area (m^2)	Jute (%)	Jute Area (m^2)	Mulch (%)	Mulch Area (m^2)
MZ1: PCT4025 Low Flow	27,007	100	27,004	100	27,007	0	-
MZ2: PCT4025 Full Revegetation	148,064	100	148,064	100	148,064	0	-
MZ3: PCT4025 Assisted Regeneration	44,434	75	33,325	50	16,663	50	16,663
MZ4: PCT4023 Assisted Regeneration	11,095	10	1,110	0	-	100	1,110
TOTALS	**230,600**	**-**	**209,506**	**-**	**191,734**	**-**	**17,772**

Table 19: Revegetation Densities

Zone	Revegetation Area (m²)	Revegetation Densities (m²)				TOTALS
		Tree	Shrub	Herbs / Scramblers	Sedge / Grass	
MZ1: PCT4025 Low Flow	27,007	-	-	-	6.00	**162,043**
MZ2: PCT4025 Full Revegetation	148,064	1/50	1/10	1.00	3.00	**610,0243**
MZ3: PCT4025 Assisted Regeneration	33,325	1/50	1/10	1.00	3.00	**137,300**
MZ4: PCT4023 Assisted Regeneration	1,110	1/50	1/10	1.00	3.00	**4,571**
TOTALS	**209,506**	**3,650**	**18,250**	**182,499**	**709,539**	**913,938**

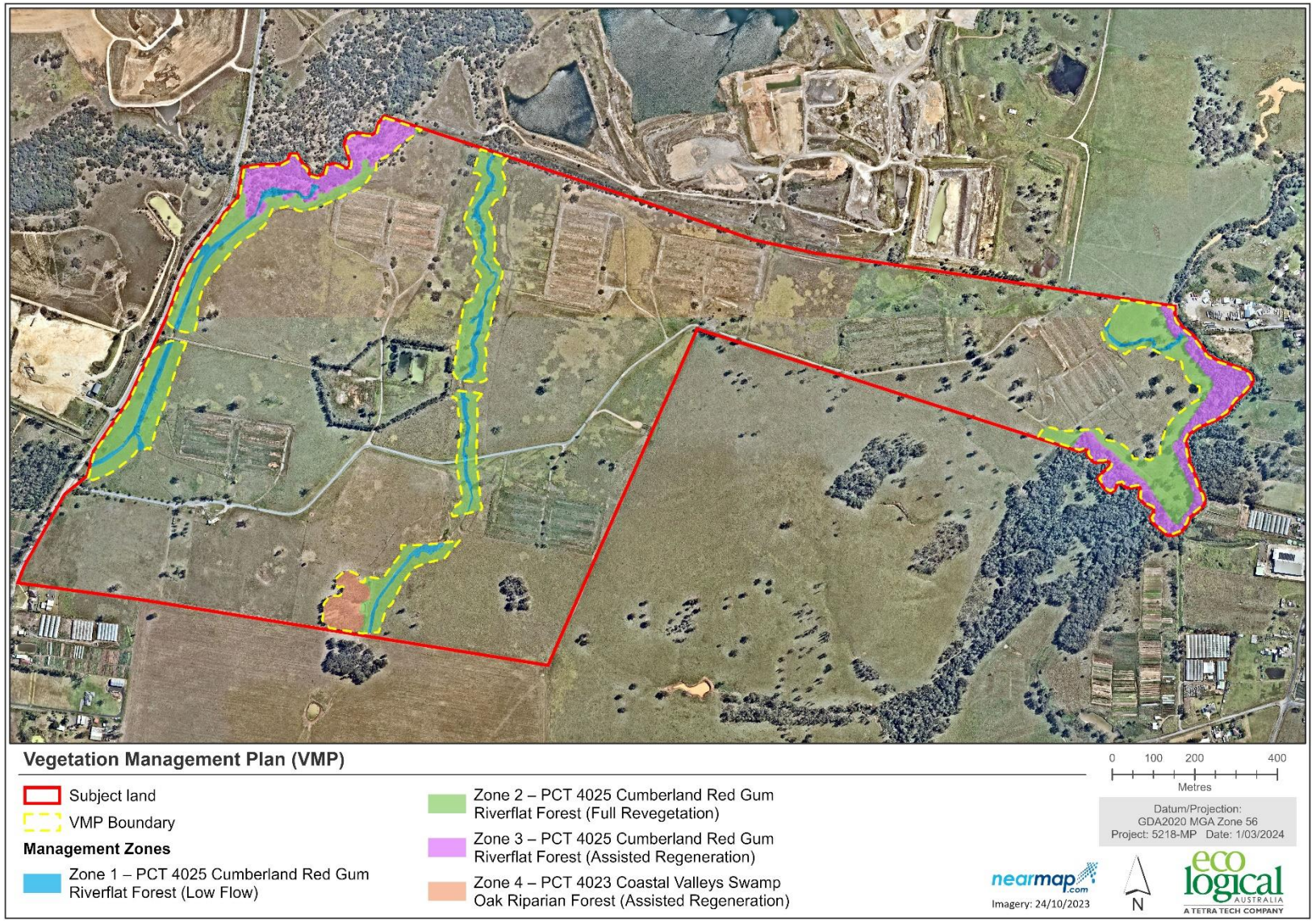


Figure 11: VMP management zones

C4 Implementation and Schedule

STAGING

VMP implementation will occur in conjunction with the development of each stage – as per the Staging Plan shown in section C7 of this document. The watercourse in the central riparian corridor forms the boundary between stages. In these stages, VMP implementation should include the inner 50% of the riparian zone on the opposite bank to ensure watercourse stabilisation.

IMPLEMENTATION SCHEDULE

Each staged implementation of the VMP will be managed with one year establishment period and a two-year maintenance period.

An indicative implementation schedule has been provided in Table 20.

Key	Civil construction activities
	Vegetation management works

ADAPTIVE MANAGEMENT

An adaptive management approach will be implemented that enables the successful contractor to learn from and respond to successful and unsuccessful techniques used on the site. In its simplest form, this may include the substitution of species identified in the planting table or for undertaking advanced direct seeding techniques in place of manual planting techniques for revegetation works.

The success of the works will be determined by meeting the performance criteria identified in Table 21**.**

Contractors have the flexibility to implement different techniques to those specified here providing that performance criteria are met. Any major departures from the VMP or proposed changes to performance criteria must be approved in writing by the relevant consent authority.

VMP MANAGEMENT AFTER MAINTENANCE PERIOD (IN PERPETUITY)

The VMP is to be re-evaluated upon completion of all works described within this VMP and at least every five years after that to ensure the site meets the performance criteria. Surveys at these inspections is to include both priority and environmental weed populations. Areas that do not conform to the performance criteria at the completion of works are required to be rehabilitated using the methods outlined within this VMP and may result in the extension of the VMP management period for a further two years.

TRAINING

Construction staff will require training/inductions into the requirements of this VMP, including the location and requirements of tree/vegetation protection zones.

Table 20: Implementation Schedule

Task	Preliminary works	Establishment								Maintenance											Ongoing
		Year 1				Year 2				Year 3				Year 4				Year 5			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
Preliminary Works																						
Site mark out/fencing																						
Earthworks																						
Soil preparation																						
Habitat enhancement																						
Revegetation																						
Seed collection, cleaning, storage																						
Site Preparation																						
Jute Matting / Mulch																						
Tubestock, supply and install																						
Replacement tubestock, supply and install																						
Irrigation																						
Weed control																						
Establishment: Years 1-2																						
Maintenance - Years 3-5																						
Associated Works																						
Monitoring & Reporting	Baseline																					

C5 Monitoring and Reporting

It is recommended that the bush regeneration contractor (or the landowner) should be responsible for monitoring restoration actions and vegetation change over time. The aim of monitoring is to measure the effectiveness of restorative actions. Information gained through monitoring (and its reporting) will help to identify actions that have or have not been successful, and ideally highlight reasons for success or failure. It may also identify non-conformance of VMP recommendations. Information derived from monitoring will also inform adaptive management decisions. Finally, monitoring and the reporting of findings will be important in quantifying the various costs related to restoration and weed management and to determining the overall cost effectiveness of the VMP.

Monitoring will entail a combination of photo monitoring and vegetation surveys. To establish a benchmark for performance, monitoring must be implemented prior to works commencing, and thereafter on an annual basis until project completion to track change against the baseline and towards meeting performance criteria. Monitoring results must be presented in an annual progress report.

PHOTO MONITORING

Photo monitoring points should be set-up using a permanent reference point to provide a visual reference of changes in the vegetation. Photo monitoring to include:

- Set up 18 photo monitoring points within the VMP area as follows:
    - MZ1: 4 photo points
    - MZ2: 8 photo points
    - MZ3: 2 photo points
    - MZ4: 4 photo points
- Mark the photo point with a six-foot star picket and map the location and bearing of each photo point.
- Take a digital photo of each photo point with the whole length of the star picket visible in the photo to act as a reference point; and
- Organise the digital photos logically with each image labelled with a unique reference number indicating the location of the photo point, the direction of the photo and the date the photo is taken.

Photo-monitoring points should be installed in the preliminary period to allow for the establishment of the baseline photos. Photo point locations should be representative of the zone based on current condition and planned VMP works. If works are staged then a minimum of two photo points for each zone in each stage will be required, and potentially more depending on proportion.

VEGETATION SURVEYS

Quadrat data points will be set up within the VMP area to monitor changes in the vegetation through time. The quadrat data forms the baseline for monitoring against the performance criteria for the duration of the VMP. Floristic plot data is to be collected including species richness, cover, and abundance in a 5 x 5 m minimum sized quadrat.

Vegetation quadrats will be required at all photo points. If works are staged then a minimum of two vegetation quadrats for each zone in each stage will be required, and potentially more depending on proportion.

PROGRESS REPORTS

Progress reports are to be provided every 6-months through Year 1 and 2 then annually until the completion of the project. This reporting includes the implementation of the monitoring actions specified in Section C5 and a description of the works that have been undertaken. These reports will be submitted to the consent authority. Reports will include at a minimum:

- The time period the report relates to.
- Qualifications and experience of contractors.
- Certification of seed and local provenance stock.
- A summary of works carried out within the period including:
    - Date and time of site visits.
    - Works completed on the site at each visit.
    - A table detailing total person hours for each task carried out on-site.
    - Methods of weeding undertaken and details of herbicide use.
    - Numbers of tube stock planted if applicable.
    - Methods implemented for Assisted Natural Regeneration.
- Photo monitoring results to date.
- A description of any problems encountered in implementing the works outlined in this VMP and how they were overcome.
- Any observations made, including new plant species recorded (native and weed species), comments on rates of regeneration and any problems which impact on the implementation of the VMP.
- If applicable, the results of the implementation works in relation to the relevant performance criteria.

PERFORMANCE CRITERIA

The performance criteria are detailed in Table 21**.**

Failure to meet these performance criteria will mean that the maintenance period will be extended until they are achieved. Therefore, maintenance must continue until the consent authority agrees that the objectives and performance criteria have been met and the maintenance period has concluded. The author of this VMP, or an equally qualified and experience person, must prepare a statement certifying the compliance of the performance criteria at the end of the VMP period.

If monitoring indicates that the VMP tasks are not resulting in achievement of the performance criteria, the task program will be revised. Ingham Property Group Pty Ltd and the bush regeneration contractor, with approval from the consent authority, can adapt these criteria as required in response to the success of rehabilitation works.

The following performance criteria will need to be achieved in perpetuity:

- Across the VMP area, minimum 85% survival rate of each species planted and a maximum 5% weed cover.
- No patches of the VMP greater than 2 m x 2 m without any surviving natives or with significant erosion present.
- No infiltration by exotic lawn species into the VMP area.
- No dumped garden waste or rubbish within the VMP area.

Table 21: Performance Criteria for all zones

Management Zone	Year 1	Years 2-3	Years 4-5
All Zones	• Commencement of all tasks outlined in the VMP or evidence of planning for their implementation. Civil construction works: • All construction and sediment fencing installed. • Information signage installed. • Removal and disposal of all exotic vegetation throughout the VMP, completed under the supervision of a qualified ecologist. • All earthworks completed under the supervision of a suitably qualified and experienced restoration ecologist or bush regenerator. • All rubbish and debris and debris are removed. • All soil preparation works completed to provide suitable conditions for revegetation. Vegetation management works: • Revegetation is to be undertaken with a minimum of 40% of the benchmark levels for species diversity provided in Table 22. • 85% survival of vegetation and no areas with more than 2mx2m without surviving native plants. • Maintenance replanting is to replace plants by the same species or where that species is unavailable with the same growth form (i.e., tree for tree etc.) and must not decrease species diversity. Any new species must be from the community being emulated and of local provenance. • Treatment of any new weed infestations. • No woody weeds present capable of producing seed. • No erosion or sedimentation beyond the boundary of the development lot. • Monitoring and reporting undertaken in accordance with Section C5.		
All Zones	< 5% priority weed cover < 10% overall weed cover	< 10% priority weed cover < 20% overall weed cover	< 2.5% priority weed cover < 5% overall weed cover
MZ1, MZ2 & MZ3	Native vegetation groundcover > 20%	Native vegetation groundcover > 50%	Native vegetation groundcover > 70%
MZ4	Native vegetation groundcover > 20%	Native vegetation groundcover > 30%	Native vegetation groundcover > 40%

Table 22: PCT benchmark conditions

PCT ID	PCT Common name (community) (BioNet 2022)	Species richness			Cover (%)		
		Canopy	Shrub	Ground cover	Canopy	Shrub	Ground cover
4025	Cumberland Red Gum Riverflat Forest	4	8	22	21	21	74
4023	Coastal Valleys Swamp Oak Riparian Forest	4	8	22	21	21	74
3320	Cumberland Shale Plains Woodland	5	8	32	52	15	73

C6 Costs

The indicative cost of implementation for establishment plus the 2 year period is approximately **$6,250,000** exclusive of GST and CPI. An indicative annual costing timeline for establishment to Year 2 is provided in Table 23. Rates and costs are based on typical commercial rates. Assumptions that have been made regarding the estimation of costs have been outlined below.

Note that the indicative cost does not take account of the changes in cost that would occur as a result of staging the implementation of the VMP as noted in section C4 and C7 of this document.

PRELIMINARY WORKS

Vegetation Clearing and Soil Preparation

It is assumed that all soil preparation works and any vegetation clearing associated with construction works with the VMP area will be undertaken by the civil contractor under the supervision of the project restoration ecologist. No costs have been provided in this VMP for the soil preparation, vegetation clearing or supervision by a suitably qualified and experienced restoration ecologist.

Seed Collection

Budget for the collection of seed has been included as a separate task. This is an indicative figure and does not consider seasonal and annual climatic variation which may increase or decrease the efficiency of seed collection. If further seed collection works are required, this may be an addition cost.

VEGETATION MANAGEMENT WORKS

Site Preparation

This cost is based on works to be undertaken after the completion of any construction activities in the riparian corridor, including soil preparation works. Costs assume access for vehicles/trucks related to restoration actions (e.g., spraying out of revegetation areas, installation of jute/mulch). If access is not available, this may increase the cost of this item. Prior to mulching and revegetation, all exotic vegetation must be treated and controlled to an acceptable standard.

Weed Control Techniques

Bush regeneration contractors will implement the weed control treatments identified in this VMP. These works have been estimated to cost **$2,500** for a team of four bush regenerators, including a supervisor, per day. The cost of bush regeneration works includes the cost of herbicide, vehicles and equipment which are required to implement the VMP.

Specific weed control techniques are available in Section C10.

Revegetation Treatments

Bush regeneration contractors will implement the revegetation treatments identified in this VMP. Tube stock costs have been budgeted at an estimated **$5.50** per tree and shrub including planting and **$2.00** per herb, grass, sedge, and groundcover including planting.

A total of approximately **915,000** plants are assumed to be required to achieve the densities identified in the VMP, plus a 10% rate for replacement plantings to be installed over Year 2 and 3.

Monitoring and Reporting

Monitoring and reporting can be undertaken either by the bush regeneration contractor or by the project ecologist.

This includes:

- The initial set up of the photo points and conducting the baseline surveys at the end of the preliminary period.
- Preparing monitoring reports, including photo points and vegetation surveying biannually in Year 1 and 2 and annually until the end of Year 5.

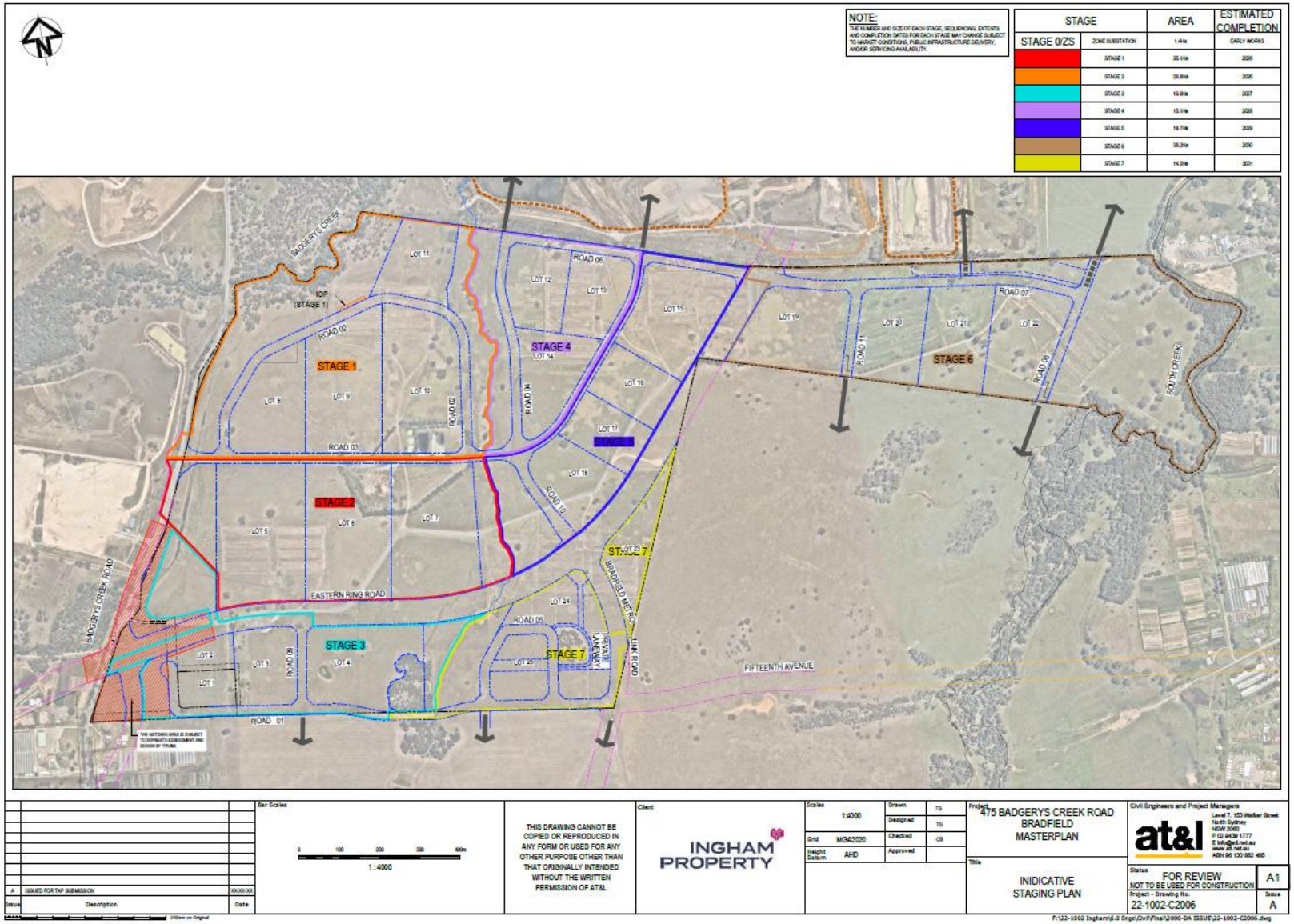
PEST CONTROL

Pest control requirements/costs over the 2-year maintenance period is difficult to predict and as such have not been included in the costings. The requirement for, and level of pest control will be assessed in the monitoring reports and an approach determined in consultation with Liverpool City Council.

Table 23: Indicative costing of VMP Implementation

Task	Preliminary works	Establishment		Maintenance			TOTALS
		Year 1	Year 2	Year 3	Year 4	Year 5	
Revegetation							
Seed collection, cleaning, storage	$45,697	$ -	$ -	$ -	$ -	$ -	**$45,697**
Site Preparation	$ -	$157,129	$ -	$ -	$ -	$ -	**$157,129**
Jute Matting / Mulch	$ -	$1,696,263	$ -	$ -	$ -	$ -	**$1,696,263**
Tubestock, supply and install	$ -	$1,904,524	$ -	$ -	$ -	$ -	**$1,904,524**
Replacement tubestock, supply and install	$ -	$ -	$142,839	$142,839	$ -	$ -	**$285,679**
Irrigation	$ -	$188,555	$10,475	$10,475	$ -	$ -	**$209,506**
Weed Control							
Establishment - Year 1-2	$ -	$443,905	$363,195	$ -	$ -	$ -	**$807,100**
Maintenance - Years 3-5	$ -	$ -	$ -	$364,522	$273,391	$273,391	**$911,304**
Associated Costs							
Disbursements	$ -	$44,390	$36,319	$36,452	$27,339	$27,339	**$171,840**
Monitoring & Reporting	$7,206	$14,413	$14,413	$7,206	$7,206	$7,206	**$57,650**
TOTALS	**$52,903**	**$4,449,180**	**$567,241**	**$561,495**	**$307,937**	**$307,937**	$6,246,692

C7 Landscape Plan and Staging


NOTE:
THE NUMBER AND SIZE OF EACH STAGE, SEQUENCING, EXTENTS AND COMPLETION DATES FOR EACH STAGE MAY CHANGE SUBJECT TO MARKET CONDITIONS, PUBLIC INFRASTRUCTURE DELIVERY, AND/OR SERVICING AVAILABILITY.
STAGE
STAGE 0/ZS
ZONE SUBSTATION
AREA
ESTIMATED COMPLETION
EARLY WORKS
STAGE 1
STAGE 2
STAGE 3
STAGE 4
STAGE 5
STAGE 6
STAGE 7
BADGERYS CREEK
IOP (STAGE 1)
ROAD 02
ROAD 06
ROAD 07
ROAD 11
ROAD 08
ROAD 03
ROAD 04
ROAD 10
ROAD 09
ROAD 01
EASTERN RING ROAD
BRADFIELD METRO LINK ROAD
FIFTEENTH AVENUE
SOUTH CREEK
LOT 1
LOT 2
LOT 3
LOT 4
LOT 5
LOT 6
LOT 7
LOT 8
LOT 9
LOT 10
LOT 11
LOT 12
LOT 13
LOT 14
LOT 15
LOT 16
LOT 17
LOT 18
LOT 19
LOT 20
LOT 21
LOT 22
LOT 24
LOT 25
Bar Scales
1:4000
THIS DRAWING CANNOT BE COPIED OR REPRODUCED IN ANY FORM OR USED FOR ANY OTHER PURPOSE OTHER THAN THAT ORIGINALLY INTENDED WITHOUT THE WRITTEN PERMISSION OF AT&L
Client
INGHAM PROPERTY
Scales
1:4000
Drawn
TS
Designed
TS
Checked
CB
Approved
Grid
MGA2020
Height Datum
AHD
Project
475 BADGERYS CREEK ROAD BRADFIELD MASTERPLAN
Title
INIDICATIVE STAGING PLAN
Civil Engineers and Project Managers
at&l
Level 7, 153 Walker Street North Sydney NSW 2060
P 02 9439 1777
E info@atl.net.au
www.atl.net.au
ABN 96 130 882 405
Status
FOR REVIEW
NOT TO BE USED FOR CONSTRUCTION
A1
Project - Drawing No.
22-1002-C2006
Issue
A
A ISSUED FOR TAP SUBMISSION XX-XX-XX
Issue Description Date

C8 Existing Vegetation

	Botanical Name	Common Name
NATIVE VEGETATION SPECIES	*Alternanthera denticulata*	Lesser Joy-weed
	Angophora subvelutina	Broad-leaved Apple
	Aristida ramosa	Purple Wire Grass
	Aristida vagans	Threeawn Speargrass
	Bursaria spinosa	Sweet Bursaria
	Carex appressa	Tall Sedge
	Casuarina glauca	Swamp She-oak
	Centipeda minima	Spreading Sneeze-weed
	Clematis glycinoides	Headache Vine
	Cynodon dactylon	Bermuda grass
	Cyperus gracilis	Slender flat sedge
	Einadia nutans	Climbing Saltbush
	Eucalyptus eugenioides	Thin-leaved stringybark
	Eucalyptus tereticornis	Forest red gum
	Juncus usitatus	Common rush
	Lachnagrostis filiformis	Pacific Bent Grass
	Melaleuca decora	Ironwood myrtle
	Melaleuca styphelioides	Prickly-leaved Paperbark
	Melaleuca viminalis	Weeping Bottlebrush
	Microlaena stipoides	Weeping Grass
	Persicaria decipiens	Slender Knotweed
	Phragmites australis	Common Reed
	Themeda triandra	Red Oat Grass
	Typha orientalis	Bullrush
WEED SPECIES	*Anredera cordifolia*	Madeira vine
	Araujia sericifera	Common moth vine
	Asparagus asparagoides	Bridal Creeper
	Avena barbata	Bearded oat
	Axonopus fissifolius	Common carpetgrass
	Bidens pilosa	Coblers Pegs
	Briza subaristata	Quaking Grass
	Bromus catharticus	rescuegrass
	Cenchrus clandestinum	kikuyu grass
	Cestrum parqui	Green Cestrum
	Chloris gayana	Rhodes grass

Botanical Name	Common Name
Cirsium vulgare	Spear thistle
Conyza bonariensis	Flaxleaf fleabane
Cortaderia selloana	Pampas grass
Cyperus eragrostis	Umbrella sedge
Echinochloa spp.	
Eragrostis curvula	African lovegrass
Galium tricornutum	Three-horned bedstraw
Gamochaeta calviceps	Narrowleaf purple everlasting
Hypochaeris radicata	Catsear
Lepidium africanum	Common peppercress
Ligustrum sinense	Chinese privet
Lolium perenne	Perennial ryegrass
Lycium ferocissimum	African boxthorn
Olea europaea subsp. *cuspidata*	African olive
Modiola caroliniana	Red-flowered Mallow
Paspalum dilatatum	paspalum
Phalaris aquatica	Canary grass
Phytolacca octandra	Inkweed
Polygonum aviculare	Wireweed
Plantago lanceolata	Ribwort
Ranunculus sceleratus	Celery buttercup
Rumex obtusifolius	Broad-leaved dock
Senecio madagascariensis	Fireweed
Sida rhombifolia	Paddy's Lucerne
Solanum pseudocapsicum	Madeira Winter Cherry
Solanum sisymbriifolium	Sticky nightshade
Sonchus oleraceus	Common sow-thistle
Sporobolus africanus	Parramatta Grass
Stellaria media	Chickweed
Sporobolus fertilis	Giant Parramatta Grass
Symphyotrichum subulatum	Aster-weed
Tradescantia fluminensis	Wandering Trad
Trifolium repens	White clover
Verbena bonariensis	Purpletop
Vulpia ciliata	Fringed Fescue

C9 Recommended Planting Scheme

Strata	Botanical Name	Common Name	Western Sydney Aerotropolis Landscape Species List	MZ1	MZ2	MZ3	MZ4
Tree	*Acacia parramattensis*	Parramatta Wattle	Y		X		X
	Acacia parramattensis	Parramatta Wattle	Y		X		X
	*Angophora floribunda^*	Rough-Barked Apple	Y*		X		X
	*Angophora subvelutina^*	Broad-Leaved Apple	Y*		X		X
	Casuarina cunninghamiana subsp. *cunninghamiana*	River Oak	Y		X		X
	Casuarina glauca	Swamp Oak	Y			X	
	*Corymbia maculata^*	Spotted Gum	Y*		X		X
	*Eucalyptus amplifolia^*	Cabbage Gum	Y*		X	X	X
	*Eucalyptus baueriana^*	Blue Box	Y*		X		X
	*Eucalyptus fibrosa^*	Red Ironbark	Y*		X		X
	*Eucalyptus moluccana^*	Gum-Topped Box	Y*		X		X
	*Eucalyptus tereticornis^*	Forest Red Gum	Y*		X		X
Shrub	*Acacia implexa*	Hickory Wattle			X		X
	Breynia oblongifolia	Coffee Bush	Y		X		X
	Bursaria spinosa	Sweet Bursaria	Y		X	X	X
	Dodonaea viscosa	Sticky Hop Bush	Y		X		X
	Indigofera australis	Austral Indigo	Y		X		X
	*Melaleuca decora^*	White Feather Honeymyrtle			X	X	X
	*Melaleuca linariifolia^*	Flax-Leaved Paperbark			X	X	X
	*Melaleuca nodosa^*	Prickly Leaved Paperbark			X	X	X
	*Melaleuca styphelioides^*	Prickly Paperbark			X	X	X

Strata	Botanical Name	Common Name	Western Sydney Aerotropolis Landscape Species List	MZ1	MZ2	MZ3	MZ4
	Ozothamnus diosmifolius	Sago Bush			X	X	X
	Trema tomentosa var. *aspera*	Peach-Leaf Poison-Bush	Y		X		X
Grass and Sedge	*Austrostipa ramosissima*	Stout Bamboo Grass			X		X
	Bothriochloa macra	Red Grass	Y+		X		X
	Carex appressa	Tall Sedge	Y+	X	X	X	X
	Carex inversa	Knob Sedge		X			
	Chloris truncata	Windmill Grass	Y+		X		X
	Chloris ventricosa	Blue Star Grass			X		X
	Cymbopogon refractus	Barbed Wire Grass	Y+	X	X		X
	Cyperus gracilis	Slender Flat-Sedge		X			
	Dichelachne micrantha	Shorthair Plumegrass	Y+	X	X		X
	Echinopogon caespitosus	Bearded Grass			X		X
	Echinopogon ovatus	Common Hedgehog Grass	Y		X		X
	Eleocharis acuta	Common Spike-Rush		X			
	Eleocharis cylindrostachys	-		X			
	Elymus scaber	Common Wheat Grass			X		X
	Entolasia marginata	Bordered Panic	Y		X		X
	Entolasia stricta	Wiry Panic	Y		X		X
	Eragrostis benthamii	Common Lovegrass			X		X
	Eragrostis brownii	Browns Lovegrass			X		X
	Eragrostis leptostachya	Paddock Lovegrass			X		X
	Fimbristylis dichotoma	Forked Fimbry			X		X
	Gahnia aspera	Rough Saw-Sedge	Y+	X		X	

Strata	Botanical Name	Common Name	Western Sydney Aerotropolis Landscape Species List	MZ1	MZ2	MZ3	MZ4
	Imperata cylindrica	Blady Grass	Y+	X	X	X	X
	Isolepis inundata	Swamp Club Rush	Y+	X		X	
	Juncus usitatus	Common Rush	Y+	X	X	X	X
	Lachnagrostis aemula	Blown Grass			X		X
	Lachnagrostis filiformis	Pacific Bent Grass			X		X
	Lepidosperma laterale	Variable Sword Sedge			X		X
	Lomandra filiformis	Wattle Mat Rush	Y+	X			
	Lomandra longifolia	Spiny Head Mat Rush	Y+		X		X
	Lomandra multiflora subsp. *multiflora*	Many Flowered Mat Rush	Y				
	Microlaena stipoides	Weeping Grass	Y+		X	X	X
	Oplismenus aemulus	Australian Basket Grass	Y+		X	X	X
	Oplismenus imbecillis	-			X		X
	Paspalidium distans	Shotgrass		X	X		X
	Phragmites australis	Common Reed		X			
	Poa labillardierei var. *labillardierei*	Common Tussock-Grass	Y+		X		X
	Rytidosperma tenuius	Purplish Wallaby Grass					
	Sporobolus creber	Slender Rat's-Tail Grass					
	Sporobolus virginicus	Seashore Dropseed					
	Themeda triandra	Kangaroo Grass	Y+	X	X	X	X
Forb	*Ajuga australis*	Austral Bugle			X		X
	Alisma plantago-aquatica	Mad-Dog Weed		X			
	Arthropodium milleflorum	Pale Vanilla Lily	Y		X		X
	Asperula conferta	Common Woodruff	Y		X		X

Strata	Botanical Name	Common Name	Western Sydney Aerotropolis Landscape Species List	MZ1	MZ2	MZ3	MZ4
	Brachyscome angustifolia	Rock Daisy			X		X
	Brunoniella australis	Blue Trumpet	Y		X		X
	Centella asiatica	Asiatic Pennywort		X	X	X	X
	Commelina cyanea	Scurvy Weed	Y		X		X
	Cotula australis	Bachelor's Buttons			X		X
	Dianella longifolia	Greater Blueberry Lily	Y+	X	X	X	X
	Dichondra repens	Kidney Weed	Y	X	X	X	X
	Einadia hastata	Berry Saltbush	Y		X		X
	Einadia nutans	Climbing Saltbush	Y		X		X
	Einadia trigonos	Fishweed			X		X
	Eremophila debilis	Winter Apple			X		X
	Geranium solanderi	Native Geranium			X		X
	Goodenia hederacea	Ivy Goodenia	Y		X		X
	Myriophyllum variifolium	Varied Water-Milfoil		X			
	Persicaria decipiens	Slender Knotweed		X		X	
	Sida corrugata	Corrugated Sida			X		X
	Sigesbeckia orientalis subsp. *orientalis*	Common St Pauls Wort			X		X
	Solanum prinophyllum	Forest Nightshade			X	X	X
	Tetragonia tetragonioides	Warrigal Greens			X		X
	Triglochin procera	Water Ribbons		X			
	Veronica plebeia	Creeping Speedwell	Y		X		X
	Viola hederacea	Ivy-Leaved Violet	Y		X		X
	Wahlenbergia communis	Tufted Bluebell	Y		X		X

Strata	Botanical Name	Common Name	Western Sydney Aerotropolis Landscape Species List	MZ1	MZ2	MZ3	MZ4
	Wahlenbergia gracilis	Australian Bluebell			X		X
	Wahlenbergia stricta	Australian Bluebell	Y		X		X
Climbers and scramblers	*Clematis aristata*	Old Man's Beard			X		X
	Clematis glycinoides	Headache Vine	Y		X		X
	Desmodium varians	Slender Tick Trefoil	Y		X		X
	Eustrephus latifolius	Wombat Berry	Y		X		X
	Geitonoplesium cymosum	Scrambling Lily	Y		X		X
	Gynochthodes jasminoides	Sweet Moorinda	Y		X		X
	Hardenbergia violacea	Purple Coral-Pea	Y		X		X
	Pandorea pandorana subsp. *pandorana*	Wonga Wonga Vine	Y		X		X
	Parsonsia straminea	Monkey Rope	Y		X		X
	Passiflora herbertiana subsp. *herbertiana*	Native Passionfruit	Y		X		X
	Smilax glyciphylla	Sweet Sarsaparilla	Y		X		X
	Stephania japonica var. *discolor*	Snake Vine	Y		X		X

* = ONLY WITHIN 3KM WILDLIFE BUFFER, WHERE SUPPORTED BY ECOLOGIST REPORT, CONFIRMING LANDSCAPE DESIGN MINIMISES WILDLIFE ATTRACTION
+ = SUBJECT TO MONITORING AND/OR MAINTENANCE PLAN TO ENSURE POTENTIAL FOR WILDLIFE ATTRACTION IS MANAGED.
^ = PROVIDE NECTAR AND HOLLOWS WHICH WOULD HELP SUPPORT THE EASTERN PYGMY POSSUM *CERCARTETUS NANUS*

C10 Techniques and Specifications

WEED CONTROL

Weed control involves a combination of mechanical, physical, and chemical techniques to remove the weeds and prevent regrowth. Weed control will be undertaken across the entire zone. A selection of the best suited weed control method within the site depends on several factors, including:

- The species or combination of weeds being targeted.
- The density of weeds present.
- Resources available (time, labour, equipment, and finances).
- Weather condition on the day.

WEED CONTROL TECHNIQUES

Details of specific weed control techniques to be used such as cut-and-paint, scrape-and-paint, herbicide-spraying, and hand weeding are provided in Brodie (1999). The principles of bush regeneration and techniques to trigger natural regeneration are to be in accordance with the Bradley Method and other techniques described in Buchanan (2009). Management techniques for different types of weeds are provided below.

Annual Grasses

Annual grasses should be hand removed or spot sprayed where isolated or in low concentrations. Larger patches of annual grasses may be slashed/brush cut in late spring to early summer, after flowering, but prior to seed set. For most species, slashing/brush cutting prior to late spring through to early summer will promote vigorous growth and should not occur. However, some annual grasses can grow and produce seed at any time of the year dependent on climatic conditions such as high rainfall and warm temperatures. Monitoring of annual species should be undertaken and if new growth occurs, the same treatment will be applied to the new growth to prevent seed production. Individual plants should be hand removed, bagged, and disposed of appropriately offsite.

Perennial Grasses

Perennial grasses, such as *Sporobolus africanus* (Parramatta Grass) or *Pennisetum clandestinum* (Kikuyu), will be hand removed where isolated or in low concentrations. Larger patches may be slashed prior to seed production in spring or summer (depending on the growth cycle of the species) and the regrowth spot-sprayed 2-3 weeks later when it is actively growing and approximately 10 cm in length. Monitoring of these species will occur and if new seed production occurs, the same treatment will be applied again as required. However, slashing will not reduce the presence of exotic grasses on its own and must always be combined with targeted removal to reduce densities and allow for native regeneration. Individual plants should be hand removed, bagged, and disposed of at a registered green waste facility.

Woody Weeds

Primary control of trees such as *Olea europaea ssp. cuspidata* (African Olive) and *Ligustrum lucidum* (Privet) following vegetation removal, should be implemented by using the cut and paint or drill and fill

method using a non-selective herbicide. The most appropriate method to be used depends on the size of the individual to be removed and will be determined by the bush regeneration contractor. Primary weed control should use techniques that will not encourage flushes of secondary weed growth. All seedlings of woody weeds will be hand pulled or spot-sprayed with a non-selective herbicide.

Follow up treatment of woody weeds, including *Ligustrum lucidum* (Broad leaf privet) will be controlled by the cut and paint or drill and fill method using a non-selective herbicide.

The most appropriate method to be used depends on the size of the individual to be removed and will be determined by the bush regeneration contractor. Primary weed control should use techniques that will not encourage flushes of secondary weed growth. All seedlings of woody weeds will be hand pulled or spot-sprayed with a non-selective herbicide.

Creepers and Climbers

The control of exotic vines should be managed by skirting at chest height then spraying the target once it is on the ground. This should be done with a suitable dicot specific herbicide.Follow up treatments will be necessary and should be done as the germinating vines are still saplings. The target species on site included, but are not limited to, *Araujia sericifera* (Moth vine).

The control of creepers varies depending on the species. For the most part, seedlings will be hand pulled, while mature plants can be controlled by the stem-scrape method or spot spraying using a non-selective herbicide. The precise method to be used will be determined by the bush regeneration contractor depending on the species, size, and reproductive status of the individual. All vegetative material removed should be bagged, removed from site, and disposed of appropriately.

Herbaceous Weeds

Where individual plants of herbaceous weeds, including *Conyza bonariensis (Flax-leaf Fleabane)* will be hand pulled prior to flowering. Where large swaths of these species occur, they will be sprayed using a non-selective herbicide. If high densities of mature stands occur, weeds may be slashed first using a brush cutter and any subsequent regrowth sprayed. Regular monitoring of these species will be required to prevent seed production. All vegetative material that is pulled out and has the potential to regrow if deposited on ground will be bagged and removed from site.

Management of Weed Waste

All weed propagules, especially priority weeds, will be bagged and disposed of as directed by legislation at facility licensed to receive green waste. All weed waste without propagules will be composted onsite in small unobtrusive piles.

Herbicide Use

The use of herbicide to control weeds should be carefully considered. Herbicide must only be used for the purpose described on the product label, as per the NSW *Pesticides Act 1999.* Herbicide use should assess potential long-term impacts of the technique, including whether the proposed works address the source of the weed infestation. However, herbicide application forms an important and useful

component of an integrated weed management approach and can be the most appropriate method for the control and eventual eradications of some weed species.

Herbicide use should occur during the active growing season for plants to encourage the chemical uptake into the plant. The selection of herbicides should also consider the type of weed and the location. Where non-selective herbicides are required for use, glyphosate is the most suitable. A glyphosate-based herbicide, formulated for use near waterways, will be used if works require herbicide application near waterways, a (e.g., Roundup Biactive®).

Broad-leaf selective herbicide may be used as per the NSW Weed Control Handbook (DPI 2018). However, this type of herbicide is extremely toxic to aquatic life and must not be used in, or adjacent to, waterways.

Registration and records must be kept in accordance with the NSW *Pesticides Regulation 2017*.

REVEGETATION WORKS

Revegetation has the dual aim of both re-establishing the original native vegetation community at the site and reducing erosion along the length of the riparian corridor, which will carry greatly increased peak flows due the increased run-off from the hard surfaces created by the associated residential development. Any plantings should consist of local provenance stock. Planting of Hiko for trees and shrub species and Hiko or Viro cells for grasses and other groundcover species is the preferred method. Planting should be done via a low impact method such as hand digging or hand auger. The holes dug for each plant should be at least 1.5x the width and 2x the depth of the root ball. Fertiliser should be added to each hole dug as per the label specifications. Water crystals or wetting agents should be added to each plant hole. This will increase the water holding capacity of the soil and reduce watering schedules. Initial irrigation of the plantings is essential to ensure that the soil forms around the root ball and air pockets are removed. This will be required unless sufficient rainfall (approx. 10mm) occurs on the day of planting.

Tree guards should be installed on each tree or shrub to protect seedlings from extreme weather (frosts and heat), herbivorous grazing and herbicide drift during maintenance works. Bio-degradable tree guards are recommended to protect the seedlings. Following the revegetation works, irrigation needs to be undertaken for at least 8 weeks following planting to ensure the establishment of the plants. The level of irrigation will be determined by rainfall and temperature experienced at the planting site.

A temporary irrigation system should be installed to assist in the establishment of vegetation. Timing of the planting of these areas will need to take into consideration surrounding civil works and erosion/sediment control requirements, these areas will not be planted until earthworks have been completed. A minimum rate of attrition of 10% is to be expected and should be allowed for. Approval for water supply is to be obtained if necessary.

Mulch can be derived from vegetation removed from the development area, if available. Alternately, mulch should be comprised of un-composted wood (preferably wood waste), with a particle size of 15 mm to 40 mm, with no fines, and good air-filled porosity. Mulch should not contain any weed seeds, nor be derived from diseased trees or from any part of the tree lower than 1 m above the ground. Mulch, where required, should be installed to a depth of 100 mm.

Jute matting, where required, must be comprised of 100% biodegradable jute fibres with a minimum weight of 680g/m2 (~6 mm thickness). Jute must be pegged with at least 3 x 150 mm pins per m^2, and each roll overlapped by 100 mm.

Seed Collection

For the growth of the plants used in the revegetation works, seed must be collected from local provenance species. Groundcovers, shrubs, and trees should be collected as within close proximity (i.e., <20km) to the site. However, soil type, climate and aspect of the collection site(s) should also be considered. Native grasses typically have much larger dispersal mechanisms and are to be collected from within the Sydney basin.

Where species identified in this VMP cannot be sourced, they may be substituted for other species as identified by Tozer (2003). Species must be substituted with species of a similar form, e.g., trees for tree, grasses for grasses, etc. Only wild native species are to be used. Plants are not to be substituted with horticultural varieties under any circumstances.

Record keeping of seed collection and planting locations are to follow the Florabank guidelines (Mortlock, 2000). A Section 132C licence under the NSW *National Parks and Wildlife Act 1974* will be required to undertake seed collection works. The bush regeneration contractor is responsible for recording this information and providing it to SW.

BUSH REGENERATION CONTRACTORS

In accordance with Condition 34(d) of the Conditions of Consent, the rehabilitation and revegetation requirements detailed in this VMP must be implemented under the supervision of the supervising Ecologist or Bush Regenerator.

The supervising Bush Regenerator should be a member of AABR or should possess the required qualifications and experience for membership. In addition to this, they should have, as a minimum, a Certificate III in Conservation & Land Management or equivalent. The contractor will need to conduct best practice bush regeneration techniques as described by Buchanan (2009).

A flexible approach to this site is recommended since techniques may need to be changed or modified to suit site conditions. This approach is consistent with adaptive management and allows the contractor to develop and build on site knowledge whilst implementing this VMP. Monitoring will assist in the development of the VMP actions in subsequent years.

HYGIENE PROTOCOLS

To avoid introducing soil pathogens / diseases, in particular *Phytophthora cinnamomi* (Root rot disease), onto site a hygiene protocol should be undertaken as per the guidelines developed by the Royal Botanic Gardens in '*Best Practice Management Guidelines for Phytophthora cinnamomi with the Sydney Metropolitan Catchment Management Authority.'*

For Bush Regenerators all tools and boots should be washed down and thoroughly cleaned of soil / mud using a solution of water and disinfectants prior to undertaking works onsite. All machinery should be thoroughly cleaned of all soil / mud / debris prior to working within the VMP area.

APPENDIX D

Weed Eradication

D1 Introduction

This WEMP has been prepared to satisfy the requirements of Appendix D.48 of the Western Sydney Aerotropolis DCP Phase 2, as outlined in Table 24 below.

Table 24: Appendix D.48 DCP requirements

Appendix D.16 DCP Requirement
A Weed Eradication and Management Plan is required on land adjacent to areas avoided for biodiversity and are to include specific measures to manage the spread of weeds in threatened ecological communities and threatened flora and fauna populations (including land protected by the Cumberland Plain Conservation Plan).
Subdivision design and bulk earthworks must minimise the likelihood of weed dispersion and include measures to eradicate priority weeds in accordance with the Council's weed policy.
The Plan is to be prepared by an ecologist and is to outline the weed control measures during and after construction.
The Plan should include: • An inventory of all Weeds of National Significance, Priority and Environmental weeds on the development site and a site plan indicating the weed infestations with reference to the species and degree of infestation or density (i.e., low, medium, high, or expressed as a percentage). • A treatment schedule in tabulated form, specifying for each species: • The method of treatment (mechanical or herbicide use) • The rates of application methods of all herbicide treatments • The primary control treatment to achieve a minimum 70% kill and a secondary control treatment to achieve a minimum 90% kill. • The timing of treatments. • An annual weed maintenance program indicating the methods to be implemented to maintain a weed-free site. • Details of any methods of disposal of weed material. • Details of monitoring and reporting requirements.

SCOPE AND OBJECTIVES

The overall objective of this WEMP is to manage weeds within the development footprint, in the period prior, during and after civil works and to manage weeds within adjacent areas set aside for biodiversity in accordance with Appendix D.48 of the Western Sydney Aerotropolis DCP Phase 2.

This WEMP will guide the management and maintenance of WoNS, priority weeds and significant weeds for the Liverpool City Council (LCC) by:

- Identifying WoNS, Priority weeds and significant weeds onsite
- Documenting the area and degree of weed infestations within the site (i.e., low, medium, high)
- Identifying control methods for each weed type
- Identifying ongoing management and monitoring processes to reduce the potential for the weeds to regenerate or be re-introduced to the site.
- Identifying ongoing management processes to control weeds if introduction or re-introduction occurs.

D2 Management

WEED MANAGEMENT

Weed management within the subject land should be undertaken prior to construction. This should be undertaken by suitably qualified persons holding a minimum qualification of TAFE Cert II in Conservation & Land Management. In addition, team leaders should have, as a minimum, a Certificate III in Conservation & Land Management or equivalent and an AQF 3 Chemical user's certificate. All herbicides should be used as per the Australian Pesticides and Veterinary Medicines Authority (APVMA) approved chemical label and at the associated dilution and application rates.

All weeds on-site are required to be controlled as outlined in Section D5 In addition, WoNS and/or Priority weeds for Liverpool City Council LGA must be managed in accordance with their Biosecurity and regional strategic requirements. Refer to Sections D7 and D8 for a complete list of priority weed species declared within the Liverpool City Council LGA and legal requirements for each species.

As part of the Masterplan the development area will be cleared, and bulk earthworks undertaken to prepare the land for development. This will include removing the topsoil and stockpiling on site. As such, weed control is focused on processes to reduce the likelihood of transport of weeds to and from the site on vehicles and in soil. This has been broken up into three stages, prior, during and after civil works as shown in Table 25. It is recommended that these controls are implemented in addition to the ongoing management processes outlined below. Given the seasonal nature of weed germination and growth, and the potential delay between approval and implementation of this WEMP, it is recommended that a qualified ecologist or bush regenerator be onsite immediately prior to any vegetation clearance or weed eradication to identify any additional significant weeds on site and provide recommendations for their management. If there is a significant delay in construction a further site inspection is required. Additional species-specific treatment methods are provided in Section D5.

Table 25: Weed management stages and actions

Stage	Management Actions
Prior to Civil Works	Weed control must commence prior to civil works commencing to allow for repeated treatments to exhaust the seed bank
	Control of woody weeds should be undertaken through the cut and paint method
	Control of pasture grasses should be undertaken through repeated slashing with machinery and herbicide spraying
	Control of woody weed regrowth and / or priority weeds (e.g., WONS, environmental) should be undertaken by herbicide spraying
	All vegetative material and weed propagules including from woody weeds should be disposed of appropriately at an off-site facility Woody weed material can be mulched and remain on site, stockpiled separately from native mulch
During Civil Works	Machinery is to be washed down before entering and leaving the site
	Mitigation measures including erosion control should be employed within the site to prevent movement of weed seed into or out of the site
	Topsoil should be removed as part of the earthworks only where there is minimal weed invasion. If significant weeds are present, then management of weeds as per above must be undertaken. Topsoil may be stockpiled on site and must be kept weed free.

Stage	Management Actions
	All stockpiles must be located >50m from riparian lands and areas of native vegetation.
	Any fill used on-site must be 'clean' fill free of weed propagules. The site supplying the fill (either onsite or off site) is to be inspected prior to the transportation of any fill material. This includes the inspection of any topsoil on site that is to be stockpiled. If invasive weeds are present within the fill material, the weeds are to be treated prior to fill transportation. Treatment must take into consideration the likelihood of seed being present in the soil and include measures to reduce the potential for transported seed to germinate (e.g., through stockpiling time or using pre-emergent herbicides). The inspection is to be undertaken by a qualified person holding a minimum qualification of TAFE Cert III in CLM. Written certification that the fill is 'clean' from weeds should be obtained prior to transportation.
	The area receiving fill, including stockpiles, must have sediment fences installed around the perimeter of the fill placement areas.
	Monitoring of fill, including stockpiles will be required fortnightly for a period of three months after fill has been transported. The frequency of the monitoring is designed to reduce the potential for weeds to reproduce and re-establish. A brief report is to be submitted following each site visit outlining the date of the inspection, weeds observed, and treatment action required. Monitoring is to be undertaken by a suitably qualified and experienced person holding a minimum qualification of TAFE Cert III CLM.
After Civil Works	Engage a qualified ecologist or bush regenerator holding a minimum qualification of TAFE Cert III in CLM to undertake regular maintenance inspections to ensure weeds do not re-establish and set seed. If weeds are recorded on site they must be treated within five days.
	Undertaken ongoing management of the site, as specified in **Section D3** until lot ownership is transferred.

WEED MANAGEMENT PROGRAM

A weed management program will be required during all stages of the civil works, especially focusing on expected peak weed growing seasons. The frequency of weed control / maintenance will depend on weed persistence and seasonal fluctuation in growth (e.g., less frequent requirement in the cooler months). It is expected that maintenance works following will be required at least bi-monthly during the peak growing seasons and quarterly in cooler periods.

Ongoing management actions that area required include:

- Treatment of any regrowth from primary treated weed species
- Control of subsequent growth of other weed species
- Reducing the potential for the spread of weeds to and from the subject land

These actions must be implemented through all stages of the civil works. These processes include but are not limited to the following:

- Any weeds recorded on site are to be treated in appropriate manner within five days of their presence being reported. It is recommended that IPG establish an agreement with a suitable service provider to provide responses within these timeframes.
- Wet areas within the site are monitored for weed occurrence monthly (including aquatic weeds) and weeds identified treated within the reporting period.

- Herbicide spraying in proximity to waterways is to only use herbicide formulated for this purpose (e.g., Roundup© Bioactive™) and is conducted with care to avoid unnecessary damage to native species.
- Where weed material from WoNS, or priority weeds and/or soil contaminated with those species is found onsite, it will be removed from the site in sealed plastic bags and disposed of offsite at an appropriately licenced waste disposal facility.
- Regular (at minimum monthly) surveys and weed treatment of the project boundaries and carriageways (e.g., pathways and access roads).

D3 Weed Management Specification/Standards

Weed controls involve a combination of mechanical, physical, and chemical techniques to remove unwanted weeds and prevent their regrowth. Selecting weed control methods may depend on several factors including:

- The weed species or combination of weed species being targeted
- Weed density
- Available resources (e.g., time, labour, equipment, and finances)
- Weather conditions (windy, hot, rain)
- Seasonal timing (e.g., winter/summer)
- Contractor knowledge and/or expertise.

WEED CONTROL TECHNIQUES

Weed control techniques are varied (e.g., Brodie 1991, Buchanan 2000 and Muyt 2001). General approaches for different weed groups/types are provided below. Management techniques for different types of weeds are provided in Section D9.

ANNUAL GRASSES

Where isolated or in low concentrations annual grasses (e.g., Fringed Fescue (*Vulpia ciliata)*, Prairie Grass (*Bromus catharticus*) and Bearded Oats (*Avena barbata*)) should be hand removed or spot herbicide sprayed. Larger patches can be slashed / brush-cut after flowering in spring to early summer, but prior to seed set, to prevent seed re-entering the soil seed bank, and boom sprayed. For some species, cutting can promote vigorous regrowth and retreatment may be required to prevent seed production. Some annual grasses continue to grow to produce seed at various times of the year if conditions are suitable (e.g., high rainfall and warm temperatures). Monitoring of annual species should be undertake and if new growth occurs, the same treatment will be applied to the new growth to prevent seed production. Individual plants should be hand removed, bagged, and disposed of appropriately offsite.

PERENNIAL GRASSES

Where isolated or in low concentrations perennial weedy grasses (e.g., African Lovegrass (*Eragrotis curvula*), Kikuyu grass (*Pennisetum clandestinum*) and Paspalum (*Paspalum dilatatum)*) should be hand removed or spot herbicide sprayed. Larger patches can be slashed / brush-cut prior to seed production in spring or summer and the regrowth herbicide boom sprayed 2-3 weeks later when it is actively growing and approximately 10 cm in length. Outcomes should be monitored and if plants survive and begin setting seed the same treatment will be required.

Note*:* Slashing will not remove exotic grasses, only reduce their biomass, for removal, treatment such as chemical, mechanical, or other (e.g., biological) must be used.

Actions should be monitored to identify if secondary weed flushes require treatment. All vegetative material removed should be bagged, removed from site, and disposed of appropriately.

WOODY WEEDS

Treatment of weeds such as African Olive (*Olea europaea subsp. cuspidata*), Gren Cestrum (*Cestrum parqui*) and African Boxthorn (*Lycium ferocissimum*) can be achieved with various techniques. Where plants are too numerous or too large for hand / mechanical removal, chemical herbicides can be applied using techniques such as stem injections ('cut and paint', 'drill and fill'), foliar sprays, gas or splatter gun (e.g., low volume of high concentration), rope or wick application (as per Control techniques using herbicides (nsw.gov.au)). Choosing the most appropriate technique will depend on various factors including site conditions, topography, population size, density, and resources available.

Actions should be monitored to identify if secondary weed flushes required treatment. All vegetative material removed should be bagged, removed from site, and disposed of appropriately.

CREEPERS AND CLIMBERS

Creeper weed control (e.g., Bridal creeper (*Asparagus asparagoides*) and Moth Vine (*Araujia sericifera*)) can vary depending on the species. For the most part, seedlings should be hand removed, while mature plants can be chemically controlled using the stem-scrape method or spot foliage sprays. The choice of method to be used will depend on the species being treated, plant size, plant reproductive status and population density. All vegetative material removed should be bagged, removed from site, and disposed of appropriately. Actions should be monitored to identify if secondary flushes of weeds required treatment.

HERBACEOUS WEEDS

Where isolated or in low concentrations herbaceous weeds (e.g., Wandering Trad (*Tradescantia fluminensis*), Cobblers Pegs (*Bidens pilosa*), Broad-leaved dock *(Rumex obtusifolia*), Spear thistle (*Cirsium vulgare*), Flax-leaf Fleabane (*Conzya bonariensis*), Flatweed (*Hypochaeris radicata*), Fireweed (*Sida madagascariensis*) and Paddy' Lucerne (*Sida rhombifolia*)) can be hand removed or spot sprayed. Where population densities occur at a height above native ground-layer species, chemical wick or rope wipers can be used to selectively treat weeds. Herbaceous weeds can also be slashed to prevent flowering and seeding, and regrowth treated chemically (e.g., spot spray, or mounted wick application). All vegetative material removed should be bagged, removed from site, and disposed of appropriately. Actions should be monitored to identify if secondary flushes of weeds require treatment.

WATER WEEDS

Water weeds must be controlled prior to any dam dewatering procedures that would lead to the transport or spread of these species. Where isolated, weeds can be hand removed. For larger infestations, chemical applications through foliar spray may require the procurement of a permit from the NSW Department of Primary Industries (DPI) (NSW WeedWise). Vegetative material produced must be treated and disposed of securely.

MANAGEMENT OF WEED WASTE

Weed material containing propagules (especially priority weeds) should be securely bagged and disposed of as directed by regulation (e.g., facilities licenced to receive green waste).

HERBICIDE USE

Weeds should ideally be treated with herbicides during their active growing season for optimal chemical uptake into the plant. The selection of herbicides should consider the type of weed being treated or its stage of growth (e.g., grass/broadleaf, seedling/mature) and there are a range of products available that treat weed selectively or non-selectively. Some herbicides are toxic to aquatic life and must not be used in, or adjacent to, waterways (see *Noxious and environmental weed control handbook* (DPI 2010) and all chemicals used should be applied only as specified as per chemical label or Off label permit No. 9907. Usage records must be kept in accordance with *NSW Pesticide Regulation 2009*.

WEED CONTROL CONTRACTORS

All weed management works will be undertaken by suitably qualified and experienced bush regeneration contractors (e.g., members of the Australian Association of Bush Regenerators or fulfil the membership criteria). In addition, team leaders should have, as a minimum, a Certificate III in CLM or equivalent and a current AQF 3 Chemicals user's certificate. A flexible approach to weed management is recommended as techniques may need to be changed or modified to suit conditions. This approach is consistent with adaptive management and allows contractors to develop and build on site knowledge whilst implementing this WEMP.

D4 Monitoring and Reports

Monitoring and reporting are important for tracking the effectiveness of management actions and overall project success. It is recommended that the bush regeneration contractor or project lead should be responsible for this task. Information gained through monitoring (and its reporting) will help to identify actions that have or have not been successful, and ideally highlight reasons for success or failure. Monitoring and the reporting are also important for quantifying the various costs related to weed management and to determining the overall cost effectiveness of this WEMP.

MONITORING REPORTS

Reporting will be required at the completion of each of the three main stages (prior to, during and after civil works are completed) and during each stage, monthly. Monthly site walkover inspections are required to monitor weed management progress. In addition, multiple permanent monitoring photo points should be established as visual gauges of actions and change. Following walkover inspections, a report will be prepared and should include:

- Outline of management objectives for the period
- compliance with performance criteria
- works carried out, including weed species/zone targeted
- approximation of time spent on tasks
- notes on chemicals/herbicides used (including quantity, dilution rate and other relevant details)
- other weed controls used
- relevant observations (e.g., occurrence of new weed species, rates of weed regeneration)
- description of problems encountered (and if/how they were overcome)

- if required, maps showing weed distribution and density.

A final report should be prepared at the completion of development activities.

PERFORMANCE CRITERIA

Outcomes and progress of weed control actions should be assessed, reviewed, and reported against performance criteria outlined in Table 26.

Table 26: WEMP performance criteria

Stage	Criteria
Prior to civil works	All significant weeds identified on-site by a qualified ecologist or bush regenerator prior to any vegetation clearance or weed eradication.
	Commencement of all tasks outlined in the WEMP or evidence of planning for their implementation.
	No woody weeds present on-site
	No weeds present in areas of topsoil translocation
	Evidence of weed seed bank suppression
	No WoNS or Priority Weeds present on-site
	Exotic material appropriately disposed off-site
	Machinery washed down before and after entering site
During civil works	Soil and water management actions implemented
	Proportion of weed cover no greater than 15% cover
	Fill used on site is 'clean' (i.e., free of weed seed and contamination)
	Development area including stockpiles and sediment basins monitored for weeds
	Weeds recorded on site in Civil Works zones are actively managed within 5 days
	No WoNs or Priority weeds present on-site
	Exotic material appropriately disposed off-site
	Machinery washed down before and after entering site
After civil works	Soil and water management actions implemented
	Proportion of weed cover no greater than 15% cover
	Development area including stockpiles and sediment basins monitored for weeds
	Weeds recorded on site in Civil Works zones are actively managed within 5 days
	Machinery washed down before and after entering site
	No WoNS or Priority weeds present on-site

D5 Weed Species and Treatment Table

Scientific Name	Common Name	Degree of Infestation	Primary Treatment (Kill 70%)	Timing	Secondary Treatment (90% Kill)	Ongoing Management
Anredera cordifolia	Madeira Vine	Low	Hand removal or 'scrape and paint' with 'neat Glyphosate 360g/L	September to April, best during active growth; bulbils and tubers can be removed at any time and fall year-round.	Spot spray with Glyphosate 360g/L at a rate of 1:100 with the addition of a surfactant (i.e., Pulse) to the rate of 1L: 200L if water	Seeds are extremely viable. Regular monitoring required to manage seedlings.
Araujia sericifera	Moth Vine	Low	Hand removal or 'scrape and paint' with 'neat Glyphosate 360g/L	All year	Spot spray with Glyphosate 360g/L at a rate of 1:100 with the addition of a surfactant (i.e., Pulse) to the rate of 1L: 200L if water	Seeds are extremely viable. Regular monitoring required to manage seedlings.
Asparagus asparagoides	Bridal Creeper	Low	Manual removal of underground tubers with biomass taken from site or application of a METSULFURON METHYL based herbicide applied at 10g: 100L	August to September	Spot spray seedlings or hand remove with biomass taken from site	Ensure the crown to plant is completely removed during Primary treatment
Avena barbata	Bearded Oat	High	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Axonopus fissifolius	Common Carpet Grass	Low	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Bidens pilosa	Cobbler's Pegs	Low	Hand removal or spot spay with a Glyphosate based	All year	Spot spray seedlings with Glyphosate based herbicide (360	Regular monitoring to manage seedlings

Scientific Name	Common Name	Degree of Infestation	Primary Treatment (Kill 70%)	Timing	Secondary Treatment (90% Kill)	Ongoing Management
			herbicide (360 g/L) applied at a rate of 1L:100L of water		g/L) applied at a rate of 1L:100L of water	
Briza subaristata	Quaking Grass	High	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Bromus catharticus	Rescue Grass	High	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Cenchrus clandestinum	Kikuyu	High	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Centrum parqui	Green Cestrum	Low	Cut and paint' Or Drill/frill with 'neat' Glyphosate 360 g/L	All year	Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	Regular monitoring required to manage seedlings
Chloris gayana	Rhodes Grass	High	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Cirsium vulgare	Spear Thistle	High	Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring to manage seedlings

Scientific Name	Common Name	Degree of Infestation	Primary Treatment (Kill 70%)	Timing	Secondary Treatment (90% Kill)	Ongoing Management
Conyza bonariensis	Flax Leaf Fleabane		Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring to manage seedlings
Cortaderia selloana	Pampas Grass	Low	Foliar spray 1 -1.3 Litres Glyphosate 360g/L per 100Ltr of water. Use higher rate for specimens over 1m high	Actively growing plants, Prior to flowering, spring to autumn	Foliar spray 1 -1.3 Litres Glyphosate 360g/L per 100Ltr of water. Use higher rate for specimens over 1m high	Regular monitoring to manage seedling
Cyperus eragrostis	Umbrella Sedge	Low	Hand removal or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100: of water	All year	Spot spray seedlings with Glyphosate based herbicide (360g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage seedlings
Echinochloa spp.		Med	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage seedlings
Eragrostis curvula	African Lovegrass	High	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Galium sp.		Low	Hand remove or spot spray with Glyphosate based herbicide (360g/L) applied at a rate of 1L:100L of water	All year	Spot spray regrowth/seedlings ith Glyphosate based herbicide(360g/L) applied at a rate of 1L:100L of water	Monitor for seedlings tom maintain low densities
Gamochaeta calviceps	Narrowleaf Purple Everlasting	Low	Hand remove or spot spray with Glyphosate based herbicide (360g/L) applied at a rate of 1L:100L of water	All year	Spot spray regrowth/seedlings ith Glyphosate based herbicide(360g/L) applied at a rate of 1L:100L of water	Monitor for seedlings tom maintain low densities

Scientific Name	Common Name	Degree of Infestation	Primary Treatment (Kill 70%)	Timing	Secondary Treatment (90% Kill)	Ongoing Management
Hypochaeris radicata	Flatweed / Cats Ear		Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring to manage seedlings
Lepidium africanum	Common Peppercress		Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring to manage seedlings	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring to manage seedlings
Ligustrum sinense	Chinese Privet	Low	'Cut and paint' or 'Drill/Fill' with 'neat' Glyphosate 360g/L	Best results achieved on actively growing / flowering plants.	Hand removal OR spot spray with a Glyphosate based herbicide (360g/L) applied at a rate pf 1L:100L of water	Regular monitoring required to manage seedlings.
Lolium perenne	Perennial Ryegrass	High	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Lycium ferocissimum	African Boxthorn	Low	Cut and paint' Or Drill/frill with 'neat' Glyphosate 360 g/L	All year	Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage seedlings
Olea europaea subsp. *cuspidata*	African Olive	Low	Cut and paint' Or Drill/frill with 'neat' Glyphosate 360 g/L	All year	Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage seedlings
Modiola caroliniana	Red-Flowered Mallow	Low	Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring to manage seedlings

Scientific Name	Common Name	Degree of Infestation	Primary Treatment (Kill 70%)	Timing	Secondary Treatment (90% Kill)	Ongoing Management
Paspalum dilatatum	Paspalum	High	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant
Phalaris aquatica	Canary Grass	Med	Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage seedlings
Phytolacca octandra	Inkweed	Low	Cut and paint' Or Drill/frill with 'neat' Glyphosate 360 g/L	All year	Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage seedlings
Polygonum aviculare	Knotgrass	Low	Hand removal or spot spray with a Glyphosate based herbicide (360g/L) applied at a rate of 1L:100L of water	All year	Hand removal or spot spray with a Glyphosate based herbicide (360g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage
Plantago lanceolata	Lamb's Tongue		Spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water.	All year	Spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water.	Regular monitoring to manage seedlings
Ranunculus sceleratus	Celery Buttercup	Low	Spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 700mL:100L of water.	All year, best results achieved on actively growing plants.	Spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 700mL:100L of water.	Regular monitoring to manage seedlings
Rumex obtusifolius	Broad-Leaved Dock	Low	Hand removal or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year	Hand removal or spot spray with a Glyphosate based herbicide (360g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage

Scientific Name	Common Name	Degree of Infestation	Primary Treatment (Kill 70%)	Timing	Secondary Treatment (90% Kill)	Ongoing Management
Senecio madagascariensis	Fireweed	Med	Manual removal or spot spraying application of a METSULFURON METHYL based herbicide applied at 10g: 100L	All year	Manual removal or application of a METSULFURON METHYL based herbicide applied at 10g: 100L	Regular monitoring to manage seedlings. Gloves to be worn during removal
Sida rhombifolia	Paddy's Lucerne	Low	Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	Regular monitoring to manage seedlings
Solanum pseudocapsicum	Jerusalem Cherry	Low	Hand removal Or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	All year	Hand removal Or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	Regular monitoring to manage seedlings
Solanum sisymbriifolium	Sticky Nightshade	Low	Hand removal or spot spray with a Glyphosate based herbicide (360g/L) applied at a rate of 1L:100L of water	All year	Hand removal Or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring required to manage seedlings
Sonchus oleraceus	Common Sow-Thistle	Low	Hand removal or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Treatment prior to seed set. A regular slashing will limit its further spread on site.
Sporobolus africanus	Paramatta Grass	High	Spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1 L per 100L of water Or Furophanate based herbicide 200 mL:100L water	All year, best results achieved on actively growing plants	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Treatment prior to seed set. A regular slashing will limit its further spread on site
Sporobolus fertilis	Giant Paramatta Grass	Low	Spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of	All year, best results achieved on actively growing plants	Hand remove Or Spot spray seedlings with Glyphosate based	Treatment prior to seed set. A regular slashing will

Scientific Name	Common Name	Degree of Infestation	Primary Treatment (Kill 70%)	Timing	Secondary Treatment (90% Kill)	Ongoing Management
			water OR Flupropanate based herbicide 200mL:100L water		herbicide (360 g/L) applied at a rate of 1L:100L of water	limit its further spread on site
Stellaria media	Chickweed		Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L:100L of water	Regular monitoring to manage seedling
Symphyotrichum subulatum	Wild Aster		Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	Regular monitoring to manage seedling
Tradescantia fluminensis	Wandering Trad	Med	Hand removal and raking then composted preferred or spot spay with a Glyphosate 360 aquatic based herbicide (360 g/L) applied at a rate of 1L:100L of water, use a surfactant	Winter to early spring	Repeat treatment 6-8 weeks later; raking and hand removal or spot spay with a Glyphosate 360 aquatic based herbicide (360 g/L) applied at a rate of 1L:100L of water, use a surfactant	Regular monitoring and repeat treatments if required
Trifolium repens	White Clover	Med	Hand removal or spot spay with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	All year	Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	Regular monitoring to manage seedling
Verbena bonariensis	Purple Top		Hand removal or spot spray with a Glyphosate based herbicide (360g/L) applied at a rate of 1L:100L of water	All year	Hand removal or spot spray with a Glyphosate based herbicide (360g/L) applied at a rate of 1::100L of water	Regular monitoring required to manage seedlings
Vulpia ciliata	Fringed Fescue		Boom or spot spray with a Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	All year, best results achieved on actively growing plants. Slashing and stimulating regrowth prior to spraying will increase kill rate	Hand remove Or Spot spray seedlings with Glyphosate based herbicide (360 g/L) applied at a rate of 1L :100L of water	This weed dominates the development footprint ground layer. Continue to slash as suppressant

D6 WoNS Recorded

Scientific Name	Common Name	Degree of Infestation	WoNS	Priority Weed Level	Control Requirement
Anredera cordifolia	Madeira Vine	Low	Yes	State priority – Asset Protection	Mandatory Measure prohibits sale within or import into NSW.
Asparagus asparagoides	Bridal Creeper	Low	Yes	State priority – Asset Protection	Mandatory Measure prohibits sale within or import into NSW.
Lycium ferocissimum	African Boxthorn	Low	Yes	State Priority – Asset Protection	Mandatory Measure prohibits sale within or import into NSW.
Senecio madagascariensis	Fireweed	Med	Yes	State Priority – Asset Protection	Mandatory Measure prohibits sale within or import into NSW.

D7 Priority Weeds within the Greater Sydney Region

Common Name	Botanical Name	Objective
African Olive*	*Olea europaea* subsp. *Cuspidata*	CONTAINMENT
Alligator Weed	*Alternanthera philoxeroides*	CONTAINMENT
Asparagus Fern	*Asparagus virgatus*	CONTAINMENT
Asparagus Weeds	*Asparagus aethiopicus*	ASSET PROTECTION
Athel Pine	*Tamarix aphylla*	ASSET PROTECTION
Bellyache Bush	*Jatropha gossypiifolia*	ASSET PROTECTION
Bitou Bush	*Chrysanthemoides monilifera* subsp. *rotundata*	CONTAINMENT
Black Knapweed	*Centaurea x moncktonii*	PREVENTION
Black Willow	*Salix nigra*	ERADICATION
Blackberry	*Rubus fruticosus agg.* (Blackberry except the varietals Chester Thornless, Dirksen Thornless, Loch Ness, Silvan, Black Satin, Murrindindi, Smooth Stem, Thornfree and Chehalem)*	ASSET PROTECTION
Boneseed	*Chrysanthemoides monilifera* subsp. *monilifera**	ERADICATION
Bridal Veil Creeper	*Asparagus declinatus*	PREVENTION
Broomrape	*Orobanche* spp. (all species except the native O. cernua var. australiana and O. minor)	PREVENTION
Cabomba	*Cabomba caroliniana*	ASSET PROTECTION
Cape/Montpellier Broom	*Genista monspessulana*	ASSET PROTECTION

Common Name	Botanical Name	Objective
Cat's Claw Creeper	*Dolichandra unguis-cati*	ASSET PROTECTION
Chilean Needle Grass	*Nassella neesiana*	ASSET PROTECTION
Chinese Knotweed	*Persicaria chinensis*	ERADICATION
Chinese Violet	*Asystasia gangetica* subsp. *micrantha*	PREVENTION
Climbing Asparagus	*Asparagus africanus*	ERADICATION
Coolatai Grass	*Hyparrhenia hirta*	ERADICATION
Coral Creeper	*Barleria repens*	ERADICATION
East Indian Hygrophila	*Hygrophila polysperma*	PREVENTION
Eurasian Water Milfoil	*Myriophyllum spicatum*	PREVENTION
Fireweed*	*Senecio madagascariensis*	ASSET PROTECTION
Flax-Leaf Broom	*Genista linifolia*	ASSET PROTECTION
Frogbit / Spongeplant	*Limnobium* spp. (all species)	PREVENTION
Gamba Grass	*Andropogon gayanus*	Prevention
Giant Devils Fig	*Solanum chrysotrichum*	PREVENTION
Giant Rats Tail Grass	*Sporobolus pyramidalis*	PREVENTION
Giant Reed	*Arundo donax*	ASSET PROTECTION
Glory Lily	*Gloriosa superba*	ERADICATION
Gorse	*Ulex europaeus*	ASSET PROTECTION
Green Cestrum*	*Cestrum parqui*	ASSET PROTECTION
Grey Sallow	*Salix cinerea*	ERADICATION
Groundsel Bush	*Baccharis halimifolia*	ERADICATION
Hawkweed	*Hieracium* spp. (all species)	PREVENTION
Holly-Leaved Senecio	*Senecio glastifolius*	ERADICATION
Horsetails	*Equisetum* spp.	CONTAINMENT

Common Name	Botanical Name	Objective
Hydrocotyle/Water Pennywort	*Hydrocotyle ranunculoides*	PREVENTION
Hygrophila	*Hygrophila costata*	ERADICATION
Hymenachne	*Hymenachne amplexicaulis*	ASSET PROTECTION, PREVENTION
Karoo Acacia	*Vachellia karroo* (syn. *Acacia karroo*)	PREVENTION
Kei Apple	*Dovyalis caffra*	ERADICATION
Kidney Leaf Mud Plantain	*Heteranthera reniformis*	ERADICATION
Kochia	*Bassia scoparia* (excluding subsp. *trichophylla*)	PREVENTION
Koster's Curse	*Clidemia hirta*	PREVENTION
Kudzu	*Pueraria lobata*	ERADICATION
Lagarosiphon	*Lagarosiphon major*	PREVENTION
Lantana	*Lantana camara*	ASSET PROTECTION
Leaf Cactus	*Pereskia aculeata*	ERADICATION
Madeira Vine*	*Anredera cordifolia*	ASSET PROTECTION
Mesquite	*Prosopis* spp.	ASSET PROTECTION
Mexican Feather Grass	*Nassella tenuissima* (syn. *Stipa tenuissima*)	PREVENTION
Miconia	*Miconia* spp. (all species)	PREVENTION
Mikania Vine	*Mikania micrantha*	PREVENTION
Mimosa	*Mimosa pigra*	PREVENTION
Ming Fern	*Asparagus macowanii* var. *zuluensis*	ERADICATION
Mysore Thorn	*Caesalpinia decapetala*	ERADICATION, PREVENTION
Nodding Thistle	*Carduus nutans*	PREVENTION
Opuntia	*Opuntia* spp.	ASSET PROTECTION
Ox Eye Daisy	*Leucanthemum vulgare*	ERADICATION
Pampas Grass*	*Cortaderia jubata*	ASSET PROTECTION

Common Name	Botanical Name	Objective
Parkinsonia	*Parkinsonia aculeata*	ERADICATION
Parthenium Weed	*Parthenium hysterophorus*	PREVENTION
Pond Apple	*Annona glabra*	PREVENTION
Prickly Acacia	*Vachellia nilotica* (syn. *Acacia nilotica*)	PREVENTION
Rubber Vine	*Cryptostegia grandiflora*	PREVENTION
Sagittaria	*Sagittaria platyphylla*	ASSET PROTECTION
Salvinia	*Salvinia molesta*	ASSET PROTECTION
Scotch/English Broom	*Cytisus scoparius* subsp. *scoparius*	ASSET PROTECTION
Sea Spurge	*Euphorbia paralias*	ERADICATION
Senegal Tea	*Gymnocoronis spilanthoides*	CONTAINMENT
Serrated Tussock	*Nassella trichotoma*	ASSET PROTECTION
Siam Weed	*Chromolaena odorata*	PREVENTION
Sicilian Sea Lavender	*Limonium hyblaeum*	ERADICATION
Sicklethorn	*Asparagus falcatus*	ERADICATION
Silverleaf Nightshade	*Solanum elaeagnifolium*	ASSET PROTECTION
Singapore Daisy	*Sphagneticola trilobata*	ASSET PROTECTION
Skunk Vine	*Paederia foetida*	ERADICATION
Spanish Broom	*Spartium junceum*	PREVENTION
Spotted Knapweed	*Centaurea stoebe* subsp.*australis*	PREVENTION
Tropical Soda Apple	*Solanum viarum*	ERADICATION
Water Caltrop	*Trapa* spp. (all species)	PREVENTION
Water Hyacinth	*Eichhornia crassipes*	CONTAINMENT
Water Lettuce	*Pistia stratiotes*	PREVENTION
Water Poppy	*Hydrocleys nymphoides*	CONTAINMENT

Common Name	Botanical Name	Objective
Water Primrose	*Ludwigia peruviana*	ASSET PROTECTION
Water Soldier	*Stratiotes aloides*	PREVENTION
Water Star Grass	*Heteranthera zosterifolia*	PREVENTION
White Blackberry / Mysore Raspberry	*Rubus niveus*	PREVENTION
Willow-Leaf Primrose	*Ludwigia peruviana*	ASSET PROTECTION
Willows	*Salix* spp.(excludes *S. babylonica*)	ASSET PROTECTION
Witchweed	*Striga* spp. (except the native *S. parviflora*)	PREVENTION
Yellow Burrhead	Limnocharis flava	PREVENTION

D8 Local Priority Weed List

Common Name	Botanical Name	Objective	Legal	Listing
African Boxthorn	*Lycium ferocissimum**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
African Milk Bush	*Synadenium grantii*	ERADICATION	The following weeds are present in limited distribution and abundance. Elimination of the biosecurity risk posed by these weeds is a reasonably practical objective.	LOCAL
African Olive	*Olea europaea* subsp. *cuspidata*	CONTAINMENT	Strategic response in the Greater Sydney region • Promote best practice principles to landholders, including a range of control techniques for integrated weed management. • Implement quarantine and/or hygiene protocols. • Monitor change in distribution. • Within exclusion zone: • Destroy all infestations and continuously suppress thereafter. • Within core infestation area: • Destroy and continuously suppress infestations where feasible. • Targeted management of priority asset.	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
Alligator Weed	*Alternanthera philoxeroides**	CONTAINMENT	Alligator Weed Biosecurity Zone (Biosecurity Regulation 2017 - Part 5, Division 2) • An owner or occupier of land in the Alligator Weed Biosecurity Zone on which there is the weed *Alternanthera philoxeroides* (alligator weed) must: • If the weed is part of a new infestation of the weed on the land, notify the local control authority for the land as soon as practicable in accordance with Part 6. • Eradicate the weed or if that is not practicable destroy as much of the weed as is practicable and suppress the spread of any remaining weed. Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017) • A person must not import into the state or sell • Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	STATE, REGIONAL
Anchored Water Hyacinth	*Eichhornia azurea*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Arrowhead	*Sagittaria calycina* var. *calycina*	CONTAINMENT	Regional Recommended Measure • Exclusion zone: all lands in the region, except the core infestation area of: Central Coast local government area	LOCAL

Common Name	Botanical Name	Objective	Legal	Listing
			• Whole region: Land managers should mitigate the risk of new weeds being introduced to their land. The plant or parts of the plant should not be traded, carried, grown or released into the environment Notify the Local Control Authority if found. • Exclusion zone: The plant should be eradicated from the land and the land kept free of the plant. Core infestation: Land managers should mitigate spread from their land. Land managers should reduce impacts from the plant on priority assets	
Asparagus Fern	*Asparagus virgatus*	CONTAINMENT	Strategic response in the Greater Sydney region • Promote best practice principles to landholders, including a range of control techniques for integrated weed management • Implement quarantine and/or hygiene protocols. • Monitor change in distribution Within exclusion zone: • Destroy all infestations and continuously suppress thereafter • Within core infestation area: • Destroy and continuously suppress infestations where feasible • Targeted management of priority asset	REGIONAL
Asparagus Weeds	*Asparagus aethiopicus*	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017) • Must not be imported into the State or sold	STATE
Athel Pine	*Tamarix aphylla**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017) • Must not be imported into the State or sold	STATE
Bellyache Bush	*Jatropha gossypiifolia**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017) • Must not be imported into the State or sold	STATE
Bitou Bush	*Chrysanthemoides monilifera* subsp. *rotundata**	CONTAINMENT	Bitou Bush Biosecurity Zone (Biosecurity Regulation 2016 - Part 5, Division 3) • An owner or occupier of land in the Bitou Bush Biosecurity Zone on which there is the weed *Chrysanthemoides monilifera* subspecies. *rotundata* (bitou bush) must: • If the weed is part of a new infestation of the weed on the land, notify the local control authority for the land as soon as practicable in accordance with Part 6 • Eradicate the weed or if that is not practicable destroy as much of the weed as is practicable and suppress the spread of any remaining weed. Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017)	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			A person must not import into the state or sell. • Regional strategic response: • Implement Bitou Bush State Strategic Plan	
Black Knapweed	*Centaurea x moncktonii*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Black Willow	Salix nigra*	ERADICATION	Strategic response in the Greater Sydney Region • Promote best practice principles to landholders, including a range of control techniques for integrated weed management • Implement quarantine and/or hygiene protocols. • Monitor change in distribution Within exclusion zone: • Destroy all infestations and continuously suppress thereafter Within core infestation area: • Destroy and continuously suppress infestations where feasible • Targeted management of priority assets	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
Blackberry	Rubus fruticosus agg. (Blackberry except the varietals Chester Thornless, Dirksen Thornless, Loch Ness, Silvan, Black Satin, Murrindindi, Smooth Stem, Thornfree and Chehalem)*	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Boneseed	Chrysanthemoides moniliferasubspecies monilifera*	ERADICATION	Control Measures – Owners of occupied lands • The owner or occupier of land in the control zone on which there is a new infestation of boneseed must notify the local control authority for that land as soon as practicable of the following information: o The person's full name and contact details, including a telephone number o The address of the land, including the lot and deposited plan number and the property identification code for the land (if these are known) o Any other information that is requested by the local control authority. • The owner or occupier of the land must ensure that the land is kept free of boneseed by immediately destroying all boneseed on the land. This requirement applies to any new infestation as well as any subsequent generations of boneseed on that land. • The owner or occupier does not need to comply with subclause (1) if they know that notification of the new infestation on the land has already been given to the local control authority of that land	STATE
Bridal Veil Creeper	Asparagus declinatus*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by • prohibited matter is prevented, eliminated or minimised.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			• A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Broadleaf Pepper Tree	Schinus terebinthifolius	ERADICATION	The following weeds are present in limited distribution and abundance. Elimination of the biosecurity risk posed by these weeds is a reasonably practical objective.	LOCAL
Broomrape	Orobanche spp. (all species except the native O. cernua var. australiana and O. minor)	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Cabomba	Cabomba caroliniana*	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	STATE, REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
Cape/Montpellier Broom	*Genista monspessulana**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Cat's Claw Creeper	*Dolichandra unguis-cati**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	STATE, REGIONAL
Chilean Needle Grass	*Nassella neesiana**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Chinese Celtis	*Celtis sinensis*	CONTAINMENT	These weeds are widely distributed in the region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed by these weeds is reasonably practicable.	LOCAL
Chinese Knotweed	*Persicaria chinensis*	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible.	REGIONAL
Chinese Violet	*Asystasia gangetica* subsp. *micrantha*	PREVENTION	Control order – (Chinese Violet Control Zone) • Control measures for owners and occupiers of land Pursuant to section 62(1)(b) of the Act, an owner or occupier of land in the Chinese violet Control Zone on which there is Chinese violet must: • Notify the local control authority for the area if the Chinese violet is part of a new infestation of Chinese violet on the land: o As soon as practicable after becoming aware of the new infestation o Verbally or in writing Giving the following: The person's full name and contact number, the location of the Chinese violet, including the property identification code for the land (if this is known) andany other information reasonably requested by the local control authority. o Destroy all Chinese violet on the land, including fruit	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
			○ Ensure that subsequent generations of Chinese violet are destroyed ○ That the land is kept free of Chinese violet ○ The owner or occupier does not need to comply with (a) above if they know that notification of the infestation on the land has already been given to the local control authority for the area.	
Climbing Asparagus	*Asparagus africanus**	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Coolatai Grass	*Hyparrhenia hirta*	ERADICATION	The following weeds are present in limited distribution and abundance. Elimination of the biosecurity risk posed by these weeds is a reasonably practical objective.	LOCAL
Coral Creeper	*Barleria repens*	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Corky Passionfruit	*Passiflora suberosa*	CONTAINMENT	These weeds are widely distributed in the region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed by these weeds is reasonably practicable.	LOCAL
Crofton Weed	*Ageratina adenophora*	ASSET PROTECTION	These weeds are widely distributed in some areas of the State. As Weeds of National Significance, their spread must be minimised to protect priority assets.	LOCAL
East Indian Hygrophila	*Hygrophila polysperma*	PREVENTION	Strategic response in the Greater Sydney region • Implement quarantine and/or hygiene protocols • Undertake high risk sites and pathways analysis to identify potential introduction • areas and preventative options • Implement New Weed Incursion Plan if detected	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
Eurasian Water Milfoil	*Myriophyllum spicatum*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Fireweed	*Senecio madagascariensis**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Flax-Leaf Broom	*Genista linifolia**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Frogbit / Spongeplant	*Limnobium* spp. (all species)	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
Gamba Grass	*Andropogon gayanus**	Prevention	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Giant Devil's Fig	*Solanum chrysotrichum*	PREVENTION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Giant Rats Tail Grass	*Sporobolus pyramidalis*	PREVENTION	Strategic response in the Greater Sydney region • Implement quarantine and/or hygiene protocols • Undertake high risk sites and pathways analysis to identify potential introduction • areas and preventative options • Implement New Weed Incursion Plan if detected	REGIONAL
Giant Reed	*Arundo donax*	ASSET PROTECTION	Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	REGIONAL
Glory Lily	Gloriosa superba	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations.	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
			• Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	
Gorse	Ulex europaeus*	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold Strategic response in the Greater Sydney Region • Promote best practice principles to landholders, including a range of control techniques for integrated weed management • Implement quarantine and/or hygiene protocols. • Monitor change in distribution Within exclusion zone: • Destroy all infestations and continuously suppress thereafter Within core infestation area: • Destroy and continuously suppress infestations where feasible • Targeted management of priority assets	STATE, REGIONAL
Green Cestrum	Cestrum parqui	ASSET PROTECTION	Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	REGIONAL
Grey Sallow	Salix cinerea*	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Groundsel Bush	Baccharis halimifolia	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
Hawkweed	Hieracium spp (all species)	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated, or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Holly-Leaved Senecio	Senecio glastifolius	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Honey Locust	Gleditsia tricanthos	CONTAINMENT	These weeds are widely distributed in the region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed by these weeds is reasonably practicable.	LOCAL
Horsetails	Equisetum spp.	CONTAINMENT	Strategic response in the Greater Sydney Region • Promote best practice principles to landholders, including a range of control techniques for integrated weed management • Implement quarantine and/or hygiene protocols. • Monitor change in distribution Within exclusion zone: • Destroy all infestations and continuously suppress thereafter Within core infestation area: • Destroy and continuously suppress infestations where feasible • Targeted management of priority assets	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
Hydrocotyl/Water Pennywort	Hydrocotyle ranunculoides	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Hygrophila	Hygrophila costata	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Hymenachne	Hymenachne amplexicaulis*	ASSET PROTECTION, PREVENTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold Strategic response in the Greater Sydney region • Implement quarantine and/or hygiene protocols • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options • Implement New Weed Incursion Plan if detected	STATE, REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
Karoo Acacia	*Vachellia karroo (syn. Acacia karroo)*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Kei Apple	*Dovyalis caffra*	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Kidney Leaf Mud Plantain	*Heteranthera reniformis*	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Kochia	*Bassia scoparia (excluding subsp. trichophylla)*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Koster's Curse	Clidemia hirta	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Kudzu	Pueraria lobata	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Lagarosiphon	Lagarosiphon major	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Lantana	Lantana camara*	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Leaf Cactus	Pereskia aculeata	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Leafy Elodea	Egeria densa	CONTAINMENT	These weeds are widely distributed in the region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed by these weeds is reasonably practicable.	LOCAL
Lippia	Phyla canescens	ERADICATION	The following weeds are present in limited distribution and abundance. Elimination of the biosecurity risk posed by these weeds is a reasonably practical objective.	LOCAL
Long Leaf Willow Primrose	Ludwigia longifolia	CONTAINMENT	These weeds are widely distributed in the region. While broad scale elimination is not practicable, minimisation of the biosecurity risk posed by these weeds is reasonably practicable.	LOCAL
Madeira Vine	Anredera cordifolia*	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Mesquite	Prosopis spp.	ASSET PROTECTION*	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Mexican Feather Grass	Nassella tenuissima (syn. Stipatenuissima)	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			• A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Miconia	Miconia spp. (all species)	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Mikania Vine	Mikania micrantha	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			• Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Mimosa	Mimosa pigra*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Ming Fern	Asparagus macowanii var. zuluensis	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Mother Of Millions	Bryophyllum species	ASSET PROTECTION	These weeds are widely distributed in some areas of the State. As Weeds of National Significance, their spread must be minimised to protect priority assets.	LOCAL
Mysore Thorn	Caesalpinia decapetala	ERADICATION, PREVENTION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible Strategic response in the Greater Sydney region • Implement quarantine and/or hygiene protocols	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
			• Undertake high risk sites and pathways analysis to identify potential introduction • areas and preventative options • Implement New Weed Incursion Plan if detected	
Nodding Thistle	Carduus nutans	PREVENTION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Opuntia	*Opuntia spp.*	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Ox Eye Daisy	*Leucanthemum vulgare*	ERADICATION	The following weeds are present in limited distribution and abundance. Elimination of the biosecurity risk posed by these weeds is a reasonably practical objective.	LOCAL
Pampas Grass	*Cortaderia jubata*	ASSET PROTECTION	Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	REGIONAL
Paper Mulberry	*Broussonetia papyrifera*	PREVENTION	The following weeds are currently not found in the Greater Sydney region, pose significant biosecurity risk and prevention of the biosecurity risk posed by these weeds is a reasonably practical objective	LOCAL
Parkinsonia	*Parkinsonia aculeata**	ERADICATION	Control Measures – Owners of occupied lands • The owner or occupier of land in the control zone on which there is a new infestation of parkinsonia must notify the local control authority for that land as soon as practicable of the following information: ○ (a) the person's full name and contact details, including a telephone number ○ (b) the address of the land, including the lot and deposited plan number and the property identification code for the land (if these are known) ○ any other information that is requested by the local control authority. • The owner or occupier of the land must ensure that the land is kept free of parkinsonia apple by immediately destroying all parkinsonia on the land. This requirement applies to any new infestation as well as any subsequent generations of parkinsonia on that land.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			• The owner or occupier does not need to comply with subclause (1) if they know that notification of the new infestation on the land has already been given to the local control authority of that land	
Parthenium Weed	*Parthenium hysterophorus*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol. Mandatory Measure (Division 8, Clause 35, Biosecurity Regulation, 2017) - parthenium weed carriers – machinery and equipment • This clause applies to the following equipment: ○ grain harvesters (including the comb or front) ○ comb trailers (including the comb or front) ○ bins used for holding grain during harvest operations ○ augers or similar equipment used for moving grain ○ vehicles used for transporting grain harvesters ○ vehicles used as support vehicles with grain harvesters and that have been driven in paddocks during harvest operations ○ mineral exploration drilling rigs and vehicles used for transporting those rigs • A person must not import into the State from Queensland any equipment to which this clause applies.	STATE
Pond Apple	*Annona glabra**	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015)	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			• A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Prickly Acacia	*Vachellia nilotica (syn. Acacia nilotica)**	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Rattlepod	*Crotolaria lunata*	ASSET PROTECTION	These weeds are widely distributed in some areas of the State. As Weeds of National Significance, their spread must be minimised to protect priority assets.	LOCAL
Rubber Vine	*Cryptostegia grandiflora**	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			• A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Sagittaria	*Sagittaria platyphylla**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Salvinia	*Salvinia molesta**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	STATE, REGIONAL
Scotch/English Broom	*Cytisus scoparius* subsp. *scoparius**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	STATE, REGIONAL
Sea Spurge	*Euphorbia paralias*	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
Senegal Tea	*Gymnocoronis spilanthoides*	CONTAINMENT	Strategic response in the Greater Sydney Region • Promote best practice principles to landholders, including a range of control techniques for integrated weed management • Implement quarantine and/or hygiene protocols. • Monitor change in distribution Within exclusion zone: • Destroy all infestations and continuously suppress thereafter Within core infestation area: • Destroy and continuously suppress infestations where feasible • Targeted management of priority assets	REGIONAL
Serrated Tussock	*Nassella trichotoma**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold Strategic response in the Greater Sydney Region • Promote best practice principles to landholders, including a range of • control techniques for integrated weed management • Implement quarantine and/or hygiene protocols. • Monitor change in distribution Within exclusion zone: • Destroy all infestations and continuously suppress thereafter Within core infestation area: • Destroy and continuously suppress infestations where feasible • Targeted management of priority assets	STATE, REGIONAL
Siam Weed	*Chromolaena odorata*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Sicilian Sea Lavender	*Limonium hyblaeum*	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations. • Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	REGIONAL
Sicklethorn	*Asparagus falcatus*	ERADICATION	Strategic response in the Greater Sydney Region • Promote best practice principles to landholders, including a range of • control techniques for integrated weed management • Implement quarantine and/or hygiene protocols. • Monitor change in distribution Within exclusion zone: • Destroy all infestations and continuously suppress thereafter Within core infestation area: • Destroy and continuously suppress infestations where feasible • Targeted management of priority assets	REGIONAL
Silverleaf Nightshade	*Solanum elaeagnifolium**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Singapore Daisy	*Sphagnicola trilobata*	ASSET PROTECTION	Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	REGIONAL
Skunk Vine	*Paideia foetida*	ERADICATION	Strategic response in the Greater Sydney region • Manage in accordance with New Weed Incursion Plan. • Mapping and surveillance to locate all infestations.	REGIONAL

Common Name	Botanical Name	Objective	Legal	Listing
			• Implement quarantine and/or hygiene protocols. • Destruction of all infestations where feasible	
Spanish Broom	*Spartium junceum*	PREVENTION	Strategic response in the Greater Sydney region • Implement quarantine and/or hygiene protocols • Undertake high risk sites and pathways analysis to identify potential introduction • areas and preventative options • Implement New Weed Incursion Plan if detected	REGIONAL
Spotted Knapweed	*Centaurea stoebe* subsp.*australis*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Tropical Soda Apple	*Solanum vivarium*	ERADICATION	Control Measures – Owners of occupied lands • The owner or occupier of land in the control zone on which there is a new infestation of tropical soda apple must notify the local control authority for that land as soon as practicable of the following information: ○ The person's full name and contact details, including a telephone number ○ The address of the land, including the lot and deposited plan number and the property identification code for the land (if these are known) ○ Any other information that is requested by the local control authority. • The owner or occupier of the land must ensure that the land is kept free of tropical soda apple by immediately destroying all tropical soda apple on the land. This requirement applies	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			to any new infestation as well as any subsequent generations of tropical soda apple on that land. • The owner or occupier does not need to comply with subclause (1) if they know that notification of the new infestation on the land has already been given to the local control authority of that land	
Velvety Tree Pear	*Opuntia tomentosa**	ERADICATION	The following weeds are present in limited distribution and abundance. Elimination of the biosecurity risk posed by these weeds is a reasonably practical objective.	LOCAL
Water Caltrop	*Trapa* spp. (all species)	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE
Water Hyacinth	*Eichhornia crassipes*	CONTAINMENT	Water Hyacinth Biosecurity Zone (Biosecurity Regulation 2017 - Part 5, Division 4) • An owner or occupier of land in the Water Hyacinth Biosecurity Zone on which there is the weed *Eichhornia crassipes* (water hyacinth) must: ○ If the weed is part of a new infestation of the weed on the land, notify the local control authority for the land as soon as practicable in accordance with Part 6 ○ Eradicate the weed, or if that is not practicable destroy as much of the weed as is practicable and suppress the spread of any remaining weed. Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • A person must not import into the State or sell. Regional strategic response: • Implement quarantine and/or hygiene protocols.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			• Targeted management of priority assets. • Promote best practice weed management principles to landholders. • Land managers reduce the impact on priority assets.	
Water Lettuce	*Pistia stratiotes*	PREVENTION	Strategic response in the Greater Sydney region • Implement quarantine and/or hygiene protocols • Undertake high risk sites and pathways analysis to identify potential introduction • areas and preventative options • Implement New Weed Incursion Plan if detected	REGIONAL
Water Poppy	*Hydrocleys nymphoides*	CONTAINMENT	Strategic response in the Greater Sydney Region • Promote best practice principles to landholders, including a range of • control techniques for integrated weed management • Implement quarantine and/or hygiene protocols. • Monitor change in distribution Within exclusion zone: • Destroy all infestations and continuously suppress thereafter Within core infestation area: • Destroy and continuously suppress infestations where feasible • Targeted management of priority assets	REGIONAL
Water Primrose	*Ludwigia peruviana*	ASSET PROTECTION	Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	REGIONAL
Water Soldier	*Stratiotes aloides*	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event.	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Water Star Grass	*Heteranthera zosterifolia*	PREVENTION	Strategic response in the Greater Sydney region • Implement quarantine and/or hygiene protocols • Undertake high risk sites and pathways analysis to identify potential introduction • areas and preventative options • Implement New Weed Incursion Plan if detected	REGIONAL
White Blackberry / Mysore Raspberry	*Rubus niveus*	PREVENTION	Strategic response in the Greater Sydney region • Implement quarantine and/or hygiene protocols • Undertake high risk sites and pathways analysis to identify potential introduction • areas and preventative options • Implement New Weed Incursion Plan if detected	REGIONAL
Willows	*Salix* spp. (excludes *S.babylonica**	ASSET PROTECTION	Mandatory Measure (Division 8, Clause 33, Biosecurity Regulation 2017): • Must not be imported into the State or sold	STATE
Willow-Leaf Primrose	*Ludwigia peruviana*	ASSET PROTECTION	Strategic response in the Greater Sydney Region • Implement quarantine and/or hygiene protocols. Targeted management of priority assets Promote best practice weed management principles to landholders. Land managers reduce the impact on priority assets	REGIONAL
Witchweed	*Striga* spp. (except the native *S. parviflora*)	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response:	STATE

Common Name	Botanical Name	Objective	Legal	Listing
			• Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	
Yellow Bells	Tecoma stans	ERADICATION	The following weeds are present in limited distribution and abundance. Elimination of the biosecurity risk posed by these weeds is a reasonably practical objective.	LOCAL
Yellow Burrhead	Limnocharis flava	PREVENTION	Prohibited Matter (Part 4, Biosecurity Act, 2015) • A person who deals with any biosecurity matter that is Prohibited Matter throughout the State is guilty of an offence. • A person has a biosecurity duty to ensure that so far as is reasonably practicable, the biosecurity risk posed by prohibited matter is prevented, eliminated, or minimised. • A person who becomes aware of, or suspects, that a prohibited matter event has occurred, is occurring or is about to occur has a biosecurity duty to immediately notify the local control authority about the prohibited matter event. Regional strategic response: • Implement quarantine and/or hygiene protocols. • Undertake high risk sites and pathways analysis to identify potential introduction areas and preventative options. • Trigger rapid response protocol.	STATE

D9 Weed Control Techniques

CUT AND PAINT

Cut and paint methods are suitable for the control of woody weeds, large herbaceous weeds, and vines/climbers. This is commonly used when the biomass is to be removed from the site following the primary weed control. It is most suitable for plants with a small diameter at the base and a single stem or trunk. The cut and paint method are suitable for the control of species such as Lantana. Where plants have a larger diameter at the base or multiple stems, the drill and fill method may be more efficient, e.g., large Privets.

The plant should be cut as close to the base as possible, below any branches and the cut should be horizontal. The remaining stump should not exceed 10 mm in height. The tools required to make the cut may be a handsaw, secateurs, or chainsaw. Any dirt on the stump needs to be removed and the herbicide needs to be directly applied to the stump using a dabber bottle. Some plant species re-sprout after this treatment and follow up work may be required to kill the plant effectively. A non-selective herbicide should be used for the cut and paint method. A non-selective herbicide formulated for use around waters (e.g., RoundUp© Biactive™) is required when working near waterways or sensitive areas.

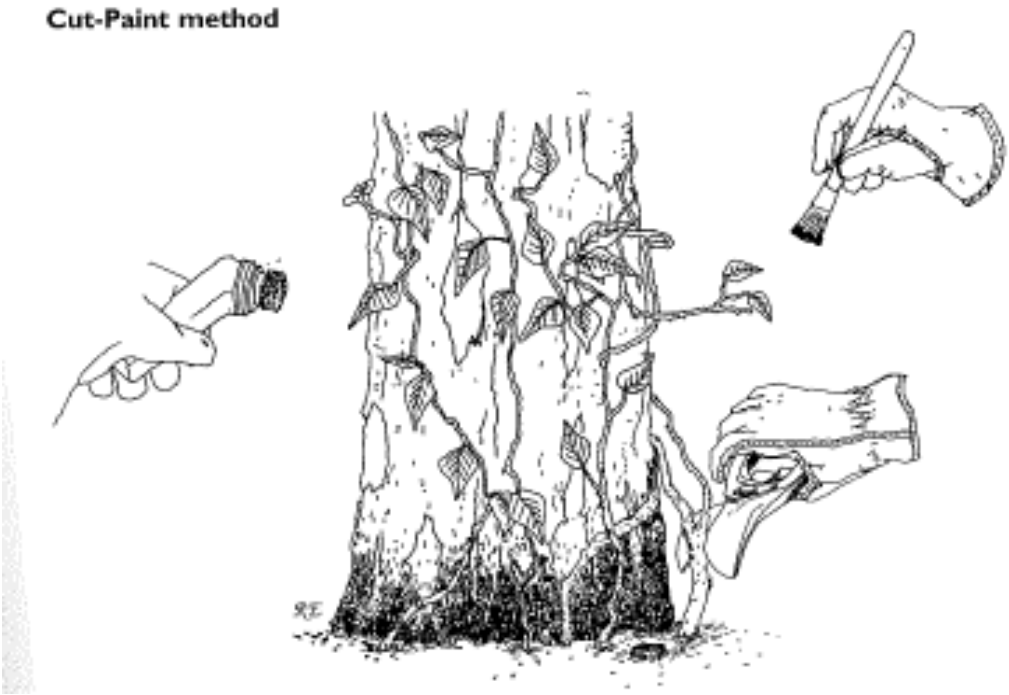


Figure 12: The cut and paint method (Muyt 2001)

STEM SCRAPE

The stem scrape method is used to control vines or woody shrubs and herbaceous weed species such as *Solanum mauritianum* (Wild Tobacco Bush) and *Sida* sp. However, this method is not suitable for most herbaceous climbing species such as Bridal Creeper (*Asparagus asparagoides*) or Balloon Vine (*Cardiospermum grandiflorum*).

The stem scrape method involves using a sharp knife to scrape back the top layer of bark from the shrub or vine 20-30cm long. An appropriately mixed herbicide needs to be applied immediately (within 30

seconds) using a dabber bottle (Figure 13). The root system of the plant should not be disturbed until the plant has died as this may reduce the effectiveness of the herbicide. Skirting method may be used in conjunction with stem scrape. This method is especially important to remove large infestations of vines within the canopy layer. Skirting involves cutting the vines within the canopy at chest height. This will allow an increase in the amount of light and resources to the canopy trees through the reduction of plants biomass.

SPRAYING GRASSES AND OTHER WEEDS

The most important issue to consider when controlling grasses is to understand their active growing period. Some species are only actively growing in late winter - spring, while other species are actively growing in spring – summer.

The spraying of grasses needs to be undertaken while they are actively growing, but before their flowering season to prevent seed set. Grasses may be slashed using a brush cutter before they are sprayed to remove any dead foliage and to promote the growth of new foliage. The grasses should be sprayed, using a knap-sack sprayer, once new growth has sprouted ensuring herbicide mix is sprayed carefully to prevent off target damage from occurring.

If adjacent aquatic environments, a non-selective herbicide suitable for use near waterways (e.g., RoundUp© Biactive™) should be used. However, in circumstances away from aquatic environments the use of grass selective herbicides may be suitable to be used (i.e., Fusillade©). The use of a grass selective herbicide will prevent off target damage to broad leaf species. Spray drift should be kept at a minimal and correct handling and application must be followed to ensure non-target impacts on native species. Spot spraying should not be applied in sensitive areas.

Spot spraying is also suitable for small patches of emerging saplings (e.g., Privets or Balloon Vine). Intensive spraying is usually done during primary weed control and is usually reduced during consecutive weed control. Large patches of weeds may be boom sprayed instead.

HAND REMOVAL / MANUAL REMOVAL

The hand removal or pulling of weeds is suitable for many species of weeds if they have a shallow root system (Figure 4). This includes woody weeds, grasses, and herbaceous species. It is useful for follow up work on woody weeds to control seedlings. The hand pulling of weeds involves pulling the plant as close to the base as possible and ensuring the entire tap root is pulled out of the soil. This usually results in soil disturbance and the soil should be replaced and compressed to prevent further weed invasion.

Some weeds require additional effort to ensure the entire regenerative parts are removed; this may require the use of a hand mattock, knife, or trowel. Crowning involves using a knife to cut the roots around the crown of the plant. This method is suitable for Cirsium vulgare (Spear Thistle) (Figure 5).

MANAGEMENT OF WEED WASTE

All fruiting parts and tubers should be carried off site and composted at a registered green waste disposal facility. Unless otherwise specified, non-fruiting organic waste may remain in-situ. When leaving debris in situ it should be ‘rafted’; dead wood should be laid on the ground first then stacked with the cut, living material on top. This keeps the live tips off the ground, preventing them from re-sprouting. Black plastic sheets can be used to accelerate the compositing process.

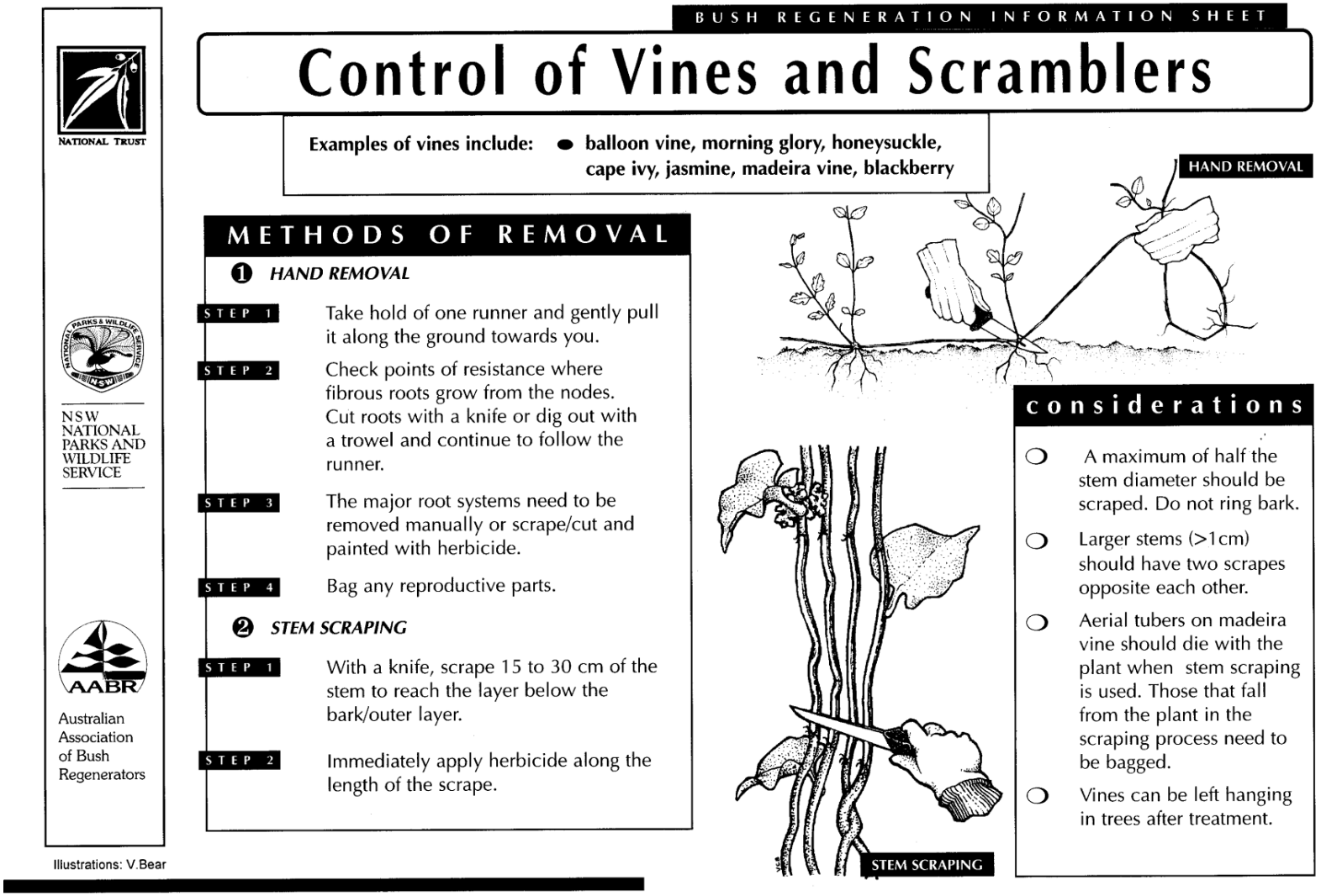


Figure 13: Control of vines and scramblers (AABR 2010)

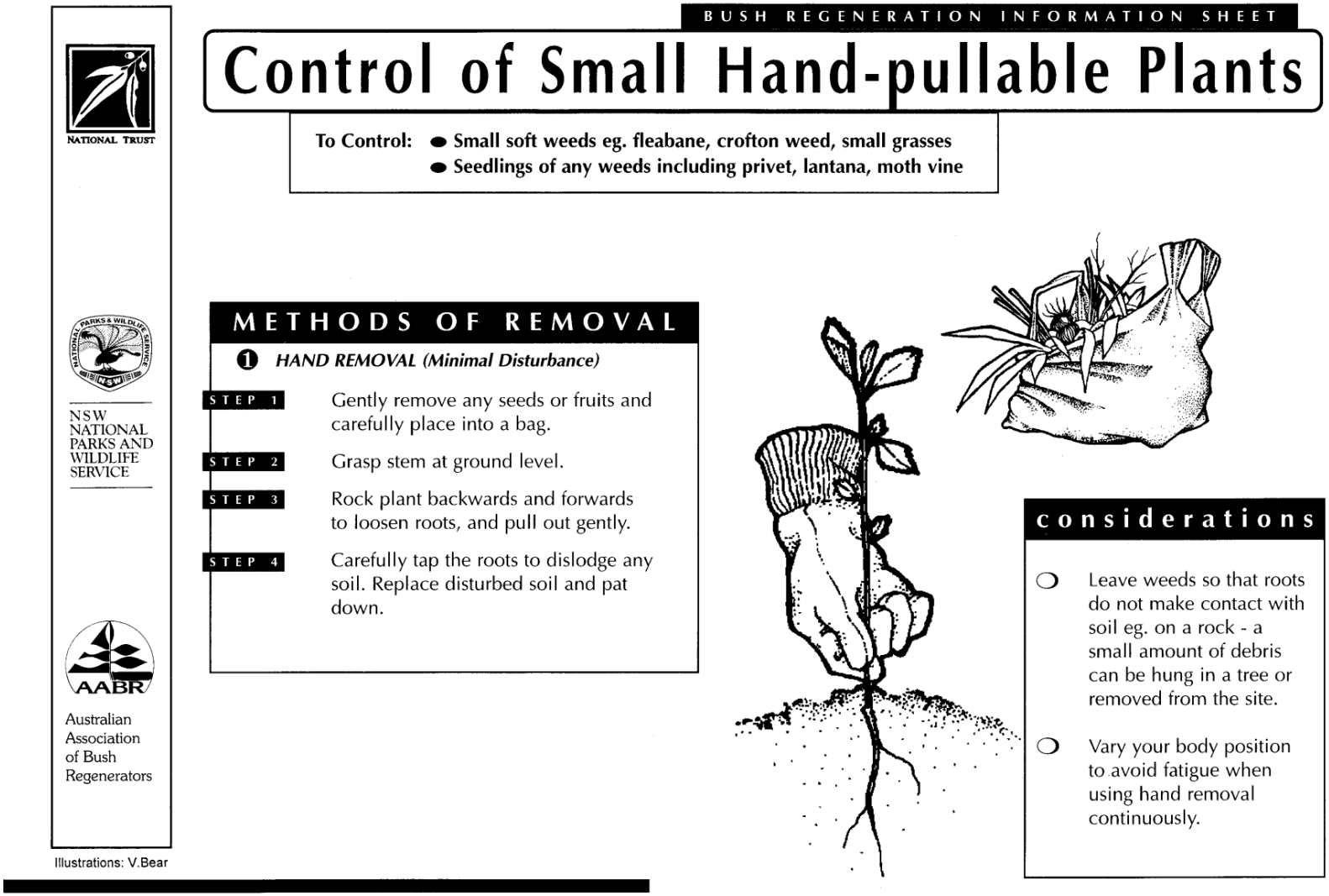


Figure 14: Hand pulling method (AABR 2010)

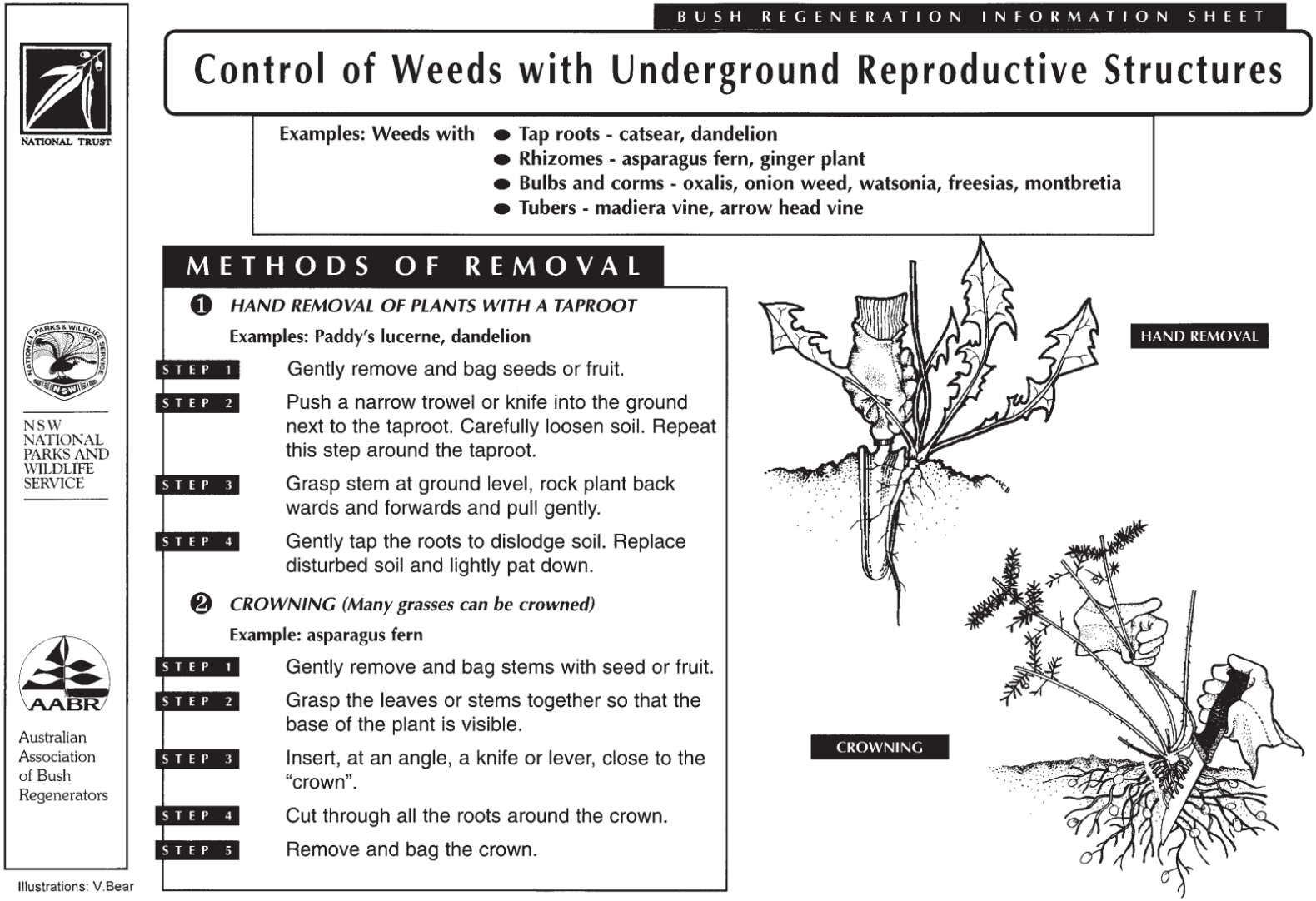
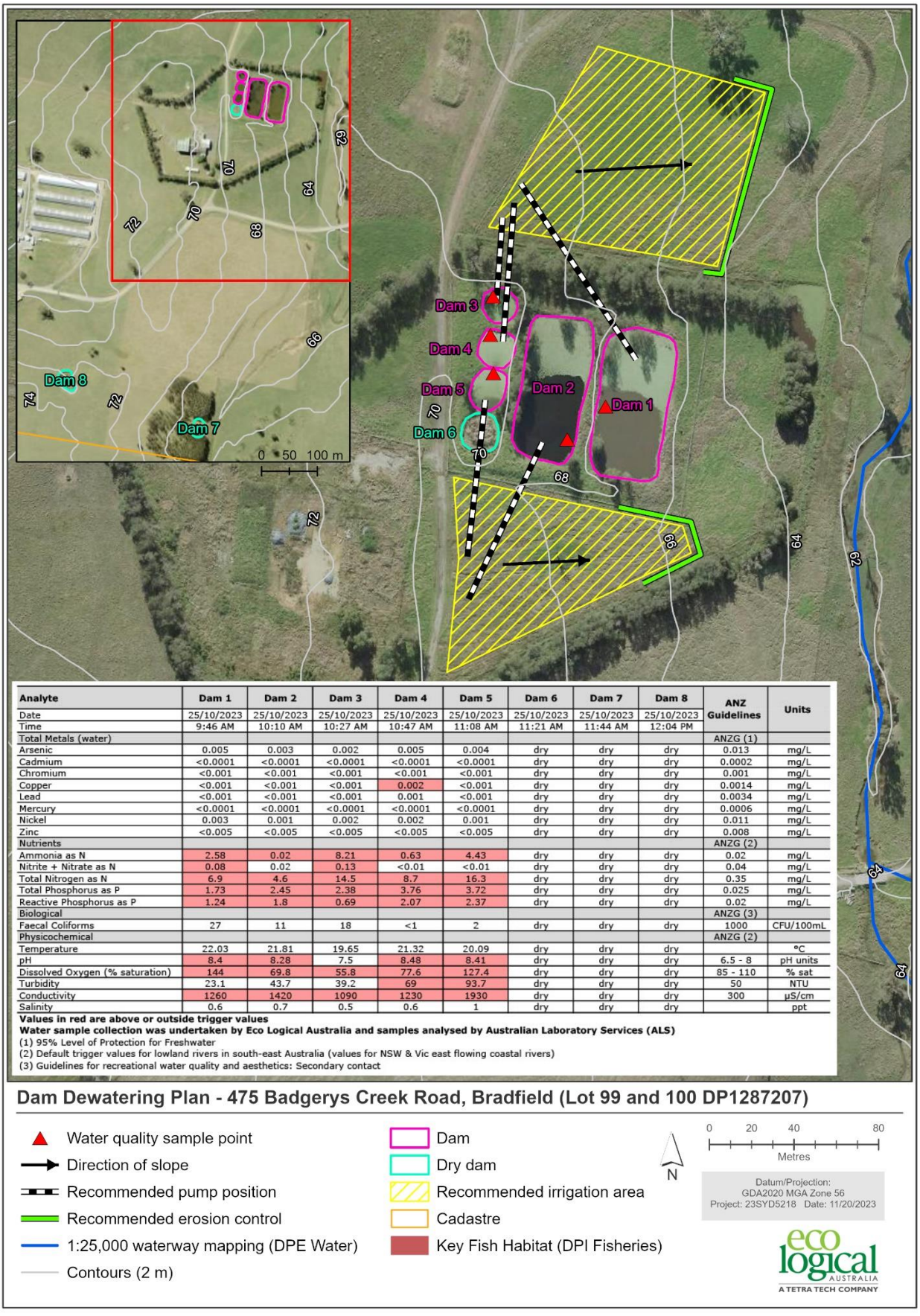


Figure 15: Crown method (AABR 2010)

APPENDIX E

Dam Dewatering Plan



Analyte	Dam 1	Dam 2	Dam 3	Dam 4	Dam 5	Dam 6	Dam 7	Dam 8	ANZ Guidelines	Units
Date	25/10/2023	25/10/2023	25/10/2023	25/10/2023	25/10/2023	25/10/2023	25/10/2023	25/10/2023		
Time	9:46 AM	10:10 AM	10:27 AM	10:47 AM	11:08 AM	11:21 AM	11:44 AM	12:04 PM		
Total Metals (water)									ANZG (1)	
Arsenic	0.005	0.003	0.002	0.005	0.004	dry	dry	dry	0.013	mg/L
Cadmium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	dry	dry	dry	0.0002	mg/L
Chromium	<0.001	<0.001	<0.001	<0.001	<0.001	dry	dry	dry	0.001	mg/L
Copper	<0.001	<0.001	<0.001	0.002	<0.001	dry	dry	dry	0.0014	mg/L
Lead	<0.001	<0.001	<0.001	0.001	<0.001	dry	dry	dry	0.0034	mg/L
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	dry	dry	dry	0.0006	mg/L
Nickel	0.003	0.001	0.002	0.002	0.001	dry	dry	dry	0.011	mg/L
Zinc	<0.005	<0.005	<0.005	<0.005	<0.005	dry	dry	dry	0.008	mg/L
Nutrients									ANZG (2)	
Ammonia as N	2.58	0.02	8.21	0.63	4.43	dry	dry	dry	0.02	mg/L
Nitrite + Nitrate as N	0.08	0.02	0.13	<0.01	<0.01	dry	dry	dry	0.04	mg/L
Total Nitrogen as N	6.9	4.6	14.5	8.7	16.3	dry	dry	dry	0.35	mg/L
Total Phosphorus as P	1.73	2.45	2.38	3.76	3.72	dry	dry	dry	0.025	mg/L
Reactive Phosphorus as P	1.24	1.8	0.69	2.07	2.37	dry	dry	dry	0.02	mg/L
Biological									ANZG (3)	
Faecal Coliforms	27	11	18	<1	2	dry	dry	dry	1000	CFU/100mL
Physicochemical									ANZG (2)	
Temperature	22.03	21.81	19.65	21.32	20.09	dry	dry	dry		°C
pH	8.4	8.28	7.5	8.48	8.41	dry	dry	dry	6.5 - 8	pH units
Dissolved Oxygen (% saturation)	144	69.8	55.8	77.6	127.4	dry	dry	dry	85 - 110	% sat
Turbidity	23.1	43.7	39.2	69	93.7	dry	dry	dry	50	NTU
Conductivity	1260	1420	1090	1230	1930	dry	dry	dry	300	µS/cm
Salinity	0.6	0.7	0.5	0.6	1	dry	dry	dry		ppt

Values in red are above or outside trigger values
Water sample collection was undertaken by Eco Logical Australia and samples analysed by Australian Laboratory Services (ALS)
(1) 95% Level of Protection for Freshwater
(2) Default trigger values for lowland rivers in south-east Australia (values for NSW & Vic east flowing coastal rivers)
(3) Guidelines for recreational water quality and aesthetics: Secondary contact

Figure 16: Dam Dewatering Plan

E1 Water Quality

Water testing and a brief field survey occurred on 25 October 2023, using a calibrated water quality meter and samples analysed at ALS Laboratories Smithfield. Water quality analytes that did not meet the adopted ANZ guidelines are summarised in Table 29, including minor exceedance of copper in dam 4 and major exceedance of nutrients in all dams. Faecal Coliform count met the guidelines, therefore the water is suitable for secondary human contact during dewatering. Sediment testing is recommended after dewatering to ensure suitability for re-use.

Full water quality results are provided in Figure 16.

E2 Dewatering Method

The works could be completed at any time of the year, provided that daytime temperature does not exceed 36°C during the final stages (to prevent stress to fauna and ecologists). Water should be pumped and slowly irrigated across the adjacent grassland prior to the removal of any vegetation. The intake pipe should be caged or shielded to minimise injury to aquatic fauna. Pumped water should be released at the highest ground and allowed to infiltrate the soil with minimal overland flow, using *AS/NZS 1547:2012 Onsite domestic wastewater management* as a guide to calculate flow rate. If soil becomes saturated, irrigation should be adjusted accordingly or repositioned. A large irrigation area would reduce soil saturation and minimise concentrated application of contaminants into the soil. Sediment controls, such as a silt fence or hay bales, are recommended to filter sediments from any excess overland flow. The bottom sludge material and any remaining turbid water should be excavated and dried onsite. All turbid water and sediment must be prevented from entering other waterbodies. Breaching the wall is not recommended as water collects clays and fines from the wall structure, resulting in turbid flows offsite.

Recommended pump, erosion control and irrigation areas are provided in Figure 16.

E3 Fauna Relocation Timeline

The relocation of fauna is to be coordinated with the Dam Decommissioning Work Method Procedure (or similar) and Project Aquatic Ecologist, in accordance with the timeline in Table 27 below.

Table 27: Timeline of fauna relocation

Timing	Procedure
Day 1	• Install erosion controls, such as silt fence (see map on left), hay bales and/or geotextile fabric, and prepare flat pump pad near the deepest end. The pump intake head is best positioned on a floating device above the deepest part of dam, held in position with ropes spanning the dam. It is difficult to move the pipe when the water is low, so it is easiest to install when dam is full. • Test discharge to ensure no erosion/sedimentation occurs. • Avoid disturbing vegetation (grass) where water will travel. • **Notify Project Aquatic Ecologist to explain type of equipment in place and likely dewatering timeframe.**
Day 2 – 5 (or longer)	• Pump water and irrigate overland at a rate allowing infiltration to the soil. • Check sediment controls if irrigation saturates soil causing surface runoff. Adjust pumping rate to slow runoff.

Timing	Procedure
	• **Update Project Aquatic Ecologist and send photos of water level to coordinate timing of fauna relocation.**
Day 6	• **During final 0.3 m of dewatering allow Project Aquatic Ecologist to rescue fauna in one day. Contractor must be able to pump all remaining water that day. Ecologist will instruct excavator operator to dig a solid surface around pump pit and carve steps for safe access up the bank. A suitable pump, excavator and communication with site staff is essential.** • Water will become turbid as it lowers and when ecologists trample sediment. This water should be discharged overland and away from drainage lines. To allow rapid fauna rescue, the pump inlet needs to be large enough to suck sediment (e.g. 4 - 6 inch). Earthworks machinery can push sediment across the dam to assist final fish capture (adjusted to suit conditions and ecologist's instructions). • Grade escape ramp for fauna hidden in bottom sediment overnight. • **Project Aquatic Ecologist to advise on ramp design (slope and location).**
Day 7 – 8	• Leave escape ramp for fauna trapped overnight (minimum two nights).
Ongoing	• Remove sediment and wall and commence construction.

E4 Approvals and Permits

This dam removal is part of a proposed Master Plan and Complying Development Certificate (CDC) process. If the dam is licensed with Water NSW, they require notification of dam decommissioning to remove it from the register. To check status refer to the contact details in Table 28.

Any conditions issued with the approval of the Master Plan or CDC should state that an ecologist is present to relocate fauna. This will only be performed by a person with the licenses/approvals under Section 37 *Fisheries Management Act 1994* (for fish) and an Animal Research Authority (issued by the Secretary's Animal Care & Ethic Committee).

If there is no condition specifying an ecologist or qualified wildlife handler be present, then a Biodiversity Conservation Licence under the *Biodiversity Conservation Act 2016* is required to relocate turtles, frogs and wetland birds.

Table 28: Water NSW licensing contacts

Contact	
Website	https://www.waternsw.com.au/customer-services/water-licensing https://waterregister.waternsw.com.au/water-register-frame
Email	Customer.Helpdesk@waternsw.com.au
Phone	1300 662 077

E5 Biodiversity

During a brief field survey, the following fauna species were observed:

- *Chelodina longicollis* (Eastern Long-necked Turtle)
- *Chenonetta jubata* (Australian Wood Duck)
- *Gallinula tenebrosa* (Dusky Moorhen)
- *Tachybaptus novaehollandiae* (Australasian Grebe).

Based on dewatering activities undertaken nearby the subject land, the following native aquatic fauna could inhabit the site:

- *Anguilla australis* (Shortfin Eel)
- *Anguilla reinhardtii* (Longfin Eel)
- *Philypnodon grandiceps* (Flathead Gudgeon).

Pest species may also occur, including *Carassius auratus* (Wild Goldfish), *Cyprinus carpio* (European Carp) and *Gambusia holbrooki* (Eastern Gambusia). Dominant native macrophytes and sedges included *Cyperus* sp. (Cyperus), *Juncus* sp. (Juncus), *Ludwigia peploides* subsp. *montevidensis* (Water Primrose), *Persicaria decipiens* (Slender Knotweed) and *Typha domingensis* (Narrow-leaved Cumbungi). No noxious aquatic weeds were observed.

E6 Aquatic Fauna Handling Procedure

The aquatic fauna handling procedure is provided as part of the FFMP (Appendix A9) and below.

NOTICE

The Aquatic Ecologist is to notify DPI Fisheries of the activity 48 hours prior to fish relocation (unless an agreement is in place), including locations of dewatered and relocation sites (see regional office contacts https://www.dpi.nsw.gov.au/contact-us/local-office). Fisheries require permits to be carried by the licensed ecologist, who should also display a sign clearly showing licence number (if working in public areas, especially when releasing fauna to local creek).

PLANNING

The dewatering schedule should allow time for fish rescue, especially during the final 0.3 m water depth or as advised by Aquatic Ecologist. Fauna should be captured in one day, so pumps need to be of an adequate size and placed in an area free from mud and debris (e.g. inside excavator bucket or screened sump pit). If wetland birds are observed nesting, or young birds (chicks) are using the dam, advise the Aquatic Ecologist immediately for advice. Depending on species and age, birds may be able to relocate themselves. Chicks will need temporary refuge during dewatering, or works may need to be postponed.

CAPTURE

Fish are to be collected by hand nets during the final day of dewatering. This is most effective when the water is < 0.3 m deep. Dissolved Oxygen concentration will drop rapidly as water volume decreases, especially in warm water or if lots of fish are present. Larger bodied fish should be targeted first. Wetland birds will scavenge for small fish in the shallows (e.g. Gambusia). Most small fauna will likely remain uncaptured in the dam until the water becomes very shallow (especially eels and turtles). Eels are best captured by large hand nets in water < 0.3 m deep, although they burrow into mud. When the water is extremely low, turtles and fish may head towards the intake pump (placed in deepest part). This area should be monitored to intercept fauna (stand in water next to intake on hard surface). Turtles will burrow into mud and may require observation and rescue the following morning but can also move themselves to suitable nearby habitat if an escape ramp is graded. Frogs can be collected by hand using a freezer/snap-lock bag if observed or heard around the fringe. Hygiene protocols are to be followed and each frog stored in a separate bag. For safety, at least two people are required when wading and handling heavy tubs of water/fish up banks (excavator should dig access steps/ramp).

RELOCATE

Native fish healthy enough for relocation are to be contained and transported in an aerated tub/tank to an appropriate waterbody. DPI Fisheries advise that the host location should be large enough to accommodate additional fish, especially predatory eels. Additional release sites may be needed. Do not overstock tubs or leave in direct sun for extended periods. Aeration can be provided by battery aquarium pumps or manual turbulence if only stored for a short period. Turtles can be transported in a shaded tub with a wet hessian bag placed inside for moisture and support during transport. Frogs can be transported in an inflated freezer/snap-lock bag containing leaves moistened with bottled water or dam water. Tadpoles can be transported in small buckets with dam water.

RELEASE

Water from the receiving waterbody should be mixed slowly over 5 - 10 minutes with the tank water to allow fish to acclimatise to the new water quality. Eels are less susceptible to changes in water quality. Care should be taken when releasing fauna not to also transfer weeds or invasive species (e.g. Carp eggs and Gambusia). Transfer animals via hand nets, rather than tipping the tub with water in the host waterbody. Eels can be released on land a few metres from the edge and pointed towards the water. Frogs are to be released in dense shade alongside water in the nearest protected riparian corridor.

PESTS

Exotic fish (e.g. Carp, Gambusia) are to be intercepted, euthanised and disposed of in accordance with the ecologist's Animal Research Authority (issued by the Secretary's Animal Care & Ethic Committee). Exotic *Trachemys scripta elegans* (Red-eared Slider Turtle) are to be contained humanly and DPI immediately notified (Biosecurity Line – 1800 680 244). They will collect the live turtle from the ecologist.

POST-DEWATERING

An escape ramp should be graded to allow trapped fauna to escape overnight. The Project Aquatic Ecologist will advise on ramp design (slope and location) on the day. Sediment should be left up to two nights to allow hidden fauna to emerge, unless the ecologist confirms there are no fauna remaining (site specific assessment). Earthworks staff should notify the Project Aquatic Ecologist if stranded fish or turtles are observed post-dewatering.

REPORTING

The Project Aquatic Ecologist should prepare a summary report suitable for submission to Council within 7 days of completing the aquatic fauna relocation works. The report would detail that the works have been completed according to this aquatic fauna handling procedure, and would include information relating to the location of the dam, the licences held by the staff involved in the works, the number and type of native species relocated, location of release point/s for native fauna and the number and type of exotic species dispatched. Photographic evidence of various steps in the procedure should be included.

Table 29: Summary of dams and water quality results

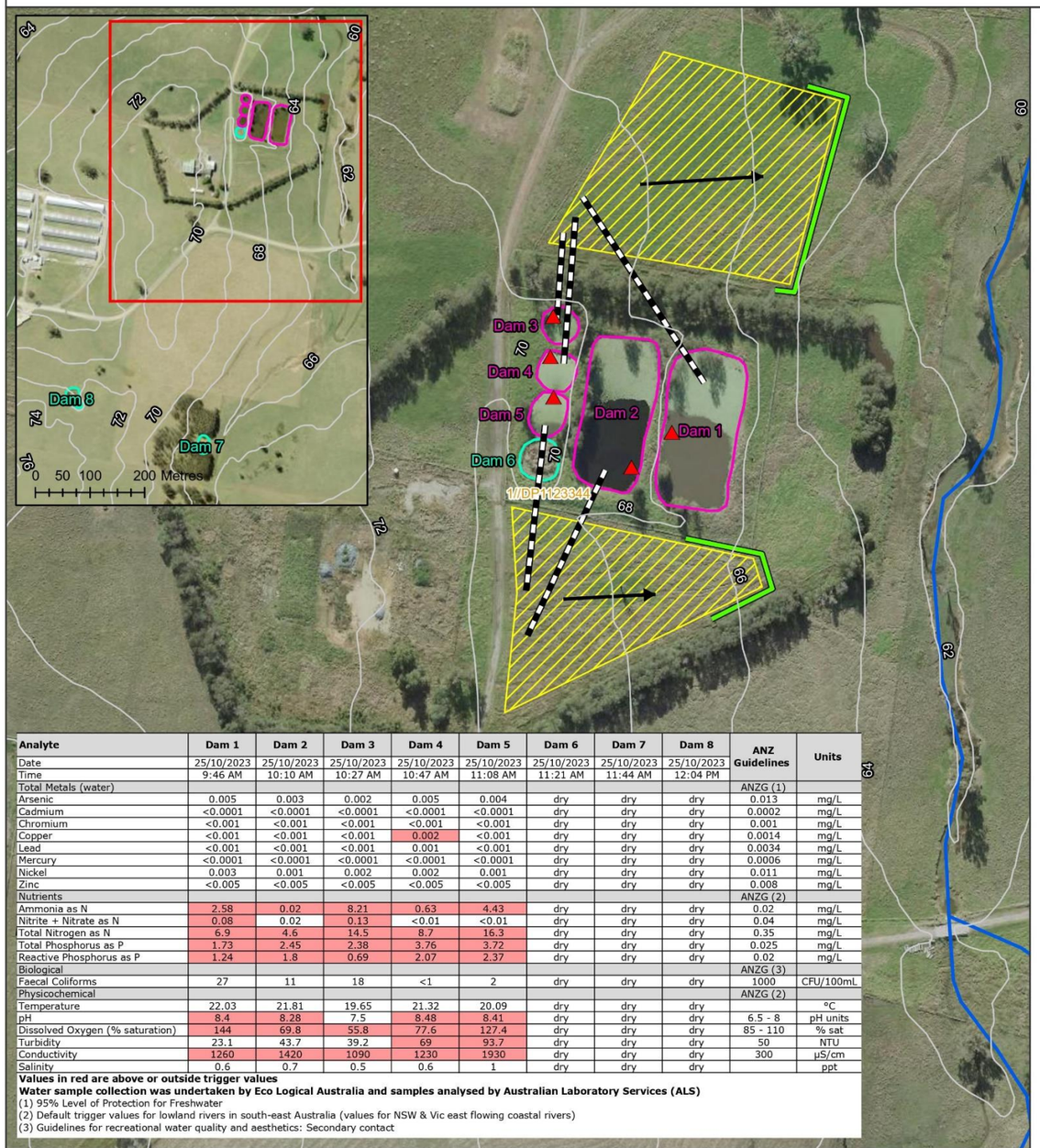
Dam	Location	Estimated maximum depth	Surface area	Volume (0.4 x Depth x Surface Area / 1000)	Catchment size	Slope of irrigation area	Water quality analytes that did not meet guidelines (see Figure 16 for full results)
1	-33.90340, 150.74285	3.0 m	2297 m^2	2.76 ML	3.5 ha	1:24	• Ammonia • Nitrite + Nitrate • Total Nitrogen, • Total Phosphorus • Reactive Phosphorus • pH • Dissolved Oxygen (%) • Conductivity
2	-33.90331, 150.74244	2.8 m	2022 m^2	2.22 ML	2.1 ha	1:27	• Ammonia • Total Nitrogen • Total Phosphorus • Reactive Phosphorus • pH • Dissolved Oxygen (%) • Conductivity
3	-33.90295, 150.74219	1.8 m	216 m^2	0.15 ML	1.3 ha	1:24	• Ammonia • Nitrite + Nitrate • Total Nitrogen • Total Phosphorus • Reactive Phosphorus • Dissolved Oxygen (%) • Conductivity
4	-33.90315, 150.74216	1.0 m	259 m^2	0.10 ML	1.3 ha	1:24	• Copper • Ammonia • Total Nitrogen • Total Phosphorus • Reactive Phosphorus • pH

Dam	Location	Estimated maximum depth	Surface area	Volume (0.4 x Depth x Surface Area / 1000)	Catchment size	Slope of irrigation area	Water quality analytes that did not meet guidelines (see Figure 16 for full results)
							• Dissolved Oxygen (%) • Turbidity • Conductivity
5	-33.90332, 150.74212	1.5 m	274 m^2	0.16 ML	1.3 ha	1:27	• Ammonia • Total Nitrogen • Total Phosphorus • Reactive Phosphorus • pH • Dissolved Oxygen (%) • Turbidity • Conductivity
6*	-33.90350, 150.74207	Dry	-	-	-	-	Samples not collected.
7*	-33.90860, 150.74123	Dry	-	-	-	-	Samples not collected.
8*	-33.90782, 150.73865	Dry	-	-	-	-	Samples not collected.

*At time of field survey, the dam did not have sufficient water levels to collect water quality samples.

E7 Consolidated Dam Dewatering Plan

Dam Dewatering Plan - 475 Badgerys Creek Road, Bradfield (Lot 99 and 100 DP1287207)



Analyte	Dam 1	Dam 2	Dam 3	Dam 4	Dam 5	Dam 6	Dam 7	Dam 8	ANZ Guidelines	Units
Date	25/10/2023	25/10/2023	25/10/2023	25/10/2023	25/10/2023	25/10/2023	25/10/2023	25/10/2023		
Time	9:46 AM	10:10 AM	10:27 AM	10:47 AM	11:08 AM	11:21 AM	11:44 AM	12:04 PM		
Total Metals (water)									ANZG (1)	
Arsenic	0.005	0.003	0.002	0.005	0.004	dry	dry	dry	0.013	mg/L
Cadmium	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	dry	dry	dry	0.0002	mg/L
Chromium	<0.001	<0.001	<0.001	<0.001	<0.001	dry	dry	dry	0.001	mg/L
Copper	<0.001	<0.001	<0.001	0.002	<0.001	dry	dry	dry	0.0014	mg/L
Lead	<0.001	<0.001	<0.001	0.001	<0.001	dry	dry	dry	0.0034	mg/L
Mercury	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	dry	dry	dry	0.0006	mg/L
Nickel	0.003	0.001	0.002	0.002	0.001	dry	dry	dry	0.011	mg/L
Zinc	<0.005	<0.005	<0.005	<0.005	<0.005	dry	dry	dry	0.008	mg/L
Nutrients									ANZG (2)	
Ammonia as N	2.58	0.02	8.21	0.63	4.43	dry	dry	dry	0.02	mg/L
Nitrite + Nitrate as N	0.08	0.02	0.13	<0.01	<0.01	dry	dry	dry	0.04	mg/L
Total Nitrogen as N	6.9	4.6	14.5	8.7	16.3	dry	dry	dry	0.35	mg/L
Total Phosphorus as P	1.73	2.45	2.38	3.76	3.72	dry	dry	dry	0.025	mg/L
Reactive Phosphorus as P	1.24	1.8	0.69	2.07	2.37	dry	dry	dry	0.02	mg/L
Biological									ANZG (3)	
Faecal Coliforms	27	11	18	<1	2	dry	dry	dry	1000	CFU/100mL
Physicochemical									ANZG (2)	
Temperature	22.03	21.81	19.65	21.32	20.09	dry	dry	dry		°C
pH	8.4	8.28	7.5	8.48	8.41	dry	dry	dry	6.5 - 8	pH units
Dissolved Oxygen (% saturation)	144	69.8	55.8	77.6	127.4	dry	dry	dry	85 - 110	% sat
Turbidity	23.1	43.7	39.2	69	93.7	dry	dry	dry	50	NTU
Conductivity	1260	1420	1090	1230	1930	dry	dry	dry	300	µS/cm
Salinity	0.6	0.7	0.5	0.6	1	dry	dry	dry		ppt

Values in red are above or outside trigger values
Water sample collection was undertaken by Eco Logical Australia and samples analysed by Australian Laboratory Services (ALS)
(1) 95% Level of Protection for Freshwater
(2) Default trigger values for lowland rivers in south-east Australia (values for NSW & Vic east flowing coastal rivers)
(3) Guidelines for recreational water quality and aesthetics: Secondary contact

Dam	Location	Estimated maximum depth	Surface area	Volume (0.4 x Depth x Surface Area / 1000)	Catchment size	Slope of irrigation area	Water quality analytes that did not meet guidelines (see table to left for full results)
1	-33.90340, 150.74285	3.0 m	2297 m^2	2.76 ML	3.5 ha	1:24	Ammonia, Nitrite + Nitrate, Total Nitrogen, Total Phosphorus, Reactive Phosphorus, pH, Dissolved Oxygen (%), Conductivity
2	-33.90331, 150.74244	2.8 m	2022 m^2	2.22 ML	2.1 ha	1:27	Ammonia, Total Nitrogen, Total Phosphorus, Reactive Phosphorus, pH, Dissolved Oxygen (%), Conductivity
3	-33.90295, 150.74219	1.8 m	216 m^2	0.15 ML	1.3 ha	1:24	Ammonia, Nitrite + Nitrate, Total Nitrogen, Total Phosphorus, Reactive Phosphorus, Dissolved Oxygen (%), Conductivity
4	-33.90315, 150.74216	1.0 m	259 m^2	0.10 ML	1.3 ha	1:24	Copper, Ammonia, Total Nitrogen, Total Phosphorus, Reactive Phosphorus, pH, Dissolved Oxygen (%), Turbidity, Conductivity
5	-33.90332, 150.74212	1.5 m	274 m^2	0.16 ML	1.3 ha	1:27	Ammonia, Total Nitrogen, Total Phosphorus, Reactive Phosphorus, pH, Dissolved Oxygen (%), Turbidity, Conductivity
6*	-33.90350, 150.74207	Dry	n/a	n/a	n/a	n/a	Samples not collected
7*	-33.90860, 150.74123	Dry	n/a	n/a	n/a	n/a	Samples not collected
8*	-33.90782, 150.73865	Dry	n/a	n/a	n/a	n/a	Samples not collected

*At time of field survey, the dam did not have sufficient water levels to collect water quality samples.

Water quality
Water testing and a brief field survey occurred on 25 October 2023, using a calibrated water quality meter and samples analysed at ALS Laboratories Smithfield. Water quality analytes that did not meet the adopted ANZ guidelines are summarised above, including minor exceedance of copper in dam 4 and major exceedance of nutrients in all dams. Faecal Coliform count met the guidelines, therefore, the water is suitable for secondary human contact during dewatering. Sediment testing is recommended after dewatering to ensure suitability for re-use.

Dewatering method
The works could be completed at any time of the year, provided that daytime temperature does not exceed 36°C during the final stages (to prevent stress to fauna and ecologists). Water should be pumped and slowly irrigated across the adjacent grassland prior to the removal of any vegetation. The intake pipe should be caged or shielded to minimise injury to aquatic fauna. Pumped water should be released at the highest ground and allowed to infiltrate the soil with minimal overland flow, using *AS/NZS 1547:2012 Onsite domestic wastewater management* as a guide to calculate flow rate. If soil becomes saturated, irrigation should be adjusted accordingly or repositioned. A large irrigation area would reduce soil saturation and minimise concentrated application of contaminants into the soil. Sediment controls, such as a silt fence or hay bales, are recommended to filter sediments from any excess overland flow. The bottom sludge material and any remaining turbid water should be excavated and dried onsite. All turbid water and sediment must be prevented from entering other waterbodies. Breaching the wall is not recommended as water collects clays and fines from the wall structure, resulting in turbid flows offsite.

Timeline of fauna relocation to be coordinated with Dam Decommissioning Work Method Procedure (or similar) and Project Aquatic Ecologist

Day 1	Day 2 - 5 (or longer)	Day 6	Day 7 - 8	Ongoing
Install erosion controls, such as silt fence (see map on left), hay bales and/or geotextile fabric, and prepare flat pump pad near the deepest end. The pump intake head is best positioned on a floating device above the deepest part of dam, held in position with ropes spanning the dam. It is difficult to move the pipe when the water is low, so it's easiest to install when dam is full. Test discharge to ensure no erosion/sedimentation occurs. Avoid disturbing vegetation (grass) where water will travel. **Notify Project Aquatic Ecologist to explain type of equipment in place and likely dewatering timeframe.**	Pump water and irrigate overland at a rate allowing infiltration to the soil. Check sediment controls if irrigation saturates soil causing surface runoff. Adjust pumping rate to slow runoff. **Update Project Aquatic Ecologist and send photos of water level to coordinate timing of fauna relocation.**	**During final 0.3 m of dewatering allow Project Aquatic Ecologist to rescue fauna in one day. Contractor must be able to pump all remaining water that day. Ecologist will instruct excavator operator to dig a solid surface around pump pit and carve steps for safe access up the bank. A suitable pump, excavator and communication with site staff is essential.** Water will become turbid as it lowers and when ecologists trample sediment. This water should be discharged overland and away from drainage lines. To allow rapid fauna rescue, the pump inlet needs to be large enough to suck sediment (e.g. 4 - 6 inch). Earthworks machinery can push sediment across the dam to assist final fish capture (adjusted to suit conditions and ecologist's instructions). Grade escape ramp for fauna hidden in bottom sediment overnight. **Project Aquatic Ecologist to advise on ramp design (slope and location).**	Leave escape ramp for fauna trapped overnight (minimum two nights).	Remove sediment and wall and commence construction.

Approvals and permits
This dam removal is part of Development Approval (DA). If the dam is licensed with Water NSW, they require notification of dam decommissioning to remove it from the register. To check status refer to Website: https://www.waternsw.com.au/customer-services/water-licensing; Email: Customer.Helpdesk@waternsw.com.au; Phone: 1300 662 077. The DA conditions of consent should state that an ecologist is present to relocate fauna. This will only be performed by a person with the following licenses/approvals: Section 37 *Fisheries Management Act 1994* (for fish) and an Animal Research Authority (issued by the Secretary's Animal Care & Ethic Committee). If there is no DA condition specifying an ecologist or qualified wildlife handler be presenter, then a Biodiversity Conservation Licence – *Biodiversity Conservation Act 2016* is required to relocate turtles, frogs and wetland birds.

Biodiversity
During a brief field survey, the following fauna species were observed: *Chelodina longicollis* (Eastern Long-necked Turtle), *Chenonetta jubata* (Australian Wood Duck), *Gallinula tenebrosa* (Dusky Moorhen) and *Tachybaptus novaehollandiae* (Australasian Grebe). Based on dewatering activities nearby, the following native aquatic fauna could inhabit the site: *Anguilla australis* (Shortfin Eel), *Anguilla reinhardtii* (Longfin Eel) and *Philypnodon grandiceps* (Flathead Gudgeon). Pest species may also occur, including *Carassius auratus* (Wild Goldfish), *Cyprinus carpio* (European Carp) and *Gambusia holbrooki* (Eastern Gambusia). Dominant native macrophytes and sedges included: *Cyperus* sp. (Cyperus), *Juncus* sp. (Juncus), *Ludwigia peploides* subsp. *montevidensis* (Water Primrose), *Persicaria decipiens* (Slender Knotweed) and *Typha domingensis* (Narrow-leaved Cumbungi). No noxious aquatic weeds were observed.

Aquatic fauna handling procedure
i. **NOTICE:** The Aquatic Ecologist is to notify DPI Fisheries of the activity 48 hours prior to fish relocation (unless an agreement is in place), including locations of dewatered and relocation sites (see regional office contacts https://www.dpi.nsw.gov.au/contact-us/local-office. Fisheries require permits to be carried by the licensed ecologist, who should also display a sign clearly showing licence number (if working in public areas, especially when releasing fauna to local creek).
ii. **PLANNING:** The dewatering schedule should allow time for fish rescue, especially during the final 0.3 m water depth or as advised by Aquatic Ecologist. Fauna should be captured in one day, so pumps need to be of an adequate size and placed in an area free from mud and debris (e.g. inside excavator bucket or screened sump pit). If wetland birds are observed nesting, or young birds (chicks) are using the dam, advise the Aquatic Ecologist immediately for advice. Depending on species and age, birds may be able to relocate themselves. Chicks will need temporary refuge during dewatering, or works may need to be postponed.
iii. **CAPTURE:** Fish are to be collected by hand nets during the final day of dewatering. This is most effective when the water is <0.3 m deep. Dissolved Oxygen concentration will drop rapidly as water volume decreases, especially in warm water or if lots of fish are present. Larger bodied fish should be targeted first. Wetland birds will scavenge for small fish in the shallows (e.g. Gambusia). Most small fauna will likely remain uncaptured in the dam until the water becomes very shallow (especially eels and turtles). Eels are best captured by large hand nets in water <0.3 m deep, although they burrow into mud. When the water is extremely low, turtles and fish may head towards the intake pump (placed in deepest part). This area should be monitored to intercept fauna (stand in water next to intake on hard surface). Turtles will burrow into mud and may require observation and rescue the following morning but can also move themselves to suitable nearby habitat if an escape ramp is graded. Frogs can be collected by hand using a freezer/snap-lock bag if observed or heard around the fringe. Hygiene protocols are to be followed and each frog stored in a separate bag. For safety, at least two people are required when wading and handling heavy tubs of water/fish up banks (excavator should dig access steps/ramp).
iv. **RELOCATE:** Native fish healthy enough for relocation are to be contained and transported in an aerated tub/tank to an appropriate waterbody. DPI Fisheries advise that the host location should be large enough to accommodate additional fish, especially predatory eels. Additional release sites may be needed. Do not overstock tubs or leave in direct sun for extended periods. Aeration can be provided by battery aquarium pumps or manual turbulence if only stored for a short period. Turtles can be transported in a shaded tub with a wet hessian bag placed inside for moisture and support during transport. Frogs can be transported in an inflated freezer/snap-lock bag containing leaves moistened with bottled water or dam water. Tadpoles can be transported in small buckets with dam water.
v. **RELEASE:** Water from the receiving waterbody should be mixed slowly over 5 - 10 minutes with the tank water to allow fish to acclimatise to the new water quality. Eels are less susceptible to changes in water quality. Care should be taken when releasing fauna not to also transfer weeds or invasive species (e.g. Carp eggs and Gambusia). Transfer animals via hand nets, rather than tipping the tub with water in the host waterbody. Eels can be released on land a few metres from the edge and pointed towards the water. Frogs are to be released in dense shade alongside water in the nearest protected riparian corridor.
vi. **PESTS**: Exotic fish (e.g. Carp, Gambusia) are to be intercepted, euthanised and disposed of in accordance with the ecologist's Animal Research Authority (issued by the Secretary's Animal Care & Ethic Committee). Exotic *Trachemys scripta elegans* (Red-eared Slider Turtle) are to be contained humanly and DPI immediately notified (Biosecurity Line – 1800 680 244). They will collect the live turtle from the ecologist.
vii. **POST-DEWATERING:** An escape ramp should be graded to allow trapped fauna to escape overnight. The Project Aquatic Ecologist will advise on ramp design (slope and location) on the day. Sediment should be left up to two nights to allow hidden fauna to emerge, unless the ecologist confirms there are no fauna remaining (site specific assessment). Earthworks staff should notify the Project Aquatic Ecologist if stranded fish or turtles are observed post-dewatering.
viii. **REPORTING:** The Project Aquatic Ecologist should prepare a summary report suitable for submission to Council within 7 days of completing the aquatic fauna relocation works. The report would detail that the works have been completed according to this aquatic fauna handling procedure, and would include information relating to the location of the dam, the licences held by the staff involved in the works, the number and type of native species relocated, location of release point/s for native fauna and the number and type of exotic species dispatched. Photographic evidence of various steps in the procedure should be included.

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