

Vegetation Management Plan

The Forest High School, Allambie Road, Allambie NSW

NCA23R159293

28 November 2023



10/156 Boundary Street, West End,
QLD 4101

Phone +61 7 4957 5036



Vegetation Management Plan

The Forest High School, Allambie Road, Allambie NSW

Kleinfelder Project: NCA23R159293

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Prepared for:

ADCO Constructions Pty Ltd

Level 2, 7-9 West Street
North Sydney NSW 2060

Prepared by:

Kleinfelder Australia Pty Ltd

10/156 Boundary Street, West End, QLD 4101
Phone +61 7 4957 5036
ABN: 23 146 082 500

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Howard Rogers	Rob Townsend	Rob Townsend
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EXECUTIVE SUMMARY

The Forest High School (TFHS) is undertaking a redevelopment in a new location that will include new infrastructure and buildings and associated landscaping. A Vegetation Management Plan (VMPP) is required for the TFHS. This is required under Condition B22 of the Development Consent SSD-26876801 (DC) for the TFHS. Condition B22 of the DC for the TFHS requires that prior to the commencement of construction, the Applicant must prepare a revised Vegetation Management Plan (VMP), that is prepared by a suitably qualified bush regenerator and a suitably qualified ecologist. Key objectives need to include the rehabilitation and reconstruction of Duffys Forest. The conditions are in **Table 1**.

Table 1: Compliance Table for Development Consent Condition B20

Condition	Compliance
Prepared by	Prepared by Dr Howard Rogers (PhD Forest Ecology, BSc (Forestry)). Howard has over 25 years of experience in ecological assessments and rehabilitation projects across Australia. His CV is provided in Appendix 1 .
Ensure that initial weed removal and replacement planting works occur over a minimum of three years from the time of replacement planting.	Stated in Table 4 .
Be carried out in perpetuity and include appropriate monitoring and adaptive management methods	Stated in Table 4
Meet the benchmark values, as contained within BioNet Vegetation Classification, for PCT 1786.	See Section 5.1.2 .



TABLE OF CONTENTS

EXECUTIVE SUMMARY	II
1 INTRODUCTION	1
1.1 OVERVIEW	1
1.2 SITE DESCRIPTION	1
1.3 PROPOSED DEVELOPMENT	1
2 BIODIVERSITY VALUES.....	4
2.1 GEOLOGY AND SOILS	4
2.2 NATIVE VEGETATION	4
2.3 FAUNA HABITAT	4
2.4 THREATENED FAUNA SPECIES	4
3 MANAGEMENT ISSUES AND OBJECTIVES	5
3.1 EROSION AND SEDIMENT CONTROL	5
3.1.1 Management objective.....	5
3.2 VEGETATION PROTECTION	5
3.2.1 Management objective.....	5
3.3 FAUNA AND HABITAT MANAGEMENT	5
3.3.1 Management objective.....	5
3.4 WEED MANAGEMENT	6
3.4.1 Management objective.....	6
3.5 VEGETATION RESTORATION	7
3.5.1 Management objective.....	7
4 IMPLEMENTATION	8
4.1 MANAGEMENT ZONES	8
4.1.1 Management zone 1	8
4.1.2 Management zone 2	8
4.1.3 Management zone 3	8
4.2 MANAGEMENT STRATEGIES	9
4.2.1 Erosion and sediment control	9
4.2.2 Vegetation protection	9
4.2.3 Fauna management.....	9
4.2.4 Fauna habitat replacement	10
4.2.5 Weed management	10
4.2.6 Vegetation Restoration	11
5 MONITORING AND REPORTING.....	12
5.1 MONITORING METHODS	12
5.1.1 Annual walkover	12
5.1.2 Monitoring against the PTC benchmarks.....	12
5.1.3 Bat box / nest box monitoring	13
5.1.4 Reporting	13
5.2 PROJECT SCHEDULE	14
6 REFERENCES	16



TABLES

Table 1: Weed species requiring control within the Subject Land.....6

Table 2: PCT Benchmarks for Sydney Coastal Dry Sclerophyll Forests14

Table 3: Project task schedule14

FIGURES

Figure 1. The Forest High School Development and Vegetation Management Zones3



1 INTRODUCTION

1.1 OVERVIEW

The Forest High School (TFHS) is undertaking a redevelopment of outdated infrastructure and buildings to modernise and increase its capacity at a new location. Kleinfelder Australia Pty Ltd was engaged by ADCO Constructions Pty Ltd (ADCO) to prepare a Vegetation Management Plan (VMP) for the project at TFHS. The VMP is required under Condition B22 of the Development Consent SSD-26876801 (DC) for the TFHS.

Condition B22 of the DCV requires that prior to the commencement of construction, the Applicant must prepare a revised Vegetation Management Plan (VMP), that is prepared by a suitably qualified bush regenerator and a suitably qualified ecologist. Key objectives need to include the rehabilitation and reconstruction of Duffys Forest. The VMP is to:

- Ensure that initial weed removal and replacement planting works occur over a minimum of three years from the time of replacement planting.
- Be carried out in perpetuity and include appropriate monitoring and adaptive management methods.
- Meet the benchmark values, as contained within BioNet Vegetation Classification, for PCT 1786.

1.2 SITE DESCRIPTION

The Forest High School's new location is at Allambie Road, Allambie Heights, NSW on Lot 750 & 751 DP 1271174, Lot 6 & 7 DP 1280781 and Lot 3 DP 1280781 (Subject Land). The combined lots have a total area of 4.3 ha (**Figure 1**). The subject land is located within the Northern Beaches Council Local Government Area (LGA), approximately 12 kilometres (km) north from the Sydney central business district. The Subject Land was occupied by an abandoned building, carparks, driveways and mature landscaping in the eastern parts. The western parts of the subject land contain weedy native vegetation and a transmission line in the north, an area of open exotic grassland in the centre and a band of regrowth native vegetation which has been previously identified as Duffys Forest endangered ecological community (EEC) in the south.

1.3 PROPOSED DEVELOPMENT

The Northern Beaches Hospital Structure Plan has nominated the existing The Forest High School (TFHS) site as the location for the new Frenchs Forest Town Centre, part of the Frenchs Forest Planned Precinct (FFPP). To realise this plan and support a whole of government approach to strategic planning, the Department of Education (DoE) is relocating the existing TFHS to a newly acquired site at 187 Allambie Road, Allambie Heights. The new school will provide capacity for the 2036 projected enrolment demand of 1,847 students. This will be achieved by catchment boundary changes to redistribute 387 students to adjacent schools and by providing a new Stream 9 high school with the following features:

- 73 GLS to allow for 1,460 student enrolments.
- Core facilities of Stream nine High School
- New synthetic sports field.

The project scope for the Forest High School Education Precinct consists of the following:

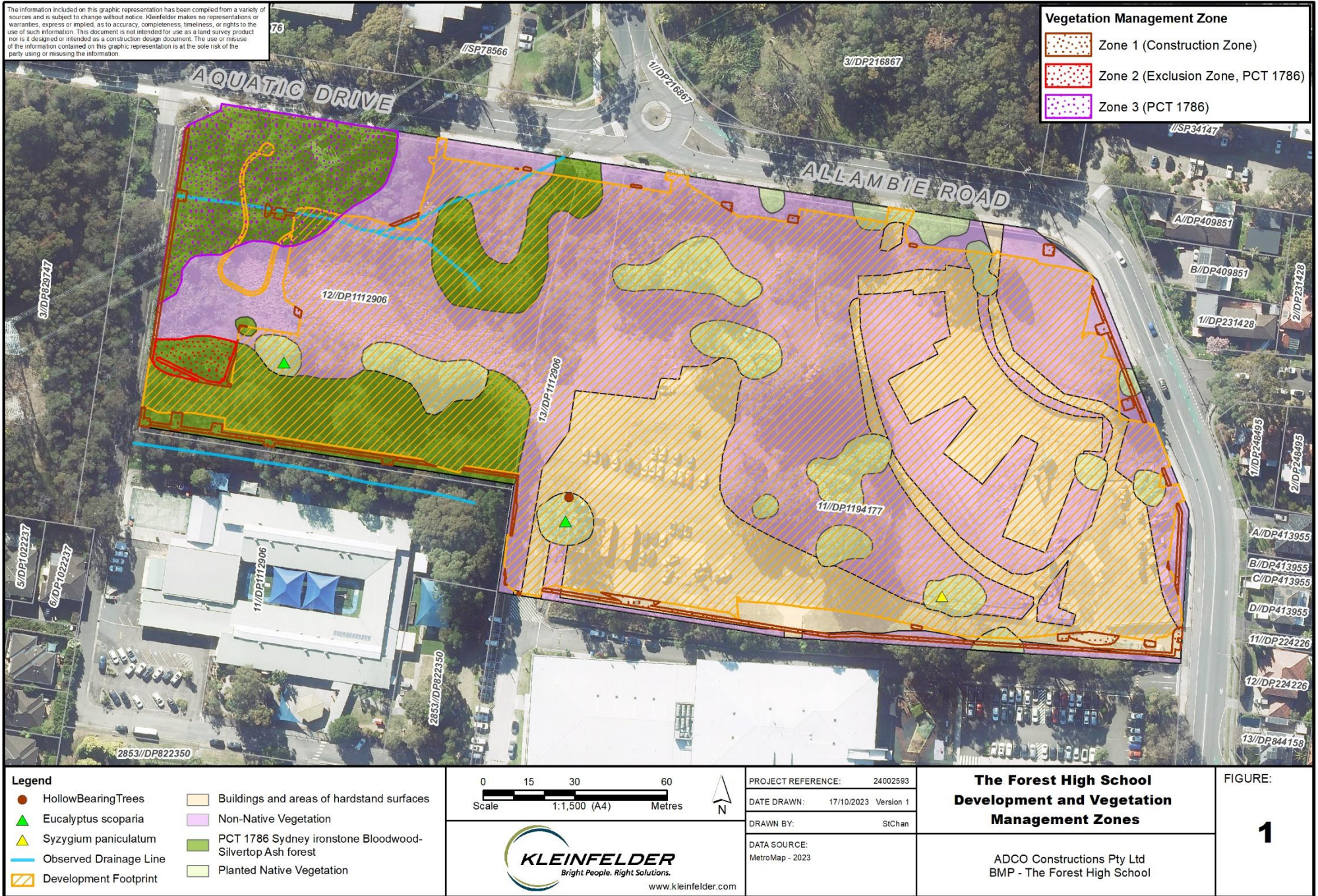
- Block A, a two-storey building comprising administration, staff, library and classroom facilities
- Block B (Comprising Blocks B1 and B2), a three-storey building comprising general and specialist classroom facilities
- Block C, a two-storey building containing a library, general classrooms and associated rooms
- Block D (comprising Blocks D1 and D2), a two-storey building comprising classrooms, laboratories and associated facilities
- Block E, a two-storey building comprising classroom facilities and special classrooms
- Block F, a one-to-two-storey gymnasium building and specialist classroom facilities




- Block G, a two-to-three-storey building containing classrooms, workshops, a theatre and a canteen, with associated facilities
- Sporting facilities, including new sporting field and games courts
- Car parking, including at-grade and basement parking areas
- Associated earthworks, tree/ stump removal, landscaping, stormwater.

Construction of the proposed development will require the permanent removal of 0.43 ha of native vegetation, comprising 0.28 ha of PCT 1786 Sydney Ironstone Bloodwood-Silvertop Ash Forest in moderate condition and 0.15 ha of PCT 1786 in low condition. The removal of the PCT 1786 in moderate condition also represents the permanent removal of 0.28 ha of Duffys Forest EEC, which is also an SAIL (Serious and Irreversible Impacts of Development on Biodiversity) entity. In relation to threatened species habitat, the removal of PCT 1786 represents removal of non-breeding habitat for the Large-eared Pied Bat.










The proposed development areas are mapped in **Figure 1**.

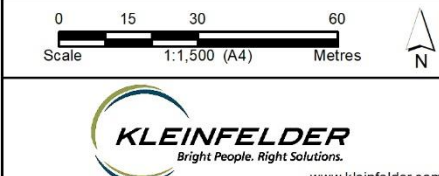


Vegetation Management Zone

- 
- Zone 1 (Construction Zone)
- Zone 2 (Exclusion Zone, PCT 1786)
- Zone 3 (PCT 1786)

Legend

	HollowBearingTrees		Buildings and areas of hardstand surfaces
	Eucalyptus scoparia		Non-Native Vegetation
	Syzygium paniculatum		PCT 1786 Sydney ironstone Bloodwood-Silvertop Ash forest
	Observed Drainage Line		Planted Native Vegetation
	Development Footprint		



PROJECT REFERENCE:	24002593
DATE DRAWN:	17/10/2023 Version 1
DRAWN BY:	SiChan
DATA SOURCE:	MetroMap - 2023

The Forest High School Development and Vegetation Management Zones

ADCO Constructions Pty Ltd
BMP - The Forest High School

FIGURE:
1



2 BIODIVERSITY VALUES

2.1 GEOLOGY AND SOILS

The geology of the Subject Land is mapped as shale and laminate of the Wianamatta Group. The Wianamatta Group is a geological feature of the Sydney Basin, that directly overlies the older (but still Triassic in age) Hawkesbury sandstone and generally comprise fine grained sedimentary rocks such as shales and laminites as well as less common sandstone units. Weathering of the shale units produces a rich clayey soil, often with poor drainage, The clay soils are recognised as being reactive with appreciable Shrink-swell capacity (GeoScience Australia, 2020).

2.2 NATIVE VEGETATION

Small patches of PCT 1786 Sydney Ironstone Bloodwood-Silvertop Ash Forest within the western parts of the Subject Land. One patch in the southwest is in moderate condition and constitutes the Duffys Forest EEC listed under the BC Act.

A revised vegetation map showing the extent of native vegetation (i.e. PCT 1786) within the subject land is presented in **Figure 1**. The area that constitutes the Duffys Creek EEC that will not be impacted by construction is demarcated as an exclusion zone (**Figure 1**).

Direct impact of construction of the proposed development will require the permanent removal of 0.43 ha of native vegetation, comprising 0.28 ha of PCT 1786 in moderate condition and 0.15 ha of PCT 1786 in low condition. The removal of the PCT 1786 in moderate condition also represents the permanent removal of 0.28 ha of Duffys Forest EEC, which is also an SAI entity.

2.3 FAUNA HABITAT

Despite the presence of areas of native vegetation habitat quality is relatively low. The Subject Land does not contain any large nests or hollows and therefore, does not provide breeding habitat to threatened species of arboreal mammals, owls, cockatoos, or birds of prey. A few of the rough-barked Eucalypt species across the subject land contain very small, narrow fissures which may be suitable roosting habitat for some microchiropteran bats.

2.4 THREATENED FAUNA SPECIES

One threatened species of fauna, the Grey-headed Flying-fox, was detected during surveys of the Subject Land. The Grey-headed Flying-fox was observed foraging within the tree canopies of planted native vegetation (in particular of the Swamp Mahogany *Eucalyptus robusta*, and Hills Weeping Fig, *Ficus hillii*) and as a fly-over during nocturnal surveys.

The Forest High School BDAR (SLR, 2023) determined that there were 22 species of fauna predicted to occur in the PCTs on the site and a further three species derived from the BAM calculator. The 25 species comprise 14 bird species, 4 species of non-volant mammals, 4 species of bats, 2 species of reptile and 1 species of amphibian.

No habitat for the listed migratory wetland species was present and only marginal habitat for three of the listed terrestrial migratory species predicted to occur in the locality (White-throated Needletail, Satin Flycatcher and Spectacled Monarch).

The Assessment of Impacts for threatened fauna determined that removal of human-made structures (i.e., various sheds, shipping containers, pipes and a bridge) could affect threatened microbats, including the Large Bent-winged Bat and Little Bent-winged Bat (if present). Removal of non-native vegetation could affect foraging and roosting behaviour of the Powerful Owl.



3 MANAGEMENT ISSUES AND OBJECTIVES

3.1 EROSION AND SEDIMENT CONTROL

Construction activities such as vegetation clearing and excavation may disturb the soil profile and create bare areas. These areas are more prone to erosion and the subsequent dispersion of sediment. Runoff may carry this sediment to other environments where it can cause impacts to the receiving environment. Disturbed soils are also more favourable for weed establishment.

3.1.1 Management objective

The objective of erosion and sediment control is to contain soil and sediment within the development area and prevent these materials from leaving the Subject Land.

3.2 VEGETATION PROTECTION

The proposed development will require the permanent removal of 0.43 ha of native vegetation, comprising 0.28 ha of PCT 1786 in moderate condition and 0.15 ha of PCT 1786 in low condition. In addition, two species of threatened flora on the subject land. These were the Wallangarra White Gum *Eucalyptus scoparia* and Magenta Lilly Pilly *Syzygium paniculatum*, both of which had been planted.

Potential direct impacts include the following:

- Habitat fragmentation and a general loss of biodiversity
- Damage to adjacent vegetation during clearing.
- Damage to two endangered tree species.

Potential indirect impacts include the following:

- The spread of weeds via clothes, boots, vehicles and machinery
- Introduction of Myrtle rust that could cause mortality of the endangered tree *Syzygium paniculatum*
- Weed encroachment due to increased edge effects
- Compacted soils around the two endangered tree species reducing water infiltration from rain events which may impact growth and or stress the trees.

3.2.1 Management objective

The key management objective is to ensure that native vegetation to be retained within the Subject Site is adequately protected during the construction phase. This includes avoiding encroachment into tree protection zones as defined by AS 4970-2009.

3.3 FAUNA AND HABITAT MANAGEMENT

The development area contains habitat features suitable for a range of fauna species including foraging habitat for the Grey-headed Flying Fox which utilizes the planted native vegetation (in particular of the Swamp Mahogany *Eucalyptus robusta*, and Hills Weeping Fig, *Ficus hillii*). The native vegetation remnants also provide suitable foraging and roosting habitat for a range of bird species, and the existing buildings potentially provide habitat for a range of microbat species.

3.3.1 Management objective

Key objectives that relate to the management of fauna habitat and displaced fauna include the following:

- Provide a clear description of the protocols and methods for pre-clearing surveys, vegetation clearing and habitat tree removal.
- Provide a clear description of the protocols and methods for pre-clearing surveys, to avoid microbat mortality during the demolition of the existing buildings.
- Prevent injury or death of fauna that are displaced during vegetation clearing or any other construction activities including the demolition of existing buildings.



3.4 WEED MANAGEMENT

A total of 14 exotic plant species were recorded within the Subject Site. Of these, one species, *Asparagus fern*, *Asparagus aethiopicus* is a declared priority weed species of the of the Greater Sydney LLS (Biosecurity Act).

In accordance with the objectives of the NSW Biosecurity Act 2015, landowners have a duty to control and prevent the spread of priority weeds within their lands.

In addition to priority weeds, the subject site also contains thirteen other species of weed that have the potential to cause habitat degradation if left unmanaged. For example, environmental weeds such as Whiskey Grass (*Andropogon virginicus*) can cause habitat degradation if not controlled.

A complete list of exotic plant species requiring control within the Subject Land is presented in **Table 2**.

Table 2: Weed species requiring control within the Subject Land

Family	Scientific Name	Common Name	Weeds of National Significance (WONS)	Priority weeds of the Greater Sydney LLS (Biosecurity Act)	High Threat Weeds (BAM)
Asteraceae	<i>Ageratina adenophora</i>	Crofton Weed	-	-	✓
Asteraceae	<i>Delairea odorata</i>	Cape Ivy			✓
Asparagaceae	<i>Asparagus aethiopicus</i>	Asparagus 'Fern'	✓	✓	✓
Fabaceae	<i>Senna pendula</i> var. <i>glabrata</i>	-			✓
Lamiales	<i>Ligustrum lucidum</i>	Large-leaved Privet			✓
Lamiales	<i>Ligustrum sinense</i>	Small-leaved Privet			✓
Lauraceae	<i>Cinnamomum camphora</i>	Camphor Laurel			✓
Ochnaceae	<i>Ochna serrata</i>	Mickey Mouse Plant			✓
Oleaceae	<i>Olea europaea</i> ssp. <i>cuspidata</i>	African Olive			✓
Poaceae	<i>Andropogon virginicus</i>	Whisky Grass		-	✓
Poaceae	<i>Cenchrus clandestinus</i>	Kikuyu	-	-	✓
Poaceae	<i>Ehrharta erecta</i>	Panic Veldtgrass			✓
Poaceae	<i>Stenotaphrum secundatum</i>	Buffalo Grass			✓
Verbenaceae	<i>Lantana camara</i>	Lantana	✓		✓

3.4.1 Management objective

The objective of weed management is to achieve a weed free resilient self-sustaining vegetation community within the Subject Site. The specific target for the VMP is to reduce weeds to less than 10% cover by Year 1 and to less than 5% by Year 3 following construction.



3.5 VEGETATION RESTORATION

Key objectives of this VMP are the rehabilitation and reconstruction of Duffys Forest TEC (PCT 1786) so that it meets the benchmark values, as contained within BioNet Vegetation Classification, for PCT 1786. The remnant areas of PCT 1786 that will be retained are in low to moderate condition, both of which should be managed to maintain and improve their condition in relation to the Sydney Coastal Dry Sclerophyll Forests benchmark values (i.e. PCT 1786). Weed control and supplementary planting (ground layer, shrub and canopy species) may be required in addition to assisted regeneration to ensure that vegetation integrity condition is improved.

3.5.1 Management objective

The objectives of vegetation restoration include the following:

- To restore and enhance vegetation condition so that the vegetation for PCT 1786 is on a trajectory to achieve the Sydney Coastal Dry Sclerophyll Forests benchmark values.
- To achieve an 80% survival rate of tube-stock plantings (if planting is required).
- To ensure the native vegetation areas species composition continues to be representative of PCT 1786 for the different structural layers as far as is practicable due to the small patch sizes remaining.
- To thin the trees *Pittosporum undulatum* and *Allocasuarina littoralis* if they become dominant. These species have a tendency to dominate in the absence of a natural fire regime and because of increased runoff to PCT 1786 in urban environments (see Section 10.1, Table 31 of TFHS BDAR June 2023 version).
- To minimise nutrient runoff into the PCT 1786 remnants to minimise impacts on benchmark species composition. Increased nutrients would favour species better adapted to more fertile soils not representative of the PCT 1786 species composition
- To describe monitoring and reporting strategies to measure the success of restoration management activities. Restoration monitoring should be designed to incorporate the Sydney Coastal Dry Sclerophyll Forests Benchmark values.



4 IMPLEMENTATION

4.1 MANAGEMENT ZONES

The subject site has been split into three management zones (Figure 4). A description of each management zone is described below.

4.1.1 Management zone 1

Management Zone 1 is the largest management zone within the Subject Land and is defined by the development footprint. Several management guidelines are applicable to this zone, including the following:

- Erosion and Sediment Control – to prevent sediment from leaving the development footprint
- Vegetation Protection - pre-clearance surveys and vegetation clearing protocols
- Fauna Management - displaced fauna and fauna habitat recovery
- Weed Management.

4.1.2 Management zone 2

Management Zone 2 consists of PCT 1786 that is in moderate condition which is a TEC that is to be retained in the southwest corner of the Subject Land. This is an exclusion zone. Management guidelines which apply to this zone include:

- Disturbance – fencing and signage to be erected to prevent access.
- Erosion and Sediment Control – to prevent sediment from entering this zone.
- Ongoing thinning of populations of *Pittosporum undulatum* and *Allocasuarina littoralis* (if / where present) to prevent shading / regeneration of species representative of PCT 1786.
- Runoff from hard surfaces should be directed away from this management zone in perpetuity to minimise nutrient enrichment of soils and minimise excessive soil moisture conditions.
- Construction surfaces should be designed to avoid increased overland flow into this management zone so that natural soil moisture levels for PCT 1786 are not elevated where practicable..
- Fauna Management - displaced fauna may be released into this zone and fauna habitat features may be reinstated and or improved, e.g. sections of large logs, particularly if hollow or developing hollow should be retained from vegetation clearing and placed in this area where practicable.
- Fauna Habitat Restoration -nest boxes may be installed in this area to improve habitat quality.
- Weed Management.

4.1.3 Management zone 3

Management Zone 3 consists of the areas of PCT 1786 that are in low condition and do not meet the condition requirements to be classified as a TEC. The area to be reattained is in the northwest of the Subject Land. Management guidelines which apply to this zone include:

- Disturbance – fencing and signage to be erected to prevent access.
- Erosion and Sediment Control – to prevent sediment from entering this zone.
- Ongoing thinning of populations of *Pittosporum undulatum* and *Allocasuarina littoralis* (if / where present) to prevent shading / regeneration of species representative of PCT 1786.
- Runoff from hard surfaces should be directed away from this management zone in perpetuity to minimise nutrient enrichment of soils and minimise excessive soil moisture conditions.
- Construction surfaces should be designed to avoid increased overland flow into this management zone so that natural soil moisture levels for PCT 1786 are not elevated in perpetuity where practicable.
- Fauna Management - displaced fauna may be released into this zone and fauna habitat features may be reinstated and or improved, e.g., sections of large logs, particularly if hollow or developing hollow should be retained from vegetation clearing and placed in this area where practicable.
- Fauna Habitat Restoration -nest boxes may be installed in this area to improve habitat quality.
- Weed Management.



4.2 MANAGEMENT STRATEGIES

4.2.1 Erosion and sediment control

The following recommendations are to be implemented during the construction and operational phases to reduce erosion potential within the development area:

- Install a suitable sediment control fence on down slopes of the development area prior to any ground excavations. Sediment control to follow guidelines in the “Blue Book (DECC, 2008).
- Conduct weekly checks of the fence to identify and repair any areas of failure.
- Remediate any rills or areas of erosion within 1 month of observed erosion to prevent sediment transfer.
- Avoid stockpiling of materials adjacent to native vegetation, but instead use areas that are already cleared/disturbed.

4.2.2 Vegetation protection

Native vegetation to be retained within the Subject Site should be clearly identified either through the construction of a temporary fence or barricade. This should be conducted prior to construction. Vegetation clearing should be conducted in a way that ensures that large trees and branches do not fall, damaging retained vegetation.

4.2.2.1 Tree protection zones

The TPZ is a specific area above and below ground and at a distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by the development. The TPZ (as defined by AS 4970-2009) requires restriction of access during the development process. Groups of trees with overlapping TPZs may be included within a single protection area. Tree sensitive measures must be implemented if works are to proceed within the TPZ.

Tree protection zones (TPZ) are to be established as described in TFHS Arboricultural Impact Assessment. This includes protective cyclone chain wire link fence to be erected around each TPZ to protect and isolate retained trees from the construction works. Existing boundary fencing may be used as part of the TPZ.

4.2.3 Fauna management

4.2.3.1 Pre-clearance surveys

Pre-clearing surveys are to be undertaken by an experienced ecologist prior to commencement of any vegetation clearing activities within the development area. The ecologist will conduct pre-clearing surveys to identify:

- Fauna species likely to be encountered during construction and potential impacts to fauna during vegetation clearing.
- Preferred locations to relocate fauna species and habitat features that can be retained following construction.
- Pre-clearing surveys will take place 1-2 days prior to the commencement of vegetation clearing. The ecologist will mark all potential fauna habitat in the development area with high visibility tape (e.g., hollow-bearing trees, habitat logs, trees containing active bird nests).

4.2.3.2 Vegetation clearing protocol

The following recommendations are to be implemented during vegetation clearing within the Development Site:

- An ecologist is to be present on site during all vegetation clearing operations.
- Vegetation should be cleared in a way that will allow fauna species living in or near the clearing site enough time to move out of the area without additional human intervention.
- No clearing should occur during the early evening or at night, as this is when fauna species are most likely to be active.
- Habitat links must be maintained during clearing to allow fauna species to move safely from the site to adjacent areas.
- Clearing should begin in the area that is furthest from vegetation to be retained.
- The direction of clearing should also ensure that fauna species are directed away from threats such as roads, developed areas or disturbed areas (e.g., residential areas or cleared spaces > 100m).
- Habitat trees are to be cleared following the removal of all other vegetation within the development area.



- Habitat trees are to be left standing for 1-2 nights after all other vegetation has been removed, to allow for occupying species to self-relocate.
- Habitat trees are to be 'soft-felled' under the supervision of the ecologist. The soft-felling technique involves tapping trees with an excavator bucket and waiting for signs of fauna activity. If no fauna is observed after 1-minute of observation, the tree should be felled and then inspected on the ground for fauna.
- Vegetation clearing is to be conducted in a manner such that vegetation is not felled onto retained vegetation or habitat trees.

4.2.3.3 Displaced fauna

The following recommendations apply to the management of any displaced fauna species during vegetation clearing activities:

- All handling of fauna species should be conducted by an experienced ecologist.
- Animals are to be removed and relocated to the adjacent bushland/nest boxes.
- Nocturnal fauna species, such as microbats, are to be 'soft released' using bat boxes placed in adjacent habitat.
- Nocturnal fauna species, such as gliders and possums, are to be secured in suitable enclosures and kept in a quiet, dark and cool environment until they can be released into suitable habitat after dark.
- If any injured fauna species are found during the construction period, construction must stop immediately so that the injured animal can be taken to a vet or wildlife carer.
- If pre-clearance observations by an ecologist identify nests in trees that are proposed to be cleared, recommendations on the number and types of nest boxes to be erected should be provided in addition to the recommendations provided in **Section 4.2.4.1**.

4.2.4 Fauna habitat replacement

4.2.4.1 Nest boxes

Clearing of the existing infrastructure from the site could affect threatened microbats, including the Large Bent-winged Bat and Little Bent-winged Bat. Several microbat boxes should be erected to replace this habitat based on consultation with the pre-clearance ecologist.

Microbat / nest boxes should be procured from commercial suppliers that produce a range of nest boxes designed to suit specific species/groups of wildlife. Important characteristics when constructing or commissioning nest boxes include the following:

- The front and base should be made from hardwood (> 25 mm thick).
- The box should include a hinged lid to allow easy inspection during monitoring/maintenance checks (the hinge should be stainless steel or aluminium).
- Only non-toxic paint should be used on the outside and the inside and the entrance hole should be left unpainted.
- Grooves should be cut on the inside face to allow ease of access/exit.
- Drainage holes should be included in the base.
- Wood shavings or sawdust should be placed in the bottom of the box prior to installation.
- Rear entrances should be included in the design where appropriate.

Habitat occurs within the Subject Land for a range of fauna species. Although no habitat trees with suitable hollows are present remnant native vegetation potentially provides habitat for a range of species.

Microbat boxes / nest boxes are to be installed near retained vegetation where practicable. The pre-clearance ecologist should be consulted to determine the best locations.

4.2.5 Weed management

Weed control is to be conducted by a qualified bush regenerator either with demonstrated experience or holding TAFE Certificate IV in Conservation and Land Management. Weed control is to be achieved using a combination of slashing, mowing and herbicide application. Recommended control methods for the priority weed Asparagus fern is:



- Spray all of the foliage to the point of runoff on actively growing plants with 500 mL of Glyphosate 360 g/L per 100 L of water during spring to autumn.
- Or hand pull if the soil is moist – make sure all of the roots are removed as far as is practicable.

The following recommendations are also considered necessary to prevent the spread of weeds during construction:

- Any vehicles, machinery or equipment should be inspected and be free of weed propagules before entering the Subject Site.
- Within Management Zone 1, weed control works are to occur prior to the commencement of clearing on site to reduce the potential for spread of weed species during disturbance works.
- Within Management Zones 2 and 3, initial weed control works are to occur upon the commencement of works within the development site. A follow-up control event is to occur within year 1. Weed control is then to occur annually, thereafter in perpetuity.

4.2.6 Vegetation Restoration

The condition of the retained areas of the PCT 1786 (Management Zone 2 & 3) are likely to continue to improve with weed management. In the event that supplemented planting is required to achieve restoration objectives, a range of life forms (e.g., forbs, ferns, shrubs, trees etc.) may need to be planted to achieve the restoration target of Sydney Coastal Dry Sclerophyll Forests benchmark. It is likely that groundcover species such as grasses and herbs will colonise the area naturally, however this needs to be assessed at the initial annual monitoring event.

Suitable species for planting need to be determined from species that are representative for PCT 1786 for which seed is available and or can be collected to propagated by a local nursery. Supplementary planting should consider the functional traits (i.e., characteristics suitable for planting in a small remnant patch of vegetation) of individual species to assess survival likelihood and contribution towards meeting the Sydney Coastal Dry Sclerophyll Forests benchmarks. For example if the remnant vegetation is depauperate in shrub layer species supplementary planting should focus on increasing the abundance and richness of this life form. Moreover, supplementary planting should consider the shade tolerance of woody species in relation to the planting position so that a shade intolerant or a shade tolerant species is planted in an appropriate position. The density of planting should reflect what is needed to infill gaps and areas that are depauperate in species. The Forest High School BDAR provides details further details on species representative of PCT 1786 and includes *Acacia myrtifolia*, *Allocasuarina littoralis*, *Banksia serrata*, *Dampiera stricta*, *Dillwynia retorta*, *Entolasia stricta*, *Epacris pulchella*, *Hakea dactyloides*, *Lepidosperma laterale*, *Lindsaea linearis*, *Lomandra obliqua*, *Micrantheum ericoides*, *Platysace linearifolia*, and *Xanthosia tridentata*.



5 MONITORING AND REPORTING

Implementation of the VMP is required to commence prior to construction work beginning. Annual monitoring to ensure compliance and maintenance should initially be implemented for three years by the developer and then reviewed while noting that weed management is required in perpetuity. After three years of annual monitoring an adaptive management approach should be implemented to reflect performance in achieving the VMP objectives and in particular planting objectives. For example, if after three years the PCT 1786 remnants are not on a trajectory to meet the benchmarks, monitoring should continue on an annual basis until they are, with the implementation of management measures to rectify any deficiencies. Conversely, if vegetation / management objectives are being met the frequency of monitoring can be reduced after three years of annual monitoring.

5.1 MONITORING METHODS

5.1.1 *Annual walkover*

To monitor the area subject to this VMP the following methods are required:

- A general random meander across management zones 2 and 3 to assess changes in the condition of the vegetation (if any) and to identify new weed species/populations. Evidence of a decline in vegetation condition would require interventions to improve the condition. A decline in vegetation condition should be quantified where possible in terms of species composition, percentage cover (e.g. ground layer, shrub layer and canopy), counts / cover of the numbers of undesirable tree species, tree mortality / condition etc. This should involve a plot-based assessment where practicable.
- Photo monitoring points in Management Zone 2 and Management Zone 3 should be established prior to clearing and rehabilitation works, and again immediately following initial weed control and planting works, to monitor the condition of the vegetation and natural regeneration of the vegetation. Post planting photo monitoring should be undertaken annually.
- In addition to the above for Zone 3 the following checks should be undertaken:
 - Check fencing and signage is in good condition and check that the no-go zone has not been compromised.
 - Weeds are at a low level and have not compromised the functioning of the vegetation, i.e. ground layer vegetation has not been competed out and the percentage native ground cover is stable and or increasing.
 - Assessment of whether assisted natural regeneration is adequate or whether additional tubestock planting is required to maintain the ecological functions and representativeness of the vegetation. This refers to ensuring that the species composition is consistent with the PCT 1786 and that natural regeneration of woody species is promoted where practicable, e.g., the use of tree guards or clearing weeds to reduce competition around seedlings and saplings. Due to the relatively small areas of PCT within the Subject Land that will remain post construction tubestock planting may be required to supplement natural regeneration. The small scale of the remnants will limit natural processes to some extent and regeneration failure of some species may occur due to the lack of stand regenerating fire and or other natural processes (e.g. native fauna diggings creating protected germination microsites) that promote natural regeneration.
- Inspection and documentation to ensure annual weed control within Management Zones 1 to 3 has been implemented in according to methods discussed in Section 4.2.5. Weed management is required in perpetuity.
- Monitoring reports and mapping detailing the results of the annual survey should be provided to Council. Monitoring should be undertaken annually for a three-year period.

5.1.2 *Monitoring against the PCT benchmarks*

The PCT native Vegetation Integrity Benchmarks should be used as guidance towards what reflects high quality vegetation that aligns with the PCT. The benchmarks, provided in **Table 3** may not all be achievable due to the



small size of the remnant PCTs. Therefore, the focus of monitoring should be on determining (i.e., quantifying) improvement of the various species richness attributes and cover attributes (i.e., the overall integrity score), noting that edge effects (e.g., increased ground layer light levels) will impact ground cover, potentially increasing the grass and grass like cover and is likely to promote weed colonisation. A monitoring protocol should be designed appropriate to the size of the remnant PCT.

Table 3: PCT Benchmarks for Sydney Coastal Dry Sclerophyll Forests

Attribute	Value	Attribute	Value
Tree richness	7	Grass and grass like cover	33%
Shrub richness	27	Forb cover	5%
Grass and grass like richness	9	Fern cover	1%
Forb richness	8	Other cover	4%
Fern richness	2	Total length of fallen logs [^]	45 m
Other richness	5	Litter cover	62%
Tree cover	51%	Number of large trees [^]	3
Shrub cover	70%	Large tree threshold size [^]	50 cm dbh [#]

*richness refers to the number of species, [^] not practicable to achieve and or not practicable within a reasonable time frame, [#] diameter at breast height. Source: NSW Government, 2023.

5.1.3 Bat box / nest box monitoring

Bat box and nest box monitoring and maintenance should occur annually, commencing at the end of Year 1. Monitoring will be conducted annually to determine box usage, and to determine any repair and replacement requirements (as required). Monitoring will be conducted for a minimum of five years. Results of the monitoring will be provided in the annual VMP reports, including locations of any threatened fauna species identified.

5.1.4 Reporting

Annual monitoring reports should be prepared by a suitably qualified Ecologist and/or bush regenerator and submitted to Council annually detailing the progress of the bush regenerator works, observations of the annual walkover, and results of the vegetation integrity monitoring, nest box monitoring. A final report should be submitted to Council certifying the completion of the VMP at the end of the five-year period. Photo monitoring points, vegetation integrity monitoring points, and method of performance must be identified for future monitoring and reporting purposes. Any agreed further actions must be completed to the satisfaction of Council prior to the lodgement of the final report.



5.2 PROJECT SCHEDULE

The project schedule is provided in **Table 4**.

Table 4: Project task schedule

Management task	Timing	Personnel	Deliverable
Erosion and Sediment Control: Installation of a sediment fence	Installation prior to vegetation clearing. Inspections, and clean out as required, for entire duration of construction works.	Site supervisor	Sediment and runoff protection, implemented and documented as per the "Blue Book" requirements
Vegetation Protection: Installation of temporary exclusion fencing around all PCT 1786 remnants to be retained post construction.	Prior to the commencement of clearing.	Site Supervisor	Appropriate installation of fencing, and documented within VMP Annual Report.
Fauna Management: Pre-clearing surveys. For microbats follow the procedures outline in the Microbat Management Plan for TFHS	Conducted prior to the commencement of clearing and building demolition.	Qualified Ecologist	All habitat features appropriate marked prior to clearing. Documented in clearing supervision letter/report and submitted to Council.
Fauna Management: Vegetation Clearing supervision. Follow the procedures outline in the Microbat Management Plan for TFHS	During clearing	Qualified Ecologist	All habitat trees soft-felled under the supervision of an ecologist. Documented in clearing supervision letter/report and submitted to Council.
Fauna Management: Displaced Fauna	During clearing	Qualified Ecologist	All fauna captured during habitat tree felling is appropriately relocated. Documented in clearing supervision letter/report and submitted to Council.
Fauna Habitat Replacement: Installation of bat boxes	Portion of the boxes installed prior to vegetation clearing (install at least two weeks prior). Remaining boxes installed within 1 month of clearing.	Qualified Ecologist	Installation of appropriate bat boxes to replace lost microbat roosting habitat..
Monitoring: Bat box monitoring and repair	Annually from Year 1 during winter.	Qualified Ecologist	Documented in VMP Annual Report, with associated mapping
Weed Management: Weed control works	Within management zone 2 and 3: conducted prior to works on site.	Qualified bush regenerator	Documented in VMP Annual Report, with associated mapping



Management task	Timing	Personnel	Deliverable
	Within Management Zones 2 and 3: Conducted twice in first year and then annually thereafter unless monitoring determines frequency of control should be increased. The initial weed removal should be completed within 3 years from the initial weed removal. After 3 years weed removal should occur perpetually on an annual basis.	Qualified bush regenerator	Documented in VMP Annual Report, with associated mapping
Vegetation Restoration: Tubestock planting (if required)	Immediately post construction and annually as required to meet PCT Benchmark. The initial planting of native vegetation should be completed within 3 years from the initial weed removal. After 3 years the planting should occur perpetually on an annual basis when to keep the vegetation meeting the benchmark values for PCT 1786.	Qualified bush regenerator	Documented in VMP Annual Report, with associated mapping
Monitoring: Annual monitoring	Annually at the completion of works	Ecologist	Annual VMP report. Completion report at the end of Year 3.



6 REFERENCES

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