


TRAVERS BUSHFIRE & ECOLOGY

A TBE ENVIRONMENTAL COMPANY

BIODIVERSITY MANAGEMENT PLAN

Proposed Development

Lot 3 and 4, DP 584287

97-115 River Road

Greenwich

18 November 2024

(REF: TSA08.4BMP)

BIODIVERSITY MANAGEMENT PLAN

Lot 3 and 4 DP 584287, 97-115 River Road, Greenwich

Prepared by: Travers bushfire & ecology
Authors: Darren Hall (B. Pks Rec & Heritage) – Restoration Ecologist
Lindsay Holmes (B. Sc.) – BAM accredited author
Approved by: Michael Sheather-Reid (B. Nat. Res. Hons.) – Managing Director – BAM accredited assessor

Date: 18 November 2024

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Schedule 1 – Biodiversity Management Actions
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Figure 1 – Study area (red)

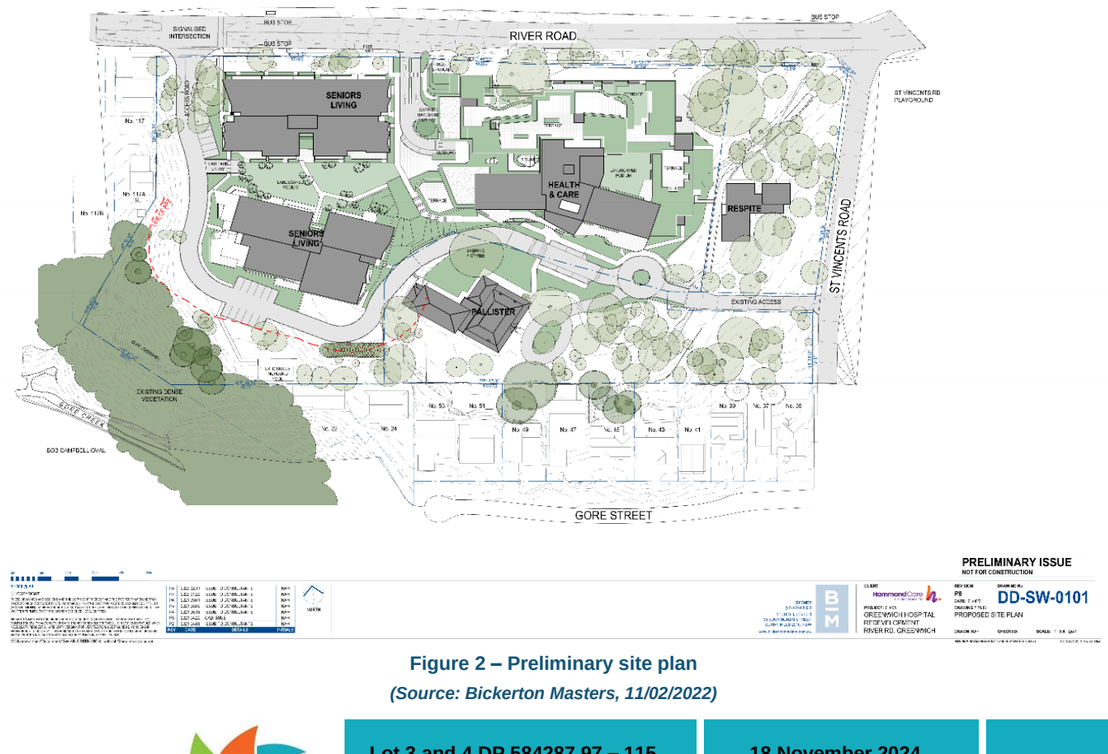


Figure 2 – Preliminary site plan

(Source: Bickerton Masters, 11/02/2022)

BIODIVERSITY MANAGEMENT AIMS

The purpose of this Biodiversity Management Plan (BMP) is to define and document the actions required for the management of biodiversity within Lot 3 and 4 DP 584287, 97-115 River Road, Greenwich, which has an approved development application for the Greenwich hospital redevelopment. The BMP aims to detail the management of the biodiversity values located within the proposed development, to protect and minimise impacts to these values, and ensure that vegetation clearance (where required) is undertaken ethically. The management of the residual bushland (avoided development area) within, Lot 3 and 4 DP 584287, can be found in the Vegetation Management Plan (TBE 17 May 2022), which focusses on the protection and restoration of the existing vegetation community and native fauna habitat.

The aims of this BMP include:

- Identify areas of land where impacts on biodiversity are to be avoided as outlined in the *Biodiversity Development Assessment Report*, prepared by Travers bushfire and ecology and dated 2 August 2023 and set out how these areas will be protected from construction impacts;
- Set out the measures identified in the Biodiversity Development Assessment Report to minimise, mitigate and manage impacts on biodiversity, including timing and responsibility for delivery of measures;
- Fauna management during clearing, and the handling and relocation of wildlife by a suitably qualified wildlife carer/fauna ecologist;
- Harvesting of suitable hollows for augmentation as per the VMP (TBE 2022);
- Sediment and erosion control;
- Ongoing rubbish and waste removal within the redevelopment areas;
- Installation of temporary protective fencing; and
- Pre-clearing survey procedures.

SITE DETAILS

The site is within the suburb of Greenwich in the Lane Cove Council Local Government Area (LGA) of New South Wales. The site is surrounded by predominately existing urban development with scattered vegetation to the east. The northern boundary runs parallel to River Rd. The southern and eastern boundary are connected to Gore Creek Reserve/Lane Cove Bushland Park. The site is situated on a sloping topography towards the south-west portion of the site where there is a approx. 40 m high drop-off/escarpment. There are no creek lines within the study area. However, there is Gore Creek to the south-west within approx. 100 m of site and it is expected that any drainage filters down to the Creek, which in turn drains into Lane Cove River.

Soil/Geology

Geology: Hawkesbury Sandstone (Rh) ‑ Sandstone, quartz, with some shale. Soils: The majority of the study area is located on the Gymea soil landscape. gy−shallow to moderately deep (30-100 cm) Yellow Earths and Earthy Sands on crests and inside of benches; shallow (<20 cm) Siliceous Sands on leading edges of benches; localised Gleyed Podzolic Soils and Yellow Podzolic Soils on shale lenses; shallow to moderately deep (<100 cm) Siliceous Sands and Leached Sands along drainage lines. The eastern and western extremities of the site lie on the Hawkesbury soil landscape. ha−shallow (>50 cm), discontinuous Lithosols/Siliceous Sands associated with rock outcrop; Earthy Sands, Yellow Earths and some Yellow Podzolic Soils on inside of benches and along joints and fractures; localised Yellow and Red Podzolic Soils associated with shale lenses; Siliceous Sands and secondary Yellow Earths along drainage lines.

Connectivity Features

There is some connectivity to the subject land. There is connection to Lane Cove Bushland Park and Gore Creek to the west and to Gore Creek Reserve to the south. The north of the site runs parallel to River Rd and to the east is mainly existing residential properties (i.e., poor connectivity in those directions). The location map (Figure 1) shows an overview of the extent of native vegetation and connective features in the locality.

Zoning

The site is currently zoned SP2 under the Lane Cove LEP of 2010 which is for Special Purposes (health services facilities).

Recorded Vegetation Summary

The following vegetation communities were identified on site in the approved BDAR:

- PCT 1841 - Coastal enriched sandstone moist forest
- PCT 1828 - Coastal sandstone gallery rainforest

Greenwich Hospital has operated from the site since 1966. Hammond Care has owned and operated Greenwich Hospital since 2008. Lot 3 DP 584287 contains the existing Greenwich hospital, associated inpatient and outpatient facilities, car parking and service areas. Existing buildings range between 1 and 5 storeys in height and are interconnected through internal corridors and external pathways. The site is serviced by water, sewer, telecommunication and power services.

The site has been subject to past historical clearing with the construction of the existing hospital buildings and associated infrastructure. Exotic vegetation exists within managed landscaped gardens alongside areas of managed turf. Patches of disturbed remnant native vegetation of PCT 1841 occur on the eastern side of the site accessed from St Vincents Rd. The area in the southwest corner of the site contains PCT 1841 along with PCT 1828 that has been incorporated into the Vegetation Management Plan (VMP).

BIODIVERSITY MANAGEMENT WORKS

A summary of the key components of the biodiversity management works to be conducted, includes the following:

- A pre-clearing survey for resident fauna and fauna habitat prior to clearing
- Clear marking of all habitat trees and any other important habitat features
- Installation of fourteen (14) salvaged hollows/nest boxes prior to clearing to provide habitat for displaced fauna as a result of vegetation clearing (as per 2022 VMP) if not already installed.
- Protection of identified conservation areas from the construction zone through temporary fencing.
- Specific tree protection fencing put in place for trees marked for retention which border the construction zone as per the Tree Management Plan (Redgum, 2018);
- Supervision of vegetation clearing by a project ecologist to capture and relocate any fauna present into the retained bushland areas.
- Relocation of any other important habitat features such as logs to the retained bushland areas.
- Hollow augmentation through the installation of additional nest boxes to replace any good quality hollows destroyed during clearing.
- Pathogen control and monitoring of equipment and machinery contractors working onsite; and
- Weed control, including ongoing maintenance and monitoring.

SITE PREPARATION & PROTECTION OF NATIVE VEGETATION

Prior to any works being undertaken, an independent project ecologist and project arborist must be engaged to undertake auditing, reporting and compliance certification.

The following site preparation is to be undertaken:

- Install temporary tree protection fencing during construction for all native remnant trees to be retained, bordering the proposed development (see Schedule 1).
- Sediment fencing is to be installed immediately adjacent or in conjunction with the permanent protection fencing along the boundary of VMP management area where it borders the construction zone for the duration of the construction period in compliance with *Soils & construction Managing Urban Stormwater* (Landcom 2004).
- Weed control should be commenced occur once the construction phase has begun. Commence weed control within the whole of the BMP management area prior to any landscaping or tree planting works.
- All litter and any other waste material on site is to be removed prior to restoration works. Ongoing rubbish removal throughout the maintenance period is to be undertaken.

TREE PROTECTION

All tree protection works should follow the procedures detailed within the (A): Arboriculture Impact Assessment (AIA) and (B) Tree Management Plan (Redgum 2018), which would provide the specifications for all on site tree management. In summary, temporary tree protection fencing will need to be put in place for marked retained trees before any on site construction works are commenced (including demolition and bulk earthworks). The protection fencing must be established at the locations specified in the AIA report and cannot be removed or altered in any way without the approval of the project arborist. An example of protection tree fencing can be viewed in Figure 3.

All protective tree fencing is to remain in place until construction is complete to prevent accidental damage or felling of non-target trees. Signage will be placed on the fencing to inform workers that the tree is marked for retention, access is restricted, and no works are to be conducted which could impact on the health of the tree without consulting with the project arborist.

Figure 3 – Example of temporary tree protection fencing

BIODIVERSITY PERFORMANCE TARGETS

The following restoration performance targets are to be audited, and compliance certificate issued by the project ecologist demonstrating satisfactory completion of the works in accordance with this BMP, with reference to the VMP (TBE 2022);

1. All building, construction, and landscaping works will be excluded from the VMP area.
2. Temporary tree protection and signage to be put in place around all trees to be retained within and adjacent to the proposed development
3. Subject to the staging of works, the presence, abundance and cover of invasive weed species within the site is not to exceed 10% weed coverage at the end of year 1, and this should be progressively reduced to less 2% by the end of year 3 and maintained at less than 2%.
4. Native vegetation is to be planted as per the species from the recommended landscape planting list (Table 1) or as specified in the landscaping plans by *Taylor Brammer*.
5. A minimum of 90% of landscaping and street planting trees should survive. If tree survival rates fall below 90%, replacement planting is to be completed.
6. As vegetation on site is cleared, logs are to be stockpiled for future use within the restoration area in the VMP area.
7. Cleared good quality hollows should be salvaged and relocated into the retained bushland area (avoided lands/VMP area) where possible. Good quality hollows destroyed during clearing are to be replaced by nest boxes.
8. A minimum of fourteen (14) nest boxes/salvaged hollows are to be installed prior to vegetation clearing to provide habitat for hollow-dependent fauna as per the VMP.
9. No stockpiles of rubbish or vegetation debris to be kept onsite, unless some native trees being felled are stockpiled for use as log habitat on site. Stockpiling locations must be agreed to by the project ecologist.
10. Sediment and erosion controls are to be implemented to a high standard and independently audited by the project ecologist.

ONSITE VEGETATION

The vegetation within the development footprint that is directly impacted by the proposed development, including access roads and areas used to store construction materials consists of:

PCT 1841 – Coastal Enriched Sandstone Moist Forest

This is the primary vegetation community on the site, occurring in the southeastern and southwestern portions of the site. It represents most of the remnant vegetation present and is in a moderate condition, with good diversity of native understorey species and a moderate abundance of exotics. Fair condition patches (Site Photo 1) consisted of native canopy including **Canopy** – *Angophora costata, Eucalyptus pilularis, Eucalyptus resinifera* and *Eucalyptus saligna* providing 20‑30% Projected Foliage Cover (PFC). **Mid-storey** ‑ *Pittosporum undulatum, Glochidion ferdinandi, Brachychiton acerifolius, Archontophoenix cunninghamiana, Doryanthes excelsa, Calochlaena dubia, Cassytha pubescens* and *Hibbertia dentata* providing 20‑40% PFC. Exotic species are abundant in places, and include *Hedera helix, Ipomoea cairica, Lantana camara, Ligustrum lucidum, Ligustrum sinense, Ochna serrulata, Olea europaea* and *Phoenix canariensis.* **Groundcovers** ‑ *Adiantum aethiopicum, Asplenium aethiopicum, Pteridium esculentum,Commelina cyanea, Dianella caerulea, Cynodon dactylon, Oplismenus aemulus, Lomandra longifolia, Lepidosperma laterale, Poa affinis, Entolasia stricta* and *Microlaena stipoides* providing 1‑20% PFC. Exotic ground covers include species such as *Tradescantia fluminensis*.

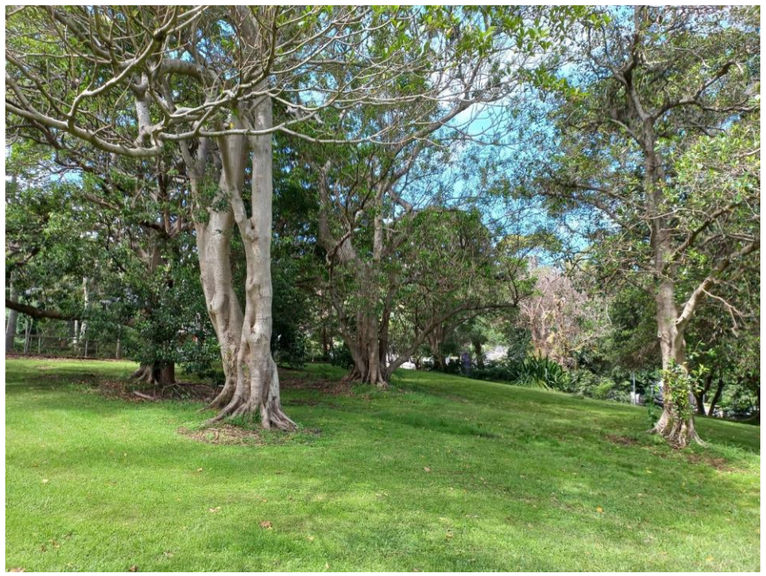
PCT 1841 - Coastal enriched sandstone moist forest – planted/managed

This vegetation is comprised mostly of planted native trees and shrubs. It is likely that some of these are remnant or self-established plants (Site Photo 2) from the indigenous, remnant vegetation, but it is not possible to distinguish which are planted or not with great level of certainty. The understorey is highly managed and contains a lot of mown lawn. **Canopy** – species include *Ficus rubiginosa, Eucalyptus pilularis, E. microcorys, E. sideroxylon* and *Stenocarpus sinuatus* providing up to 50% PFC. **Mid-storey** ‑ *Syzygium australe, Callistemon* spp., *Melia azedarach*, *Leptospermum* sp., *Banksia* spp. and *Cupaniopsis anacardioides* providing up to 5% PFC. **Groundcovers** ‑*Cyperus gracilis, Oplismenus aemulus, Lomandra longifolia* and *Microlaena stipoides* providing up to 60% PFC.

PCT 1828 - Coastal sandstone gallery rainforest (outside subject land)

This vegetation occurs outside the subject land in the far southwest of the subject lot and within the Vegetation Management (Site Photo 3). This vegetation is typically dominated by *Ceratopetalum apetalum*, with a scattered cover of small trees in the sub-canopy layer, usually comprising *Callicoma serratifolia, Acmena smithii, Tristaniopsis laurina* and tree ferns (*Cyathea* spp.). Epiphytic species *Platycerium bifurcatum* are found growing on trees along with *Asplenium australasicum* growing on rocks.

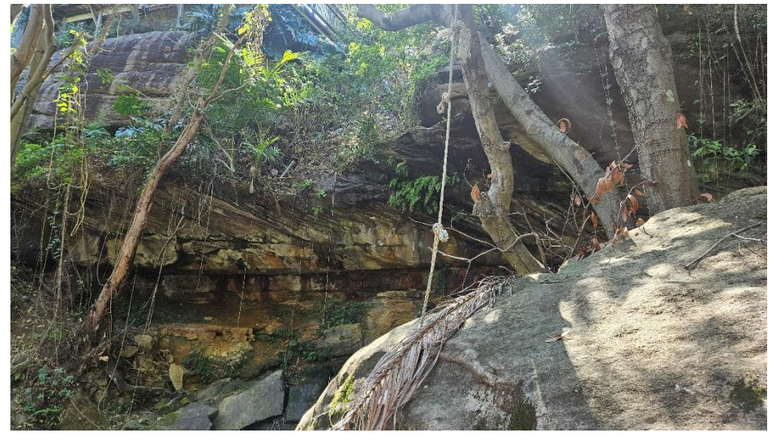
Site Photo 1 – Fair condition PCT 1841 – Coastal Enriched Sandstone Moist Forest



Site Photo 2 – PCT 1841 – Coastal Enriched Sandstone Moist Forest Planted/managed

Exotic Dominated Vegetation

Exotic and non-native trees and shrubs are scattered throughout the managed portions of the subject land. Species include *Cinnamomum camphora, Corymbia citriodora, Cupressus* spp., *Phoenix canariensis, Pinus radiata, Jacaranda mimosifolia, Camelia japonica, Liquidambar styraciflua* and *Jacaranda mimosifolia*. As the species composition is devoid of native species (Site photo 4), it has not been assigned to a vegetation zone or PCT.



Site Photo 3 – PCT 1828 - Coastal sandstone gallery rainforest (outside subject land)

Site Photo 4 – Exotic dominated vegetation

Site Photo 5 – Managed Landscape Gardens

THREATENED BIODIVERSITY

Threatened Communities

There are no Threatened Ecological Communities (TECs) on site.

Recorded Fauna

The following threatened fauna species were identified on site in 2023 and are further documented in the TBE Biodiversity Development Assessment Report (2023b):

- Southern Myotis (*Myotis macropus*).

Southern Myotis (*Myotis Macropus*)

Southern Myotis_was recorded during fauna surveys by TBE (2024c) within the Vegetation Management Plan (VMP) area to the south. The restoration actions and design specifications of the surrounding landscape are aimed at providing a habitat conducive to the requirements for this species. The southern myotis (*Myotis macropus*), also known as large-footed myotis, is a species of vesper bat (Vespertilionidae) in genus *Myotis*. The southern myotis is one of only two Australian "fishing" bats and feeds by trawling its specially adapted feet along the water's surface for aquatic invertebrates and fish along with mosquitos and moths. As a 'vesper bat', *M. macropus* are 'mouse-like' with small, rounded ears, however, its most prominent feature is its enlarged feet. Being at least 8 mm long, the *M. macropus* foot is specially adapted for trawling. Its toes are wide-set with long, hook-like claws. Like all bats, the hind limbs of the *M. macropus* are orientated so that the knees point backwards when they are bent, while the bottom of their feet face anteriorly. This aids them in scooping up aquatic prey and bringing it to their mouth, mid-flight.

Microbat Habitat

Several hollow-bearing trees and sandstone caves were located containing suitable sized hollows for microbats, including, within the development footprint and the designated Vegetation Management Plan (VMP) area.

A precautionary approach will be taken to ensure if any roosting habitat is within these trees, the relevant hollow section will be safely recovered and relocated to the conserved bushland area. If hollows cannot be salvaged, then they will be replaced with appropriate nest boxes.

MANAGEMENT OF DEVELOPMENT FOOTPRINT

In general, to maintain or improve the condition and structural diversity of the retained vegetation within the surrounding conserved bushland, the following restrictions need to be enforced within the development footprint:

Weed Management

- Engagement of qualified and experienced bushland regeneration contractors to undertake all restoration works (Supervisor - *Certificate III/IV in Conservation and Land Management* or equivalent, with at least three (3) years of field experience);
- All invasive and environmental weeds within the proposed subdivision are to be eradicated where possible or, after primary and secondary weed controls are completed, remaining weeds are severely prosecuted such that the weed cover is less than 1% by the end of year 3. Garden or landscaping waste, weed propagules (seeds, tubers etc.), or lawn clippings, should not be dumped or spread on adjacent residual bushland or allowed to be washed or blown into the conservation areas; and
- Herbicides are to be used only as per the manufacturer's instructions and by a qualified operator.

Erosion Control / Sedimentation Management

- All bare soils within the development area are to be stabilised especially within riparian vegetation, near creeks or on overland flows.
- Sediment and tree protection fences are to be installed around all construction works (including access tracks) prior to commencement of any earth or construction works.
- Sediment control infrastructure is to be installed in accordance with "*Managing Urban Stormwater Soils and Construction*" (Landcom 2004); and
- Sediment or stormwater infrastructure such as basins or grassy swales are to be installed prior to commencement of construction works.

Soil Disturbance

- There will be no works that will disturb the soil within any areas covered by the Vegetation Management Plan (VMP), or within any other earthwork's exclusion zones. Activities such as scalping or slashing are strictly prohibited.
- No leaf litter outside of the development footprint is to be disturbed or removed; and
- In the event of any unauthorised soil disturbance, the ground will be restored as close as possible to its original state, as directed by the project ecologist.

Impacts to Non-Target Vegetation

- Vegetation removal is to be undertaken strictly in accordance with this BMP.
- Within retained bushland, there will be no removal of native vegetation, branches, logs, bush rock or any other material.
- No disturbance to outcrops of sandstone that provides vital habitat.
- Any loss of vegetation that has been nominated for retention is to be replaced with the same species and in the same location to maintain a vegetation cover commensurate with the revegetation specifications contained in the VMP (TBE 2022).

Landscape Planting

- Any landscape planting within the site should aim to utilise native species as specified in Table 1, or as specified and approved in the landscaping plans by *Taylor Brammer.* This will provide some cross-site shelter/habitat for birds travelling over the development.
- All plant stock for landscaping is to be certified as local provenance from the supplier, with preference for seeds collected from similar community types within the locality.

Nutrient Management

- Lawn fertilisers and manure (horse, bovine or chicken) are not to be spread or stockpiled within 40 m of a drainage line or any of the retained bushland areas, including for the purposes of gardens or landscaping.

Access

- Construction fencing is to be utilised to restrict or direct vehicle movements on and across the site;
- If development areas adjoin native vegetation retention areas, these are to be protected by fencing to exclude access;
- Tree protection zones are to be adequately protected by temporary fencing at the discretion of the project arborist, to ensure the zones are not impacted by vehicular movement, trampling, stockpiling and excavation.
- Dogs are to be always excluded from the residual bushland.

STORMWATER MANAGEMENT

Wood & Grieve Engineers (2019) have prepared a Greenwich Hospital Overland Flow Assessment for SSD-8699.

The strategy provides methodologies for the management of stormwater on the site, which are as follows:

- The site is high enough above the creek level that there will be no flood impacts from Gore Creek and the downstream Lane Cove River.
- Stormwater will be conveyed around the site as per existing case, as such the proposed development is not obstructing any overland flow paths and will have no impact on the current overland flow path for the upstream catchment.
- Overland flow from upstream catchments will continue to be conveyed around the site as per the existing case, as such mitigation measures will not be required for the development. The proposed design will ensure that that the drainage strategy remains the same as existing wherein all overland flow will be conveyed away from habitable floor levels.

RECOMMENDED LANDSCAPE PLANTING LIST

Table 1 – Preferred revegetation and landscaping species for use on site

The below species are preferred for replacement or landscape planting, where areas are not specified in the landscaping plan.

Scientific Name	Common Name
Canopy Planting	
Angophora costata	Sydney Red Gum
Eucalyptus pilularis	Blackbutt
Eucalyptus piperita	Sydney Peppermint
Eucalyptus saligna	Sydney Blue Gum
Sub-canopy	
Allocasuarina torulosa	Forest Oak
Ceratopetalum apetalum	Coachwood
Elaeocarpus reticulatus	Blueberry Ash
Glochidion ferdinandi	Cheese Tree
Pittosporum undulatum	Sweet Pittosporum
Shrub Planting	
Acacia longifolia	Sydney Golden Wattle
Dodonaea triquetra	Hop-bush
Polyscias sambucifolia	Elderberry Panax
Notelaea longifolia	Large Mock-olive
Breynia oblongifolia	Coffee Bush
Groundcover Planting	
Grasses and grass-like species	
Calochlaena dubia	Rainbow Fern
Entolasia marginata	Bordered Panic
Entolasia stricta	Wiry Panic
Microlaena stipoides	Weeping Grass
Poa affinis	-
Forbs	
Dianella caerulea	Blue Flax-Lily
Dichondra repens	Kidney Weed
Einadia hastata	Berry Saltbush
Goodenia hederacea	Forest Goodenia
Lobelia purpurascens	White Root
Lomandra longifolia	Spiky-headed Mat-rush
Climbing	
Clematis aristata	Old Man's Beard
Hardenbergia violacea	Purple Coral Pea

Table 2 – Weed species identified within the study area

Scientific name	Common name	Weed Control Priority
TREES		
Ochna serrulata	Ochna	HIGH
Cinnamomum camphora	Camphor Laurel	MEDIUM
Morus alba	White Mulberry	MEDIUM
Liquidambar stryraciflua	Liquidambar	MEDIUM
Phoenix canariensis	Pheonix Palm	MEDIUM
SHRUBS		
Senna pendula var. glabrata	Cassia	MEDIUM
Ligustrum sinense	Small leaved Privet	MEDIUM
*Lantana camara**	Lantana	HIGH
Solanum mauritianum	Wild Tobacco	MEDIUM
VINES		
*Anredera cordifolia**	Madeira Vine	VERY HIGH
Ipomoea purpurea	Morning Glory	MEDIUM
GROUNDCOVERS		
*Asparagus aethiopicus**	Asparagus Fern	HIGH
Ageratina adenopjhora	Crofton Weed	MEDIUM
Tradescantia fluminensis	Wandering Trad	MEDIUM
Cenchrus clandestinus	Kikuyu	HIGH
Chloris gayana	Rhodes Grass	LOW
Bidens pilosa	Cobbler's Pegs	LOW
Coreopsis lanceolata	Tickseed	LOW
Conyza sumatrensis	Tall Fleabane	LOW
Sida rhombifolia	Arrowleaf Sida	LOW
Argemone mexicana	Prickly Poppy	LOW
Ehrharta erecta	Panic Veldt Grass	MEDIUM
Solanum nigrum	Black Nightshade	MEDIUM

*Denotes priority weed (DPI 2024)

GENERAL WEED CONTROL

The site in general contains pre-existing weed species from historical disturbances, primarily within the VMP designated area and below the canopy of the existing bushland remnant area at the entrance from St Vincents Rd. It is anticipated the proposed development may result in greater disturbance, with increased nutrients and edge effects, thus providing a greater opportunity for weedy species to establish or invade the retained bushland remnants. Continued weed management works are to be undertaken across the entirety of the development site for a minimum of 5 years to protect adjoining bushland areas from weed infiltration.

For the purposes of this BMP, a weed is defined as any plant species that does not naturally occur within PCT 1841 or PCT 1828. The definition of a weed includes any planted or exotic or cultivar species that are used in landscaping works or grasses commonly used to create lawns.

The development footprint is to be targeted for weeds which are to be removed using methods which minimise disturbance to protected vegetation. All ground and shrub layer weed control works are to be undertaken by qualified personnel from an experienced bushland regeneration company utilising low impact and best practice weed control, restoration, revegetation and bush regeneration methods.

Hand removal of weeds is the preferred low impact method of weed removal, However, within the development footprint if large areas of weeds need to target, herbicides may be judiciously employed using a backpack sprayer or dabbing method by an experienced bush regenerator with a chemical use certification (AQF3 Chemical Accreditation). Large scale herbicide spraying in proximity to the avoided conservation lands or any waterbodies/ watercourses (including detention basins), is strongly discouraged.

Priority weeds

Priority weeds in the Sydney region are specified in the Greater Sydney Regional Strategic Weed Management Plan 2017-2022. Priority weeds that are listed as "State Priority Weeds" and "Regional Priority Weeds" have specific measures for the control of individual weed species no matter the land ownership or location. Weed treatment is to be undertaken on both government and private lands.

Priority weeds and other environmental weed species specifically targeted for removal are listed in Table 2. This list is not exhaustive but includes all non-native species which were observed in surveys.

Fauna Habitat and Weed Control

There is a significant number of exotic vines, shrub and ground cover species including *Anredera cordifolia* (Madeira Vine*), Lantana camara* (Lantana), *Phoenix canariensis* (Phoenix Palms) and *Asparagus aethiopicus* (Ground Asparagus) within the site. Although these species are generally considered high to very high priority for removal (as stated in Table 2), these weeds currently provide habitat and foraging resources for native fauna. Therefore, care should be taken prior to weed removal to ensure native fauna species are not occupying these areas. A fauna ecologist should be consulted if there is a possibility of harm coming to resident fauna due to the removal of weed species.

Additional fauna habitat can also be created by relocating logs into the restoration area, and using leaf litter and woody debris translocated from the base of any *Eucalyptus sp.* which are to be felled. This debris should be weed free prior to translocation to ensure no harm occurs to any individuals.

Site Photo 6 – Lantana & Ground Asparagus infestation within the southern extent of the site.

PROPOSED WEEDING ACTIVIES

Weeds are to be ongoingly removed within the construction works zone and the completed subdivision in accordance with techniques recommended by the National Trust, NSW Department of Environment and Conservation (National Parks & Wildlife Service), Department of Primary Industries (DPI) and the Australian Association of Bush Regenerators.

Monitoring of the progress of weed removal and planted vegetation within the development area is to be undertaken by the project ecologist on a six (6) monthly interval with a report produced on an annual basis for five (5) years. This will include the issuing of compliance certificates before construction and post construction by the project ecologist.

Weed control works are expected to be undertaken within the development area for the duration of 5 years. It is predicted that the weed control exercise will be scaled back to a maintenance level over time as the weed control program is expected to result in few weeds within the retained bushland and only minor incursions of weeds into the future.

Weeds are to be targeted on site in accordance with their respective responsibilities under the NSW *Biosecurity Act* (2015) and the 'best practice' removal methods identified for each weed species.

PEST MANAGEMENT

Any pest management undertaken will aim at controlling European red foxes (*Vulpes vulpes*), which could potentially frequent the site as records indicate sightings within the Lane Cove LGA.

Actions for pest control are to be integrated with a combination of exclusion using the permanent protective fencing of the retained bushland under the VMP (TBE 2024d). The fencing will be designed to deter foxes though does not guarantee their exclusion.

<u>European Red Fox</u>

Most fox baiting control programs are coordinated with Local Land Services. Fox baiting will typically involve 1080, which is regulated by the 1080 Pest Control, Order (EPA 2020). However, baiting is not an option due to the location of the site within the Lane Cove LGA due to the potential harm to humans and domestics dogs.

Any fox sightings should be reported to Lane Cove Council.

SEDIMENT AND EROSION CONTROL

Erosion and sediment control measures are to be implemented during all phases of the proposed development to minimise adverse effects as a result of increased erosion and sediment loading. These include:

- Sediment control infrastructure is to be installed in accordance with "*Managing Urban Stormwater Soils and Construction*" (Landcom 2004).
- Coordinated work practices aimed at minimising land disturbance and laying down of soil treatments to prevent erosion on disturbed soil or embankments (such as temporary seeding, erosion control matting, turfing and bitumen / hay sprays).
- Identification of potential erosion areas.
- Installation and maintenance of flow, erosion, sediment and nutrient control structures as applicable.
- Routine site inspections of drains, channels and sediment control structures as applicable.
- The safe disposal of all waste products.
- The disposal of only 'clean' water within the site and associated watercourses; and
- Exclusion of machinery that cause soil disturbance within retained vegetation areas.

The minimisation of soil erosion will be achieved through soil stabilisation measures which may include but is not limited to spray seeding, sediment fencing, water control techniques or structures, revegetation of cleared surfaces via seeding, planting of native species, mulching and the installation of biodegradable erosion control blankets.

RUBBISH REMOVAL

All waste and rubbish on site are to be removed in conjunction with BMP works. The landowner is ultimately responsible for waste removal. If hazardous materials are located on site, the building contractor must ensure the material is disposed of at the appropriate facilities. Small scale rubbish removal can be completed by the bush regeneration contractors where practical. Continuous monitoring and removal of waste and rubbish is to occur throughout the restoration works to prevent illegal dumping and /or rubbish build up as this will undermine restoration efforts.

MANAGEMENT OF BUSHFIRE RISK

The proposed development is within a bushfire prone area and therefore asset protection zones (APZs) are required between the development and bushfire hazard, noted to occur in the south-western corner of the site. Revegetation works and regeneration within APZ areas will need to be carefully monitored to ensure that fuel load levels are maintained to standards set out in Planning for Bush Fire Protection, 2019, or subsequent standards. APZ fuel loads and compliance should include an annual check during late winter or early spring, before the bushfire season commences.

CONSTRUCTION IMPACT MITIGATION

The mitigation of potential adverse impacts of construction on the adjoining VMP and on residual areas of native vegetation on site, will be implemented through the following procedures:

Prior to commencement of vegetation clearance

- Temporary fencing and signage to delineate the construction zone.
- Installation of nest boxes of various types with hinged lids as per the, to provide hollows for displaced fauna during clearing. Nest boxes to be installed a minimum of two (2) weeks prior to vegetation clearance.
- Habitat tree removal is to be done under the supervision of a fauna ecologist so that any residing fauna, particularly threatened species, can be effectively recovered and relocated. If fauna is recorded utilising the hollows that are removed, or if these hollows are considered of high quality, then these hollows are to be reinstalled into trees within the avoided land area. The habitat tree location is shown on Figure 14 as SHT1 towards the eastern side of the site.
- Certification to be submitted to Council for satisfactory completion is to be provided for habitat protection and fauna relocation works and implementation of contingency measures as required by project ecologist.

During vegetation clearance

- A forest mulcher is to be used to remove shrubbery and small trees within the development footprint and excavators only used to grub out tree roots within the road access ways, internal roads and building footprint. Mulch is to be left on ground to provide erosion protection and sediment control. Mulch containing exotic plant material is not to be used in any revegetation area or landscaping garden bed.
- Tree removal is to be undertaken under the supervision of the project arborist with a method that avoids soil disturbance as much as possible. Figure 15 highlights trees to be removed and retained as per the arborist plans.
- Certification to be submitted to Council for satisfactory completion is to be provided for vegetation clearance, sediment control and fencing works and implementation of contingency measures as required by the project ecologist.

Prior to commencement of excavations, cut and fill works

- Installation of temporary construction fence at the outer extent of the construction / bulk earthworks / landscape area. Temporary 1.8 m high chain link fence panels are appropriate.
- Implementation of erosion and sediment control measures before, during and after any earthworks and construction including installation of sediment fences adjacent to retained bushland areas, overland flows, drainage lines and creeks.
- Regular inspections and compliance certificates regarding protection of retained bushland, erosion control, habitat trees and vegetation management measures by the project ecologist.
- Application of low impact weed control methods by suitably qualified bushland regenerators, especially near and within areas of vegetation which are to be conserved.
- Retention of natural logs and rocks, or move salvageable ones to areas outside of the construction footprint.
- Natural caves found within the north, east and southern boundaries of the site should not be disturbed or destroyed as they are an important habitat for fauna.
- Certification to be submitted to Council for satisfactory completion is to be provided for above works during construction and implementation of contingency measures as required by the project ecologist.

Landscaping works

- Temporary protection fencing to be installed around retained trees and the avoided designated VMP lands, to delineate an earthworks exclusion zone and to protect the remnant PCTs and restoration areas within the site.
- Turf to be limited to cut and fill areas and landscaped areas in the immediate vicinity of the proposed buildings. Turf is prohibited within or near the designated VMP area.
- Signage to be erected along fencing prohibiting construction works beyond the approved development footprint.
- All bare or disturbed areas are to be fully stabilised using methods recommended in "*Managing Urban Stormwater Soils and Construction*" (Landcom 2004) to minimise erosion into adjoining conserved bushland areas or drainage lines.
- All protective fencing (as per the landscape contractor recommendations) to be maintained and secured in perpetuity.
- Certification of project milestones are to be submitted to Council for satisfactory completion of all bushland protection and restoration works in accordance with this BMP, the conditions of consent and implementation of contingency measures as required by the appointed project ecologist.

Site photo 6 – Natural caves providing habitat

Site Photo 7 – Natural caves providing habitat

Site Photo 8 – Waterfall area with sandstone crevices providing habitat shelter

Site Photo 9 – Reptile habitat

MONITORING AND MAINTENANCE

Maintenance activities are aimed at providing a framework for the upkeep of the site in order to help protect and maintain the existing natural habitat and neighbouring retained bushland. Maintenance, in particular weed control, within the development footprint should continue for a minimum period of five (5) years.

Maintenance activities include:

- Weed control;
- Waste control;
- Watering and vegetation maintenance for landscaped/street plantings;
- Maintenance of installed nest boxes;
- Sediment and erosion control.

Maintenance activities will occur as needed during the construction, post-construction or maintenance phase for a minimum of five (5) years post-construction. It is the responsibility of the landowner to ensure all maintenance is undertaken.

It is recommended that regular monitoring inspections be undertaken by the project ecologist on a twelve (12) monthly basis for the 5-year duration of this BMP. This will allow the determination of any areas suffering from disturbance or in need of further weed control, soil stabilisation, erosion control, native plantings, fencing or other maintenance.

NON-CONFORMANCE WITH BMP

The landholder must notify council of any non-compliance and submit a contingency plan specifying corrective actions to be undertaken and the method and timing of actions.

Contingency works are to be specified on a twelve (12) monthly basis by the appointed project ecologist to ensure that the restoration performance targets are achieved.

Contingency restoration works may also include:

- Additional target weed control to prevent weed infiltration into protected bushland areas;
- Stabilisation of any identified areas of bare soil or erosion;
- Rectification of temporary tree protection and damage to roots of trees;
- Removal of waste or contaminated soil;
- Removal of litter; and
- Maintenance of sediment and erosion control fencing and rectification of any excessive sediment deposits.

COMPLIANCE AND REVIEW

An audit inspection will be undertaken by the project ecologist at a minimum every twelve (12) months for the duration of the BMP following the initial baseline monitoring inspection at the first six (6) month interval. A compliance certificate will be issued at the completion of each stage of restoration works detailing the actual performance of the restoration tasks undertaken.

Compliance certificates are to be provided on the following basis:

<u>Prior to commencement of vegetation clearance</u>

- Certification to be submitted to council for satisfactory completion is to be provided for habitat protection, tree protection fencing, fauna relocation works, habitat tree removal, installation of nest boxes, salvage of hollows, sediment and erosion control, and implementation of contingency measures as required by the project ecologist.

<u>Post vegetation clearance</u>

- Certification to be submitted to Council for satisfactory completion is to be provided for vegetation clearance, maintenance of tree protection fencing, sediment and erosion controls and implementation of contingency measures as required by the project ecologist.
- All trees to be retained as advised in the Arboriculture Impact Assessment are to be retained. In the event they are lost including but not limited to storm damage, mechanical damage, disease, or senescence, additional plantings will be specified by the project ecologist.

<u>Post completion of excavations, cut and fill works</u>

- Certification to be submitted to council for satisfactory completion of the installation of the temporary construction fence, tree protection measures, erosion and sediment control works, protection of any retained trees, application of low impact weed control methods and the retention and relocation of log habitat. This to be provided for above works during construction and implementation of contingency measures as required by project ecologist and Council.

<u>Post construction - Bushland protection works</u>

- Certification to be submitted to Council for satisfactory completion of all bushland protection such as limiting the use of turf, protection signage, treatment of any patches of bare earth to revegetate to prevent erosion sedimentation in accordance with this BMP, as well as the conditions of consent and implementation of contingency measures as required by the project ecologist and Council.

The project ecologist is to advise whether conditions of consent or targets are being met and if additional works or alternative methods are required to achieve various regeneration and protection targets.

PATHOGEN CONTROL AND MANAGEMENT

Two types of pathogens are at risk of being introduced to the site and affect the outcomes for restoration works and tree plantings.

- **Root Rot Disease** *(Phytophthora cinnamomic*)
- **Myrtle Rust** *(Austropuccinia psidii)*

Phytophthora cinnamomi

Phytophthora cinnamomi is a soil-borne plant pathogen that attacks the roots of susceptible plants—destroying the root system and reducing the ability of the plant to absorb water and nutrients. This causes symptoms referred to as 'dieback' which can lead to plant death.

Under favourable conditions *Phytophthora* spp. can spread easily and quickly, destroying plants and plant communities. These guidelines to help minimise the risk of spreading *Phytophthora cinnamomi* also apply to other species of *Phytophthora* present in Australia, as the management of those species is similar. Thousands of Australian native plant species are susceptible to *Phytophthora cinnamomi*, and several of those species may be at risk of extinction due to its impacts. The dramatic impact of *Phytophthora* spp. infestations on plant communities may also lead to major declines in some insect, bird and animal species due to the loss of shelter, nesting sites and food sources.

Phytophthora cinnamomi thrives in warm, moist conditions with temperatures between 15°C and 30°C, and with rainfall greater than 400 millimetres a year. Its impact is greatest in Western Australia, Victoria, Tasmania and South Australia. The Northern Territory remains the only jurisdiction unaffected, as its environmental conditions are generally unfavourable to the pathogen.

Phytophthora cinnamomi spreads through soil, water, and organic matter. It can remain dormant for long periods during dry weather and is impossible in most situations to eradicate from infested areas, which means limiting further spread is critical. Any activity that moves soil, water or plant material can spread the disease. This includes soil on tools, footwear, and vehicles.

Myrtle Rust

Myrtle rust is a disease caused by the fungus *Austropuccinia psidii*. It affects trees and shrubs in the Myrtaceae plant family—attacking young, soft, actively-growing leaves, shoot tips and young stems, as well as fruits and flower parts.

The first signs of rust infection are tiny, raised spots or pustules on infected leaves. After a few days, the pustules erupt into distinctive bright yellow spore masses. Left untreated, the disease can cause deformed leaves, heavy defoliation of branches, dieback, stunted growth and plant death.

Plants susceptible to myrtle rust are those in the Myrtaceae family, which includes bottle brush (*Callistemon* spp.), tea tree (*Melaleuca* spp. and *Leptospermum* spp.), Lilly pillies (*Syzygium* spp.) and eucalypts (*Eucalyptus* spp., *Angophora* spp. and *Corymbia* spp.). The Myrtaceae family in Australia is ecologically important, accounting for about 10% of Australia's native flora, with many Australian plant communities dominated by myrtaceous species.

- Arrive clean, leave clean – ensuring all clothing, hats, footwear, tools, equipment, machinery and vehicles are free of weed seeds, mud, soil and organic material before entering and leaving bushland;
- Schedule works for dry soil conditions where possible;
- Minimise soil disturbance;
- **<u>Do not</u>** remove any plant material from sites infested with myrtle rust;
- If using seedlings, purchase them from a supplier that can guarantee high standards of hygiene – such as NIASA-accredited businesses; and
- Ensure transport and disposal of plant material does not introduce weeds to new areas.

Procedures to Minimise Risk of Pathogen Transmission

When conducting works on site the following steps will help stop the spread of invasive species:

- If a site is infested with myrtle rust, **<u>do not</u>** remove any plant material from that site. Instead, dispose of plant waste by burial. If this is not possible, seal the waste in a plastic bag, seal the bag in a second bag and spray the outside of the bag with a solution of 70% ethanol or methylated spirits in 30% water before responsible disposal offsite;
- Ensure all materials taken onto site – such as seedlings, mulch, soil, gravel, rock, and sand – are certified free of weeds and pathogens. You can do this by purchasing from Nursery Industry Accreditation Scheme Australia (NIASA) accredited businesses, and ensuring materials conform to Australian Standards—for example, *AS3743–2003 Potting mixes* or *AS4454–2012 Composts, soil conditioners and mulches*;
- Create a checklist of hygiene procedures for project managers and participants to use;
- Ensure equipment is cleaned and disinfected with a solution of 70% ethanol or methylated spirits in 30% water. This includes footwear, tools, equipment, machinery, vehicles, backpacks, walking sticks, tent pegs and personal items;
- Remove all weed seeds, mud, soil and organic matter from any items or equipment which comes into contact with plants or the ground. Stay as clean as possible while in the bush.

Disinfecting Clothing, Footwear, Equipment, and Personal Items

The following procedures apply to the disinfection of vehicles and machinery:

- Carry a hard brush and a spray bottle of disinfectant—made up of a solution of 70% ethanol or methylated spirits in 30% water. If you are able to carry more, assemble a simple hygiene kit;
- Set up a wash-down area for participants to wash and dry their face and hands and clean their footwear before entering and exiting the site;
- To clean footwear, first use a hard brush or stick to remove as much mud, soil and organic matter as possible before disinfecting with a solution of 70% ethanol or methylated spirits in 30% water—applied through a spray bottle or a footbath;
- Seal all personal rubbish in a bag and spray the outside of the bag with a solution of 70% ethanol or methylated spirits in 30% water before responsible disposal offsite;
- Collect all removed mud, soil and organic matter in a bag or bucket, and keep it out of clean bushland;
- Where myrtle rust is present, disposable overalls and caps is to be worn over clothing upon entering a site and removed when leaving the site. However, in high-risk cases, also shower and change into clean clothes (including hats, gloves and footwear); and
- Wash all clothing, hats and gloves between site visits using warm or hot machine wash with detergent.

Disinfecting Vehicles and Machinery

The following procedures apply to the disinfection of vehicles and machinery:

- Use a wash-down facility for vehicles and machinery if available, or wash-down on a hard, well-drained surface, for example a road, and on ramps if possible;
- Pay particular attention to cleaning mud flaps and tyres;
- Dispose of wash-down water so that it drains back into a low area of the infested zone away from waterways. If this is not possible, empty it into a waste container for responsible disposal offsite;
- Don't allow wash-down water to drain into clean bushland; and
- Don't drive through wash-down water.

https://www.agriculture.gov.au/sites/default/files/documents/arrive-clean-leave-clean.pdf

The Australian Government, Department of the Environment (2015) has published a more comprehensive guide to the management of invasive plant diseases and weeds. The Title of this document is "*Arrive Clean, Leave Clean*" and can be found at the following website:

FAUNA MANAGEMENT

Fauna habitat will need to be removed from parts of the development area, in order to facilitate the proposed development. The following section provide guidelines on managing fauna and habitat values in order to minimise impacts on site.

Log Habitat

The proposed development will involve impacts to vegetation which may provide potential habitat for fauna. Selected logs that are to be removed as part of the development must be translocated within the VMP area (TBE 2022) for ground dwelling fauna.

Any native trees being removed, may be stockpiled at an appropriate location, with sections of logs harvested for re-use within retained vegetation areas on site as additional fauna habitat. There are no specific benchmark requirements for compliance, this is just an additional measure.

Fauna Considerations

Factors to consider include:

- Lighting elements to limit light pollution emanating from adjacent development;
- Landscape planting of a visual barrier for lots bordering the VMP area and other avoided lands areas to filter light and over time create 'night' shading;
- Progressive weeding of exotic shrub layer which currently provides potential shelter and foraging habitat for native species. Native landscaping should attempt to replace removed exotic habitat to at the minimum provide space for urban native species;
- Installation of nest boxes/salvaged hollows in the VMP if not already undertaken as per the VMP guidelines which are mentioned under the heading of Nest Box Installation;
- Installation of nest boxes/salvaged hollows to encourage arboreal mammals and birds, and subsequently prey items for larger birds; and
- Timing of demolition and clearing works to avoid critical lifecycle events (i.e. breeding).

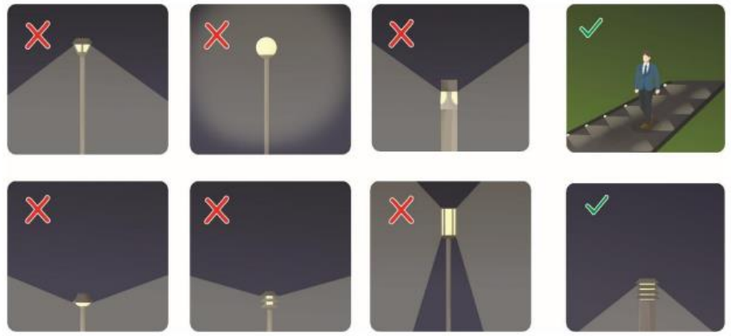


Figure 5 – Examples of outdoor wildlife friendly lighting for accessways

(National Pollution Guidelines for Wildlife - DCCEEW 2023)

Habitat Trees

The proposed development will involve the clearing of hollow-bearing and nest-bearing trees. Given that many large trees over 100mm DBH will be removed during the development impacts, particular strategies will be enacted within this BMP to help mitigate the loss. Large trees tend to have a higher incidence of hollows, and the branches that occasionally drop can be important for on-ground refugia. Hollows within the large trees are to be sectionally dismantled under the guidance of a fauna ecologist, with displaced animals moved to a nearby conservation area. Hollows shall be salvaged wherever possible and placed in the conservation area. Additional logs from trees being felled shall be stockpiled and used for ground-dwelling fauna in the conservation area. Additional trees shall be planted as part of the revegetation works, using the same species types that are being felled to ensure ongoing rejuvenation, increase the overall functioning of the wildlife corridor and habitat connectivity of the conservation area.

Guidelines for the Removal of Nests and Hollow-bearing Trees

The removal of hollow bearing trees will be required to facilitate the proposed development. For trees where the hollows or possible nests occur, hollows of high quality, or hollows and nests with fauna recorded residing within should be sectionally dismantled for each relocation and all hollows should be inspected for occupation, signs of previous activity and potential for reuse. A total of one (1) tree containing six (6) hollows is located within the allotment (BDAR, 2023) (Table 3). This tree will be required to be removed by the proposed development.

Table 3 – Data for hollow-bearing trees to be removed

Tag No.	Common Name	DBH (cm)	Spread (m)	Height (m)	Vigour (%)	Hollows recorded
HT001	Stag	60	6	8	0	2x 10-15cm spout hollow 2x 15-20cm branch spout 1x 20-30cm trunk hollow 1x 30-40cm trunk hollow

Pre-clearing Inspection of Trees

At least two (2) weeks' notice will be needed prior to the planned date for clearing of any hollow bearing trees. This is required to allow for time for inspections of trees for use by fauna and to plan for the safe felling of the tree/removal of fauna if present. After notice is given of the planned removal of trees a fauna ecologist will inspect the trees for use by fauna. This may include inspection of trees at sunset (stag or nest watching) that allows for the detection of diurnal fauna returning to hollows or nocturnal fauna leaving for the night. Inspections may also require camera probe inspection. All hollow or nest-bearing trees proposed for removal shall be clearly marked with a 'H' Symbol to indicate removal under supervision by a fauna ecologist. A fauna ecologist is to be present at the removal of each habitat tree.

During Clearing

Where fauna is identified within a hollow or nest and the risk of death or injury as a result of machine felling of the tree is high, the tree may need to be felled in sections. This will involve the removal of hollow or nest-bearing tree limbs or sections by chainsaw with the limb lowered to the ground for removal/relocation of fauna.

All nests and hollows will be inspected after felling for occupation by fauna. Any fauna will be removed and relocated to adjoining bushland.

Where young fauna is identified within a hollow or nest whose survival will be at risk as a result of the removal of the hollow or nest from the felling of the tree, then clearing will not be carried out until those young are old enough to leave the hollow and the care of the parents. It is suggested therefore that clearing is not carried out during breeding times when young are likely to be present within hollows (spring-early summer).

Where possible, hollow limbs removed from trees will be collected by the fauna ecologist for re-erection in retained bushland on site. Any fauna injured during clearing will be handed to WIRES or a veterinarian for care and rehabilitation.

Nest Box Installation

The 2022 VMP stipulated 14 nest boxes were to be installed in the native vegetation restoration area under the guidance of a fauna ecologist to ensure that there will be more hollows on site post construction than what is on site currently. The proposed nest boxes included the following:

- Four (4) nest boxes with 30cm entry suitable for forest owls
- Three (3) nest boxes with 15-20cm sized entry, suitable for large birds;
- Three (3) nest boxes with 60mm entries, suitable for lorikeets; and
- Four (4) nest boxes with 15-20mm slit entries, suitable for micro-chiropteran bats

The objective of the BMP is to ensure that this has been adequately undertaken. If the nest boxes have not yet been installed in the VMP area, the existing hollows from HT001 may be initially salvaged and utilised, and substituted with nest boxes with the dimensions above, or, just follow the above instruction.

Nest Box Design

- Timber is to be of high-grade ply 17+ mm thick (MDF, particle board and low-grade ply are not acceptable).
- The lid is to be hinged at the rear side of the box that is affixed to the tree to allow internal inspections from the front side. Lids are to be well sloped to the front to allow runoff by rain. Hinges are to be robust (not small) and made of brass, stainless steel or galvanised. Lids are to be larger than the overall cross-sectional size of the box and placed so that a small eave exists on all sides to prevent entry of rain.
- Two vertical timber supports (approximately 30x30mm timber strips 150 mm apart) are to be attached down the rear face of the box so that there are two points of attachment to the trunk on a curved surface and the box does not rock in the wind. This will also provide easy attachment points to the trees without having to screw through the inside of the box. These are to be made of treated pine and any screws into this (for hinges etc.) should be manufactured for use in treated pine or stainless. Holes at both ends of both supports are to be predrilled for easy attachment to trees. Timber supports should not be placed directly onto the box but with small timber spacers so that an eave is permissible along this side of the roof.
- Joints are to be glued and screwed for strength. Glue should be labelled as non-toxic wood glue.
- All fasteners used are to be weather resistant stainless steel, galvanised or other. Screws into the treated pine supports are to be stainless steel or screws manufactured for use in treated pine.
- All fasteners for tree attachment are to be supplied (stainless steel or treated pine coach screws). These are to be a suitable gauge depending on the size of bow and suitable length to pass through the vertical timber supports, through the bark and cambium, and into a sufficient extent of heartwood.

- Heartwood penetration will depend on the size of the box. Screws for small boxes should extend a minimum of 20mm into the heartwood of hardwood eucalypts and medium boxes ~40mm. All boxes are to be screwed so that a small distance for growth exists between the timber supports and the trunk. This can be achieved with a small stainless sleeve over the screw.
- 5 mm drainage holes are to be drilled in each corner at the base of each nest box.
- Exterior of the boxes (including treated pine supports) are to be painted with a primer and then a minimum of two coats of external non-alcohol based acrylic paint. The colour selected should be consistent with the colour of the recipient trunk and therefore recipient trees should ideally be prior selected.

Nest Box Placement

- Nest boxes are to be erected by a qualified arborist under the supervision of the project ecologist or fauna ecologist. A fauna ecologist is to locate appropriate trees and locations for installing the nest boxes.
- All replacement nest boxes are to be secured to trees at a minimum height of four metres above ground level facing the east to northeast direction. Place nest boxes as high as physically possible within a tree preferably using a cherry picker or tree climber/arborist - generally the higher the better for consideration to most species.
- Nest boxes and re-erected limbs are not to be placed near locations where public access is planned.
- The larger and more mature tree are to be selected to be nest box recipients where available. This will comparatively reduce the weighted stress on the tree, make the box less visible and result in less change in growth ratio affecting the selected attachment method. Boxes are preferably to be placed on the trunk for structural stability and protection from falling branches.
- Place nest boxes away from continual direct mid-day summer sun.
- Place nest boxes with large entry holes away from any prevailing winds when close to open waterbodies. E.g., protect from strong southerly winds close to the ocean and contrastingly cool-hot westerly winds in different seasons.
- Attach nest boxes securely so that they do not shift or shake in response to strong winds or being knocked by the movements of heavier animals, e.g. Possums and goannas.
- To ensure nest boxes are inaccessible to cats and rats or to also assist native species by exclusion of possums, the base of the trunk or branches may also require the installation of tree guards or exclusion collars.
- Nest boxes should ideally be placed in such a way that they are accessible for management but concealed from interference.
- These artificial nest boxes / structures must be accessible for maintenance purposes with an expected life span of 20 years.

Nest Box Attachment

Nest boxes are to be appropriately affixed to a recipient tree under the guidance of a fauna ecologist. Different methods of attachment to the tree are available. *Travers bushfire & ecology* generally recommends that the boxes should be fixed with robust stainless steel or treated pine coach screws that penetrate through the cambium and into the heartwood of the tree to ensure a very secure attachment. Provided that any cambium damage to a tree is not left as an open wound then the chance of fungal infection or insect attack is significantly reduced, and the tree will grow around the screw. Any other method of attachment selected should also ensure the box is secured to prevent movement or fall and allows for the future growth of the tree without any cambium constriction over the entire life of the nest box.

Nest Box Maintenance

- All nest boxes and re-erected limbs will be inspected annually for a minimum of five (5) years and any damaged, or in danger of falling, are to be repaired or replaced.
- Deterring mynas and starlings from re-nesting is not easy; these pests are very persistent, and constant vigilance is necessary. This also means that you must have convenient regular access to the nest-box, and that you must be aware of what creatures are using it for what purposes.
- Nest boxes found to be utilised by threatened or otherwise significant fauna may be prioritised for ongoing management to ensure their longevity and replicate their design/placement characteristics.

Table 4 – Typical nest box dimensions for various fauna

(Source: Birds Australia Supplement No. 5 – Nest Boxes for Natives)

SPECIES	INTERNAL SIZES	DEPTH/ LENGTH	ENTRY DIAMETRE	VERT/ HOR	HEIGHT	REF
Bat sp.	70-100 x 150-240 mm	200-250 mm	15-20 mm slit	v	-	BFNC (n.d.)
Bat, Southern Myotis	-	-	10 mm slit	v	-	Trainor (1995)
Bat, Gould's Wattled	-	-	10 mm slit	v	-	Trainor (1995)
Bat, Lesser Long-eared	-	-	10 mm slit	v	-	Trainor (1995)
Little Lorikeet	120 mm	600 mm	60mm	h	5m	-
Squirrel glider	200mm	650mm	60mm	v	6m	-

See figures 7-12 for nest box diagrams and examples of augmented hollows

Figure 6 - Southern Myotis

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EPA (2020) *1080 Pest Control, Order*

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Landcom (2024) *Soils & construction Managing Urban Stormwater* Managing Urban Stormwater soils and construction Volume 1 4th ed | NSW Environment and Heritage

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Redgum (2018) *A): Arboricultural Impact Assessment B): Tree Management Plan. Hammondcare Greenwich Hospital.*

Wood & Grieve Engineers (2019) *Greenwich Hospital Overland Flow Assessment*. C - letter template (nsw.gov.au)

Nest box diagrams and examples of augmented hollows

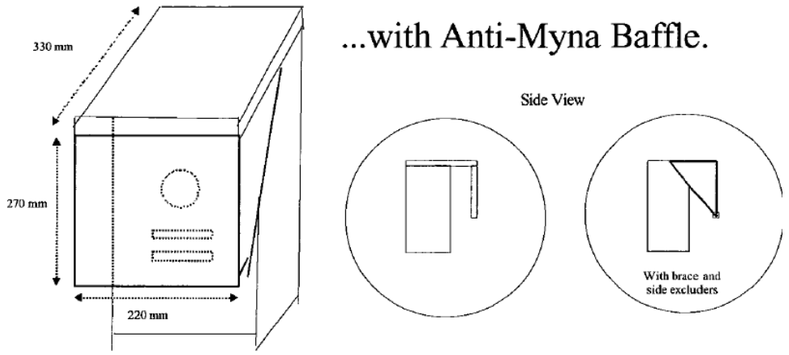


Figure 7 – Anti-Myna baffle

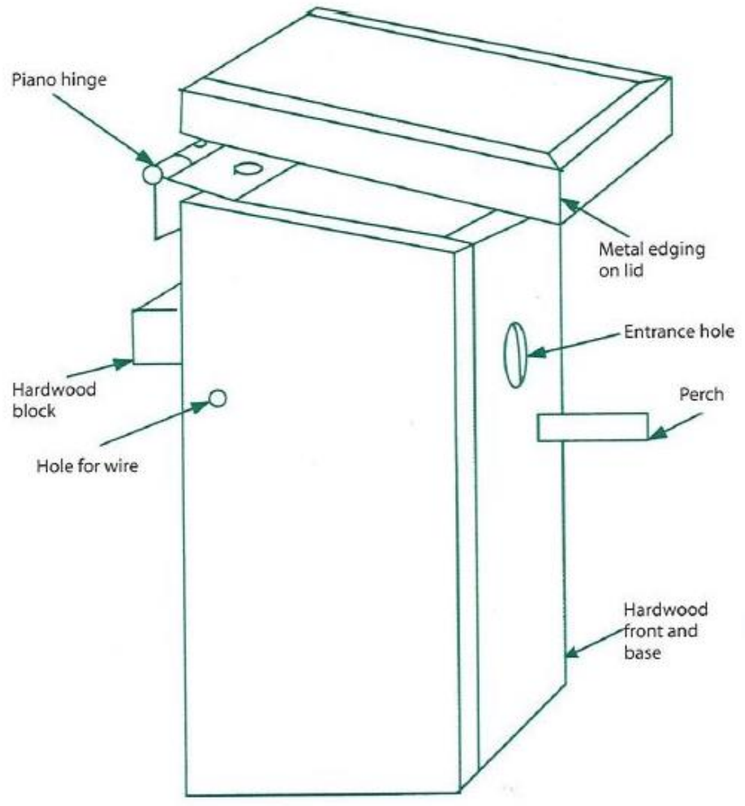


Figure 8 – A Generic nest box design
(Source - From Alan and Stacey Franks, 2003)

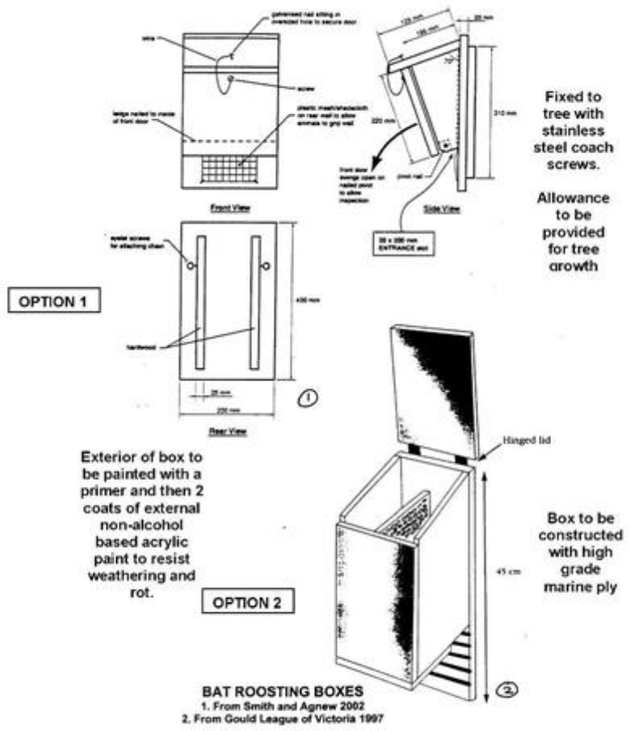


Figure 9 – Microbat nest box detail (*Option 1 & 2*)

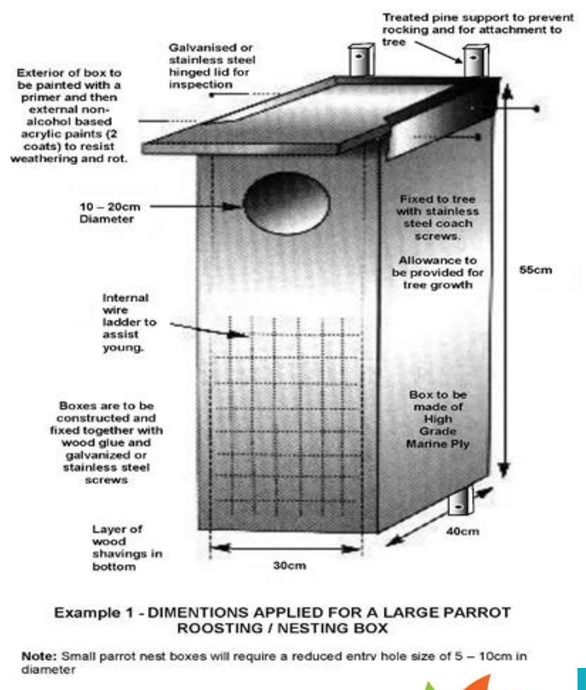


Figure 10 – Typical dimensions for large parrot box

Figure 11 – Augmented hollow using a hollow log
(Source: Sustainable McCleod
https://sustainablemacleod.org.au/creating-hollows-for-wildlife-with-chainsaws/)

Figure 12 – Augmented hollow using inserted entrance and prepared cavity
(Source: Sustainable McCleod)
https://sustainablemacleod.org.au/creating-hollows-for-wildlife-with-chainsaws/)

PROGRAM OF WORKS

The program of works Table (Table 5) is aimed at providing a management framework for enacting works such as undertaking maintenance, monitoring and review works required for the site. Site works, including sediment and erosion control and weed control works are to be undertaken in accordance with the Schedule 1 – Biodiversity Management Actions. A typical timeline of works is shown on Table 6.

Table 5 – Program of works

Stage 1 – Pre-restoration works	
Formation of site management team and establish supervision and consultation processes – minimum project ecologist, qualified bushland restoration contractor and site manager	Site project manager
Erection of erosion control fencing	Site manager / project ecologist
Installation of primary exclusion / protection fencing and access gates	Project manager
Baseline vegetation condition assessment and establishment of monitoring plots	Project ecologist
Commencement of primary weed control	Suitably qualified bushland restoration contractor
Commencement of seed collection and propagation contracts	Bushland restoration contractor / project ecologist
Provide certificates of compliance to the appointed project certifier and council	Project ecologist
Stage 2 – Restoration Works	
Supervision of any vegetation and management works	Site project manager in association with the project ecologist
Monitor erosion control measures (monthly – especially after heavy rain) and replace if required	Contractor with advice of project manager
Waste removal and soil amelioration works to control weed infestations and provide suitable restoration soil base.	Bushland restoration contractor
Complete revegetation works	Bushland restoration contractor / project manager
Commencement of secondary weed control and maintenance weed control	Contractor / bushland restoration contractor
Maintenance of fencing and signage around protected vegetation	Contractor
Continuation of primary restoration and revegetation works	Contractor / suitably qualified bushland regenerator
Provide certificates of compliance at practical completion	Project ecologist
Stage 3 – Post Restoration Works	
Further enrichment planting within revegetation areas if required.	Bushland restoration contractor with advice of project ecologist
Continuation of regeneration and weed control maintenance.	Contractor / bushland regenerator
Monitoring of retained vegetation at six (6) months, twelve (12) months and annually for five (5) years post construction stage.	Project ecologist
Conduct maintenance beyond five (5) years if required	Site manager with advice of project ecologist
Provide certificates of compliance at end of each year during the 5-year maintenance period	Project ecologist

The following typical timeline (Table 6) is provided to indicate a possible overall timing of restoration works. The commencement of the maintenance period of five (5) years is subject to the completion of primary restoration works as certified by the project ecologist. A certificate of practical completion will be required as evidence of satisfactory completion prior to the commencement of the maintenance period.

The successful implementation of restoration works may affect the release of any required bonds as required. Upon engagement, contractors are expected to meet the following typical schedule of works**.**

Table 6 – Typical Restoration works timeline

ID	Task Name	Duration
1	**PROJECT INITIATION**	
1.1	Preparation of project restoration plan	1 month
1.2	Preparation of contract schedules	1 month
1.3	Project restoration plan signoff	2 weeks
1.4	Confirmation of pricing/quotations	2 weeks
2	**WEED CONTROL**	
2.1	Primary weed control	1 month
2.2	Secondary weed control	6 months
2.3	Follow-up weed control	60 months
3	**PRECONSTRUCTION WORKS**	
3.1	Survey vegetation clearance boundaries and mark trees to be retained or removed	2 weeks
3.2	Habitat searches and relocation of affected wildlife	2 weeks
3.3	Supply and installation of artificial nest boxes	2 weeks
3.4	Dismantling of hollow bearing trees and relocate fauna and salvaged hollows	4 weeks
3.5	Installtion of hollows	4 weeks
3.6	Installation of temporary tree protection and APZ fencing/bunting	2 weeks
3.7	Kangaroo management (if required)	ongoing
3.8	Dam dewatering	2-4 weeks
4	**REVEGETATION WORKS (Only if required)**	
4.1	Site preparation	
4.1.1	Seed collection	12 months
4.1.2	Plant propagation (initial and contingency)	6-9 months
4.1.3	Site stabilisation	1 week
4.1.4	Install site irrigation system (if required)	2 weeks
4.1.5	Installation of permanent protective and erosion control fencing	1 week
4.1.6	Commence pest control (rabbit, fox, cat, dog)	6 months
4.2	Tube-stock planting and initial maintenance	
4.2.1	Pre-planting weed & waste clearance	2 weeks
4.2.2	Planting & guarding	2 weeks
4.2.3	Initial watering and maintenance	3 months
5	**5 YEAR MAINTENANCE PERIOD**	
5.1	Watering, weed control and repairs	60 months
5.2	Ongoing pest control (rabbit) and kangaroo management	60 months
6	**CONTRACT MANAGEMENT**	
6.1	Contractor supervision	60 months
6.2	Monitoring	60 months
6.3	Prepare and submit audit reports	60 months
6.4	Prepare and submit compliance certificates	60 months
7	**CONTINGENCY PLANTING (Only if required)**	
7.1	Site preparation	1 week
7.2	Replacement or contingency planting	1 week
7.3	Watering and maintenance	3 months
7.4	Medium term maintenance	6 months

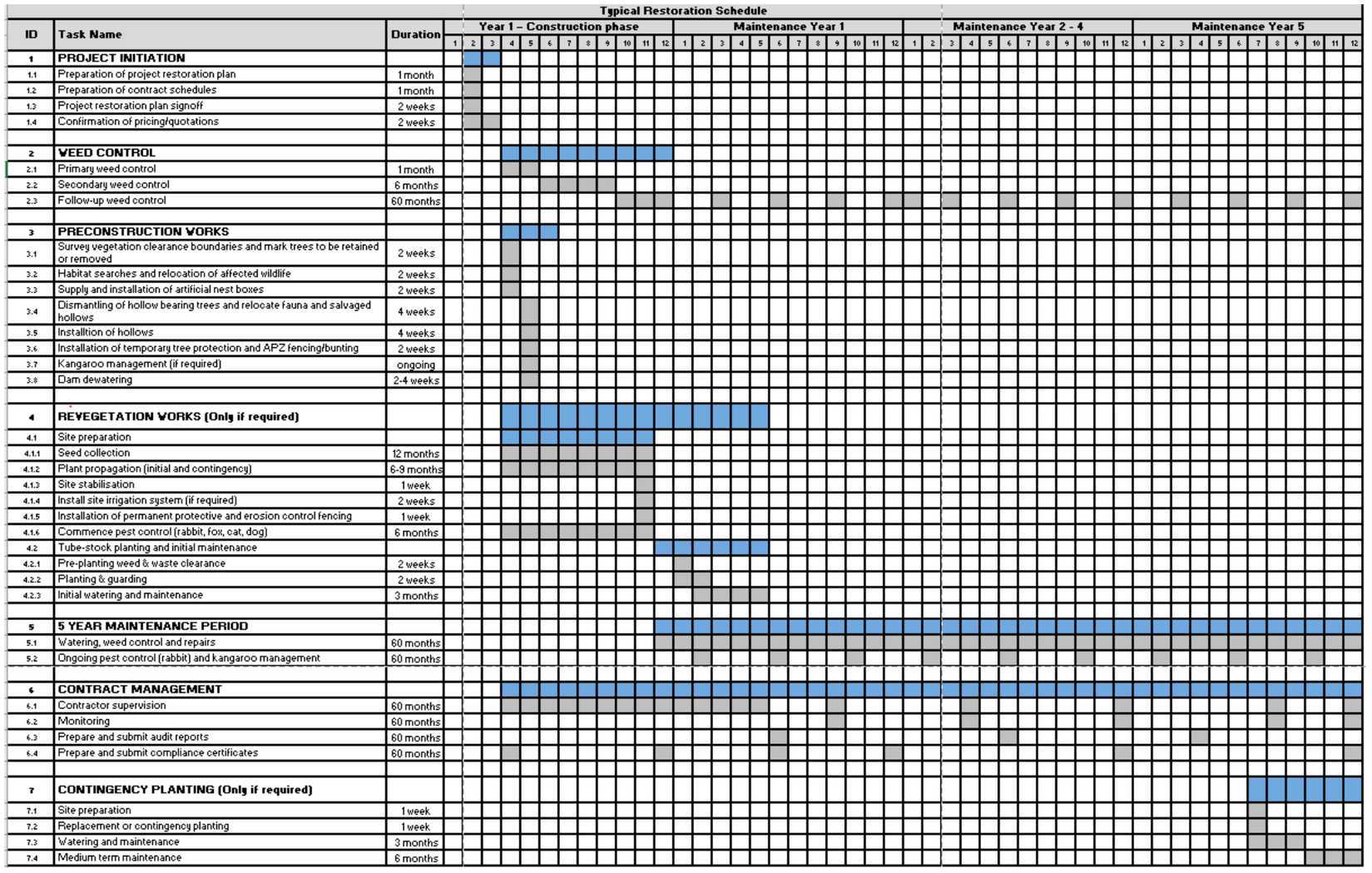


Figure 13 - Site map

Plant Community Type	IMPACT APZ	DEV	Indirect	TOTAL(HA)
PCT 1841 (remnant/unmanaged)	0.48	0.16	0.05	0.69
PCT 1841 (managed/planted)	0.18	0.13	0.04	0.35
Non-native trees & shrubs	0.13	0.26	0.06	0.45
TOTAL (HA)	0.79	0.55	0.15	1.49

Disclaimer: The mapping is indicative of available space and location of features which may prove critical in assessing the viability of the proposed works. Mapping has been produced on a map base with an inherent level of inaccuracy, the location of all mapped features are to be confirmed by a registered surveyor.

PROJECT & MXD REFERENCE	DATE & ISSUE NUMBER	SCALE & COORDINATE SYSTEM
97 - 115 River Road, Greenwich 18TSA08INT_FF001	21/12/2022 Issue 1 SC	1:1,000 @A3 GDA 1994 MGA Zone 56

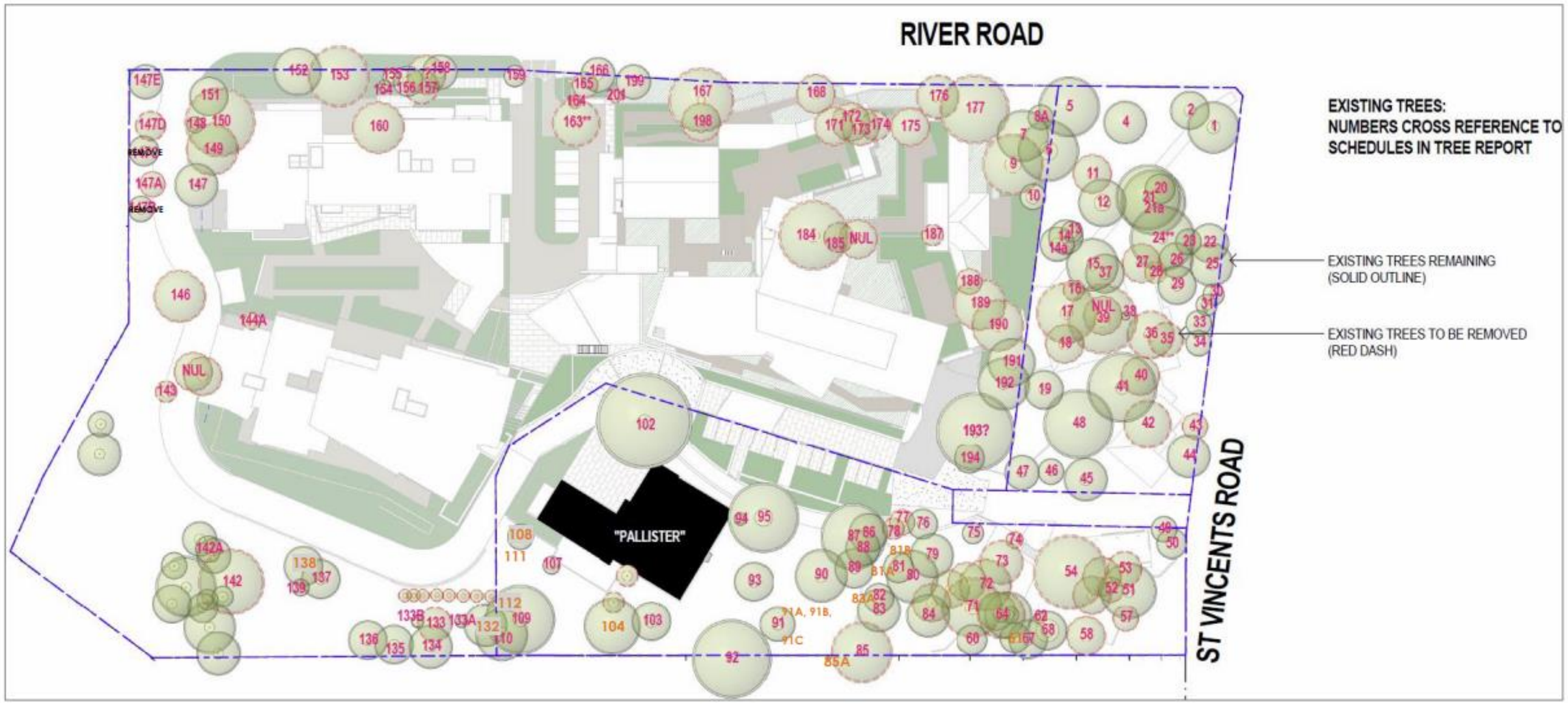
TITLE

Flora & Fauna Survey Effort & Results

Document Path: N:\GIS STORAGE\N Drive\18TSA08INT_GreenwichHospital_Greenwich\MXDs\18TSA08INT_FF001.mxd

TRAVERS BUSHFIRE & ECOLOGY
A TBE ENVIRONMENTAL COMPANY

Figure 14 – Flora and fauna survey effort and results



Legend

Tree Protection Zone (TPZ), fencing with setbacks as indicated, or other protection measures or works as indicated.

Tree Protection Zone, area of special protection measures or works outside of fenced area.

Relocated ***Tree Protection Zone,*** area of special protection measures or works outside of fenced area once construction commences.

XX Tree numbers – trees to be retained only.
Subject trees represented by the approximate location of the trunk.

Figure 15 - Tree retention and removal plan

ATTACHMENT 1 – AUDIT & COMPLIANCE CERTIFICATION TABLE

Audit items	Timing	Responsibility	Rectification works required? Yes/No	Works required	Completion Date	Compliant Yes/No
Preconstruction works (Prior to CC)						
Practical completion of all preconstruction works – weed control, local provenance seed collection, sediment erosion control, protective fencing, installation of nest boxes prior to construction	0-3 months	Bush Regeneration Contractor				
During Construction (Post issuance of CC)						
Practical completion of all primary restoration works (Prior to Issuance of Subdivision Certificate) –Nest boxes/augmented hollows, fencing installation, protective fencing, fencing installation (3 access gates), watering, litter removal,	3-12 months	Bush Regeneration Contractor				
3-12 months – Assess whether contingency works are required to achieve practical completion and satisfaction of performance targets	3-12 months	Project Ecologist				
12 months – submission of first audit and compliance certificate demonstrating practical completion and compliance with Biodiversity Performance Targets	12 months	Project Ecologist				
Year 1 Maintenance						
Commence year 1 Maintenance works – Monthly maintenance session with submission of works report to Project Ecologist	Year 1 maintenance	Bush Regeneration Contractor				
Biannual review with Project Ecologist to determine need for contingency works	Every 6 months	Bush Regeneration Contractor with Project Ecologist				
Annual Audit report demonstrating compliance with Biodiversity Performance targets	Every 12 months	Project Ecologist				
Year 2 Maintenance						
Commence year 2 Maintenance works – Monthly maintenance session with submission of works report to Project Ecologist	Year 2 maintenance Period	Bush Regeneration Contractor				
Biannual review with Project Ecologist to determine need for contingency works	Every 6 months	Bush Regeneration Contractor with Project Ecologist				
Annual Audit report demonstrating compliance with Biodiversity Performance Targets	Every 12 months	Project Ecologist				
Year 3 Maintenance						
Commence year 3 Maintenance works – Monthly maintenance session with submission of works report to Project Ecologist	Year 3 maintenance	Bush Regeneration Contractor				
Biannual review with Project Ecologist to determine need for contingency works	Every 6 months	Bush Regeneration Contractor with Project Ecologist				
Annual Audit report demonstrating compliance with Biodiversity Performance Targets	Every 12 months	Project Ecologist				
Year 4 Maintenance						
Commence year 4 Maintenance works – Monthly maintenance session with submission of works report to Project Ecologist	Year 4 maintenance	Bush Regeneration Contractor				
Biannual review with Project Ecologist to determine need for contingency works	Every 6 months	Bush Regeneration Contractor with Project Ecologist				
Annual Audit report demonstrating compliance with Biodiversity Performance targets	Every 12 months	Project Ecologist				
Year 5 Maintenance						
Undertake a review of the Vegetation Management Plan and make adjustment for any site conditions for updated methodologies to improve restoration outcomes	During year 5	Project Ecologist				
Commence year 5 Maintenance works – Monthly maintenance session with submission of works report to Project Ecologist	Year 5 maintenance	Bush Regeneration Contractor				
Biannual review with Project Ecologist to determine need for contingency works	Every 6 months	Bush Regeneration Contractor with Project Ecologist				
Annual Audit report demonstrating compliance with Biodiversity Performance Targets	Every 12 months	Project Ecologist				
Handover or extended maintenance period						
Meet with receiving organization and determine readiness for hand over	Midway through year 5 maintenance	Project Manager with Project Ecologist				
On going maintenance until hand over occurs	Every Month	Bush Regeneration Contractor				
Biannual review with Project Ecologist to determine need for contingency works	Every 6 months	Bush Regeneration Contractor with Project Ecologist				
Annual Audit report demonstrating compliance with Biodivsersity Performance Targets	Every 12 months	Project Ecologist				