introduced grasses including *Briza subaristata*, common couch (*Cynodon dactylon*), kikuyu (*Paspalum dilatatum*) and common weeds. Native species were low in abundance and included barbwire grass (*Cymbopogon refractus*) and patches of blady grass (*Imperata cylindrica*). Exotic grassland is also present, with an area in the northwest of the Bagdad Street site regularly mown, and exotic grassland in the east unmown. A number of dense thickets of blackberry are also present in a number of locations.

Some patches dominated by acacia's are present on the Bagdad Street site. A patch in the west of the site between the drainage line and Bagdad Street (near the current entrance) contained some individuals of native species such as *Melaleuca decora*, *Acacia parramattensis* and Sweet Pittosporum (*Pittosporum undulatum*). The soil, however, has been highly disturbed from road construction and the dominant plants were introduced species such as camphor laurel (*Cinnamonum camphora*), large-leaved privet (*Ligustrum lucidum*), willow (*Salix* spp.) green cestrum (*Cestrum parquii*) and lantana (*Lantana camara*).

The second patch along the southern boundary of the site consisted of regrowth *A. parramattensis*, to approximately 4m in height, with scattered native blackthorn (*Bursaria spinosa*), and grasses. The *A. parramattensis* occurs at high density, and has suppressed other plant growth within the patch, with limited native shrubs and grasses occurring primarily at the perimeter of the patch.

The vegetation on the Bagdad Street site was considered with regards to whether any areas was consistent with Cooks River Castlereagh Ironbark Forest (as per the scientific committee definition in Sydney). Of those species observed on the site, 3 are consistent with the scientific committee listing of Cooks River Castlereagh Ironbark Forest: *Melaleuca decora*, *Bursaria spinosa*, and *Dillwynia sieberi*.

The acacia dominated patch in the west of the Bagdad Street site is dominated by exotics, and the soils are heavily disturbed. It was therefore considered that this patch was <u>not</u> consistent with Cooks River Castlereagh Ironbark Forest.

The acacia dominated patch in the south of the Bagdad Street site had some species consistent with the Cooks River Castlereagh Ironbark Forest, and the soils do not appear to have had a low level of disturbance. The listing for the community states that:

> *10. Disturbed Cooks River/Castlereagh Ironbark Forest remnants are considered to form part of the community including remnants where the vegetation would respond to assisted natural regeneration such as where the natural soil and associated seedbank is still at least partially intact.*

This patch could therefore be consistent with the community, as the soils have had lower disturbance, and the seedbank would be <u>partially</u> intact. On the basis of the above asssessment, this vegetation could possibly be considered to be a very highly disturbed, small and isolated patch of Cooks River/Castlereagh Ironbark Forest. It is the professional opinion of the authors of this report, however, that it is so degraded that it is no longer representative of the community. It is nevertheless recommended that should it not be practical to retain this area as landscaping for the Bagdad

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Street site, that the limited area of good groundcover and seed be translocated to the revegetation offset areas within the main portion of Potts Hill site to utilise whatever native elements may be present in the soil seed bank.

No 'drainage lines' for the Potts Hill study area appear on 1:25,000 topographic mapping, and hence requirements for approvals affecting 'rivers' under the *Water Management Act 2000*, do not apply.

Conservation Significance Assessment

The conservation significance assessment (CSA) is the outcome of the analysis process (see methods discussion in Appendix 1). It combines vegetation community mapping (Figure 7), conservation significance mapping (Figure 8), and recovery potential (Figure 9). CSA results can function as a useful guide to identifying ecological tensions when considering development outcomes. Mapping of CSA results for Potts Hill are shown in Figure 10,

Much of identified vegetation within the site has a high conservation significance assessment value ('High' CSA = 10.90ha or 88%) largely due to 'Critically Endangered Ecological Communities' classifications under the NPWS CSA assessment guidelines (NPWS 2002b). These communities are automatically assigned 'core habitat' status regardless of their condition, patch size or connectivity (see Table 5). Much of this vegetation (8.04ha) is within land being retained by Sydney Water.

Table 9. Area of vegetation communities within proposed landuse zones.

Vegetation Community	Status *		CSA **	Vegetation Area (ha)				
	TSC	EPBC		Development Area	Open Space	Retained Land	Potential Use (10-20 yrs)	Total
Cooks River/Castlereagh Ironbark Forest †	EEC	-	High	0.26	1.11	6.36	0.57	**8.30**
Creek (Riparian)	-	-	Low	0.07	0.04	-	-	**0.11**
Cumberland Plain Woodland	EEC	EEC	Moderate	0.72	0.32	-	-	**1.04**
Grassland - Native	-	-	Moderate	-	-	0.33	-	**0.33**
Sydney Turpentine Ironbark Forest †	EEC	CEEC	High	0.55	-	1.35	0.70	**2.60**
Total				**1.60**	**1.47**	**8.04**	**1.27**	**12.38**

* TSC = Threatened Species Conservation Act; EPBC = Environmental Protection and Biodiversity Conservation; EEC = Endangered Ecological Community; CEEC = Critically Endangered Ecological Community
** CSA = Conservation Significance Assessment.

† Classified as Critically Endangered Ecological Community in western Sydney (NPWS 2002a,b)

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Figure 7. Vegetation communities.

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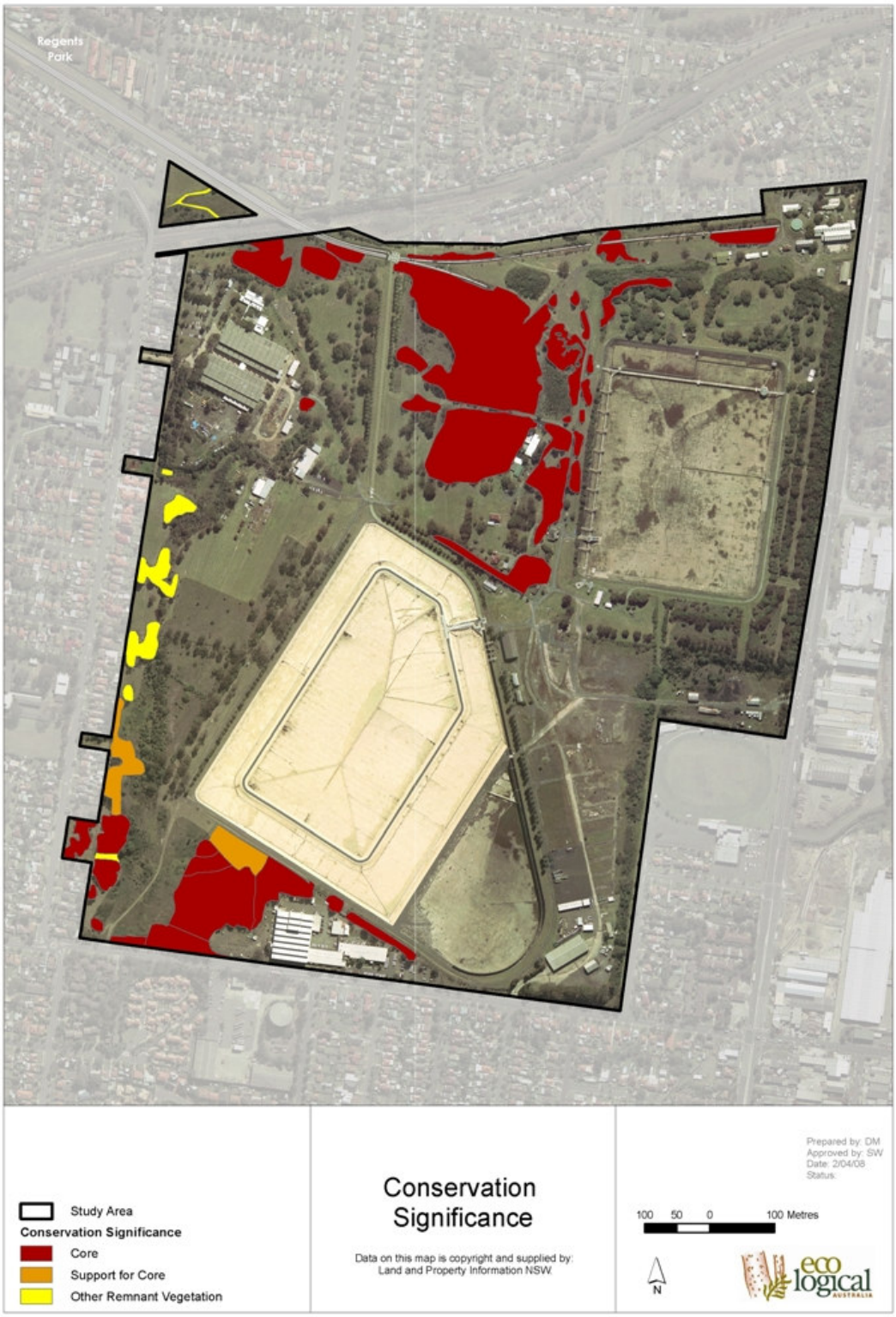

Figure 8. Vegetation conservation value.

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Figure 9. Vegetation recovery potential.

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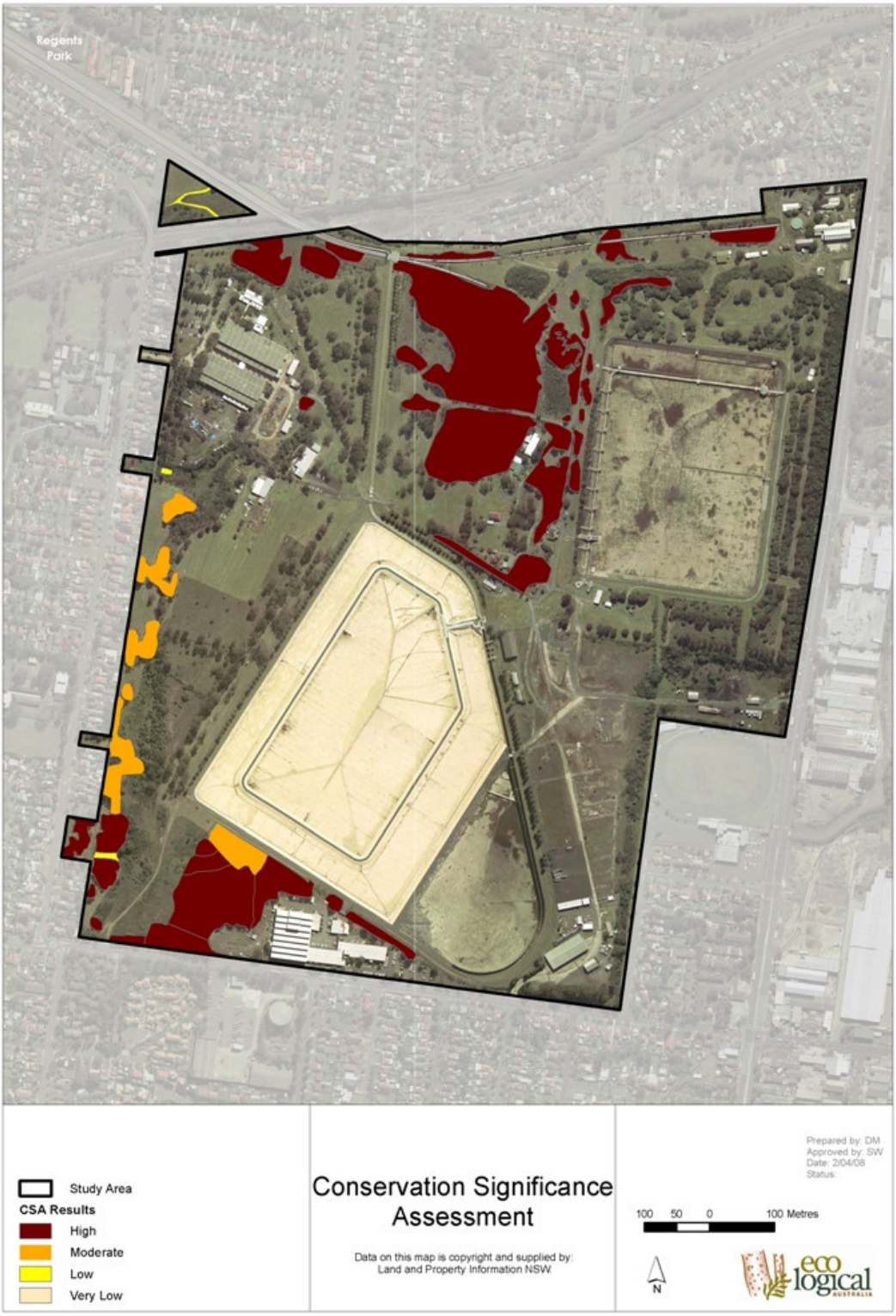

Figure 10. Conservation significance assessment results (without threatened species).

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Threatened Species

The database search for previously recorded threatened species within a 10km radius of the site resulted in 49 species of threatened fauna and 29 species of threatened flora (see Appendix 4).

The single threatened plant species identified from previous reports and field-surveys, *Acacia pubescens*, was recorded at six sites within the site (Figure 11). The total number of stems counted throughout the site was 138 with the number of stems at each site ranging from 4 to 47. The majority of plants are located in the north of the site with a more distant but relatively large population situated in the south. The size range of individual stems ranged from 0-4 m and estimated patch sizes for individual sites ranging from 16m^2 to 400m^2.

Further species of *Acacia pubescens* are reported by RailCorp as being within the rail corridor, immediately adjacent to the Potts Hill site. A 'mudmap' of known locations was received from RailCorp and indicative locations are included on Figure 11.

The Cumberland Land Snail (*Meridolum corneovirens*) was considered to potentially occur within the study area, though unlikely within the surplus lands given the unsuitability of the habitats present. Targeted searches within the proposed development lands did not result in any Cumberland Plain land snail specimens or shells. The habitat within the development areas was considered to be poor with limited leaf litter and ground debris to provide shelter for this species in most areas. Further, African Olive was present in some areas, and this plant is thought to be toxic to the snail. Substantial weed cover in other areas would likely prohibit the presence of the Cumberland Land Snail.

The Cumberland Plain Snail could potentially occur within the larger patches of Cooks River/Castlereagh Ironbark Forest to be retained and managed in the north or south of the site, where habitat quality is higher in some areas. However, it is noted that habitat quality in these areas was still generally low due to disturbance and low levels of leaf litter.

Targeted searches for the Green and Golden Bell Frog in areas of potentially suitable habitat in the west of the site did not detect any evidence of the species (sightings or calls). The areas of wetland habitat present on the site are considered to constitute only very marginal habitat for the Green and Golden Bell Frog given their nature and isolated location.

Diurnal habitat searches and nocturnal spotlight surveys did not detect the presence of the Grey-headed Flying Fox on site or overhead. This species is known to occur on site (SMEC 1997) and the vegetation remnants provide foraging habitat for this species. The site does not contain a camp site for this species.

Anabat surveys conducted to detect the possible presence of microchiropteran bats did not detect ay threatened bat species on site. Only five calls from two species were recorded during the 2-night survey period; *Tararida australis* and

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Chalinolobus gouldii/Mormopterus sp2. These species are not listed under the *Threatened Species Conservation Act 1995*.

The Eastern Bent-wing Bat (*Miniopterus schreibersii*) has been previously recorded on the Potts Hill site (SMEC 1997) and a number of other threatened micro bat species may potentially occur given the habitats present. Remnant vegetation on site and the ecotone between vegetation stands and open grassland areas is likely to provide foraging habitat for a variety of these species. Hollow-bearing trees may provide roost sites for hollow-roosting species. No caves or similar natural features are present on site for cave-roosting species. A previous roost site at Reservoir 1 was sealed in 2007 to protect the water supply and the species relocated to Prospect Reservoir (SMEC, 2007).

An assessment of the likelihood of occurrence of threatened species previously recorded in the locality has been undertaken based on the habitats present on site (see Appendix 5). On the basis of this assessment, 18 threatened species have the potential to occur on the site at least on occasion.

Fauna

- Cumberland Plain Land Snail (*Meridolum corneovirens*)
- Gang-gang Cockatoo (*Callocephalon fimbriata*)
- Swift Parrot (*Lathamus discolour*)
- Square-tailed Kite (*Lophoictinia isura*)
- Regent Honeyeater (*Xanthomyza phrygia*)
- Large-eared Pied Bat (*Chalinolobus dwyeri*)
- Great Pipistrelle (*Falsistrellus tasmaniensis*)
- Eastern Bent-wing Bat (*Miniopterus schreibersii*) – Known to occur
- Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*)
- Eastern Freetail-bat (*Mormopterus norfolkensis*)
- Grey-headed Flying-fox (*Pteropus poliocephalus*) – Known to occur
- Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*)

Flora

- *Acacia pubescens* – Known to occur
- *Allocasuarina glareicola*
- *Pimelea spicata*
- *Pomaderris prunifolia var. prunifolia*
- *Pultenaea parviflora*
- *Wahlenbergia multicaulis*

Two species of regional significance, white-winged chough (*Corcorax melanorhamphos*) and peregrine falcon (*Falco peregrinus*) were noted in SMEC (1997).

Other Fauna

A range of common and widespread fauna species have been recorded on the Potts Hill site (Appendix 4). The species recorded are generally more mobile species (eg birds and bats) that are commonly recorded in urban bushland remnants and are that utilise woodland/open forest and open grassland habitats.

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Three species of frog were located on site: *Crinia signifera* (Eastern Froglet), *Litoria caerulea* (Green Tree Frog) and *Litoria peronii* (Peron's or Emerald Spotted Tree Frog).

A numbers of cats were recorded on site during the recent targeted fauna surveys.

Fauna Habitat
Due to poor condition and high disturbance in the development area, it is unlikely that significant native faunal assemblages inhabit these areas. Nevertheless, the potential exists for mobile species such as bats to utilise habitat within low condition patches of vegetation for roosting and/or foraging, and two threatened species the Grey-headed Flying-fox and the Eastern Bent-wing Bat have been previously recorded on the Potts Hill site (SMEC 1997; Woodside 1997, Hoye 1997).

As noted above, the site provides only very marginal potential habitat for the Green and Golden Bell Frog which has not been recorded on site. Potential habitat for the Cumberland Plain Land Snail is limited to the higher quality stands of native vegetation to be retained within the SWC lands.

Additionally, the potential exists for vegetation to act as stepping stones for mobile fauna groups between remnant bushland. Assessment of trees for hollows revealed the presence of 57 hollow bearing trees (Figure 12). Most of these trees (43) were exotic peppercorn trees (*Schinus areira*), with a mixture of planted and established natives accounting for the remaining 14 trees. The majority of hollows were of sufficient size to accommodate bats and small birds or gliders, but were not a sufficient size to be used as roosts by owls or other medium to large birds. It is also noted that the peppercorn trees were of low height (up to 4m), with hollows often 1-2m above ground, and hence may not be suitable for many native fauna species, due to a potential for disturbance and the presence of cats.

Weeds
A number of weed species are present on the site, including:

- Green cestrum (*Cestrum parqui*)
- Lantana (*Lantana camara*)
- Blackberry (*Rubus fruticosus* (agg. spp.))
- Pampas grass (*Cortaderia selloana*)
- Prickly pear (*Opuntia* sp.)
- Rhus tree (*Toxicodendron succedaneum*)
- African Olive (*Olea europaea*)

It is anticipated that a dedicated weed survey will be conducted within the retained lands to provide more comprehensive detail of weed densities and distribution for input into the preparation of the Vegetation Management Plan.

Connectivity/ Corridors
The site currently has poor connectivity to other remnant vegetation, as the site is not connected or adjacent to remnant vegetation in the surrounding area. SMEC (1997) and BCC and ELA (2002) consider that Potts Hill Reservoir supports communities and species of local and regional significance. Both assessments, however, recognise the

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isolation of the site from surrounding remnant vegetation. Nevertheless, these studies considered it likely that the site acts as a potential stepping stone for mobile fauna species.

The Bankstown Biodiversity Strategy (BCC and ELA 2002) considered connectivity within the Bankstown LGA, and proposed two corridors within the site, both running in an east-west direction, one along the northern boundary and the other along the southern boundary of the site.

Both of the proposed corridors seek to link native vegetation remnants, and provide connectivity in an east-west direction. The Sydney Water pipeline corridor is noted as being more favourable, and that there is the potential of establishing "islands", or "stepping stones" at regular intervals along the corridor by augmenting with plantings relatively large areas of land along the pipeline. The alternative east-west corridor, linking up to the Duck River, was considered desirable, although it was considered that this corridor would likely be more difficult to implement due to the presence of industrial areas.

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Figure 11. Occurrences of the threatened plant *Acacia pubescens*.

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Figure 12. Location of hollow bearing trees.

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Appendix 3. Flora opportunistically noted during field surveys.

Scientific Name	Comon Name	Native (Y/N)	Noxious Weed Class in LGA*
Ageratina adenophora	Crofton Weed	N	-
Chrysanthemoides monilifera	Boneseed/Bitou Bush	N	3
Cinnamomum camphora	Camphor Laurel	N	-
Cortaderia selloana	Pampas Grass	N	3
Erythrina X sykesii	Coral tree	N	-
Hardenbergia comptoniana	*Hardenbergia comptoniana*	N	-
Juncus acutus	Sharp Rush	N	-
Ligustrum lucidum	Large-leaved Privet	N	-
Olea europaea	Common Olive / African Olive	N	-
Paspalum dilatatum	Paspalum	N	-
Phoenix canariensis	Canary Island Palm	N	-
Rubus fruticosus (agg. spp.)	Blackberry	N	4
Acacia parramattensis	Parramatta Wattle	Y	
Acacia pubescens	Downy Wattle	Y	
Angophora floribunda	Rough-barked Apple	Y	
Aristida spp.	Grass	Y	
Asplenium flabellifolium	Necklace Fern	Y	
Breynia oblongifolia	Coffee Bush	Y	
Casuarina glauca	Swamp Oak	Y	
Dodonaea triquetra	Large-leaf Hop-bush	Y	
Eucalyptus crebra	Narrow-leaved Ironbark	Y	
Eucalyptus eugenioides	Thin-leaved Stringybark	Y	
Eucalyptus fibrosa	Red Ironbark	Y	
Eucalyptus longifolia	Woollybutt	Y	
Eucalyptus moluccana	Grey Box	Y	
Eucalyptus pilularis	Blackbutt	Y	
Eucalyptus tereticornis	Forest Red Gum	Y	
Glycine clandestina	*Glycine clandestina*	Y	
Kunzea spp.	Kunzea	Y	
Lomandra longifolia	Spiny-headed Mat-rush	Y	
Melaleuca decora	White Feather Honeymyrtle	Y	
Melaleuca styphelioides	Prickly-leaved Tea Tree	Y	
Pittosporum revolutum	Rough Fruit Pittosporum	Y	
Pittosporum undulatum	Sweet Pittosporum	Y	
Polyscias sambucifolia	Elderberry Panax	Y	
Syncarpia glomulifera	Turpentine	Y	
Themeda australis	Kangaroo Grass	Y	
Typha orientalis	Bullrush	Y	

Noxious Weed class taken from:
http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed/noxious-app?sq_content_src=%252BdXJsPWh0dHAlM0ElMkYlMkZ3d3cuYWdyaWMubnN3Lmdvdi5hdSUyRnRvb2xzJTJGdmlld2NvdW5jaWwuaHRtbCZhbGw9MQ%253D%253D&council_id=5

*Legal Requirements under Noxious Weed Act
3 - The plant must be fully and continuously suppressed and destroyed
4 - The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority

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Appendix 4. Fauna recorded on site.

(Sources: Field Survey 2007, SMEC (1997))

Common Name	Scientific Name
Amphibians	
Eastern Froglet	*Crinia signifera*
Green Tree Frog	*Litoria caerulea*
Peron's or Emerald Spotted Tree Frog	*Litoria peronii*
Birds	
Common Starling	*Sturnus vulgaris*
Eastern Rosella	*Platycercus eximius*
Grey Butcherbird	*Cracticus torquatus*
Indian Myna	*Acridotheres tristis*
Magpie	*Gymnorhina tibicen*
Noisy Myna	*Manorina melanocephala*
Peregrine Falcon	*Falco peregrinus*
Pigeon	*Columba livia*
Rainbow Lorikeet	*Trichoglossus haemotodus*
Raven	*Corvus coronoides*
Red Wattlebird	*Anthochaera carunculata*
Red-browed Finch	*Neochmia temporalis*
Spotted Turtle Dove	*Streptopelia chinensis*
Superb Fairy Wren	*Malurus cyaneus*
White-faced Heron	*Egretta novaehollandiae*
Willy Wagtail	*Rhipidura leucophrys*
Yellow Thornbill	*Acanthiza chrysorrhoa*
Reptiles	
Common Garden Skink	*Lampropholis guichenoti*
Mammals	
Grey-headed Flying Fox	*Pteropus poliocephalus*
Eastern Bent-wing Bat	*Miniopterus schreibersii oceanensis*
Gould's Chocolate Mottled Bat/Eastern Free-tail bat	*Chalinolobus gouldii/Mormopterus sp2*
White-striped Mastiff Bat	*Tararida australis*
Cat	*Felis catus*

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Appendix 5. Likelihood of Occurrence Assessment.

This is a summary of an assessment to determine the likelihood of occurrence of threatened species on the proposal Potts Hill site. A search of Bionet and the Atlas NSW Wildlife, for threatened flora and fauna within 10km of the central point 150.9206, -33.802 was conducted on 25/01/2007 (10km radius search). The same search was conducted using the EPBC database (Department of Environment and Heritage) for NES matters (25/01/07).

An assessment of likelihood of occurrence was made for threatened and migratory species identified from the database search. This assessment was based on database or other records, presence or absence of suitable habitat, features of the proposal site, results of the field survey and professional judgement. Five terms for the likelihood of occurrence of species are used in this report:

- "yes" = the species was or has been observed on the site
- "likely" = a medium to high probability that a species uses the site
- "potential" = suitable habitat for a species occurs on the site, but there is insufficient information to categorise the species as likely to occur, or unlikely to occur
- "unlikely" = a very low to low probability that a species uses the site
- "no" = habitat on site and in the vicinity is unsuitable for the species.

Common Name	Scientific Name	TSC	EPBC	Habitat	Likelihood of occurrence
Birds					
Australasian Bittern	*Botaurus poiciloptilus*	V		Boggy marsh, wetland margins.	Unlikely
Bush Stone-curlew	*Burhinus grallarius*	E1		Open woodland, dry watercourses with fallen branches, leaf litter, sparse grass, coastal scrub, mangrove fringes.	Unlikely
Major Mitchell's Cockatoo	*Cacatua leadbeateri*	V		Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water.	Unlikely
Great Knot	*Calidris tenuirostris*	V		Occurs within sheltered, coastal habitats containing large, intertidal mudflats or sandflats, including inlets, bays, harbours, estuaries and lagoons.	No
Gang-gang Cockatoo	*Callocephalon fimbriatum*	V		Occurs within a variety of forest and woodland types.	Potential
Greater Sand Plover	*Charadrius leschenaultii*	V		Almost entirely restricted to coastal areas on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks.	No
Black-necked Stork	*Ephippiorhynchus asiaticus*	E1		Coastal wetlands, mangroves, tidal mudflats, floodplains, open woodlands.	Unlikely
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	-	M	Coasts, islands, estuaries, inlets, large rivers, inland lakes. Roost and nest on large platforms built in large Eucalypts.	Unlikely
Black Bittern	*Ixobrychus flavicollis*	V		Well vegetated swamps, estuaries, wetlands.	Unlikely

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Common Name	Scientific Name	TSC	EPBC	Habitat	Likelihood of occurrence
Swift Parrot	*Lathamus discolor*	E1	E	Breeds in Tasmania, but winters on mainland in diverse timbered habitats, including forests, woodlands, plantations, banksias, street trees and gardens	Potential
Broad-billed Sandpiper	*Limicola falcinellus*	V		Estuarine sandflats and mudflats, harbours, embayments, lagoons, saltmarshes and reefs as feeding and roosting habitat.	No
Black-tailed Godwit	*Limosa limosa*	V		Primarily a coastal species, usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats.	Unlikely
Square-tailed Kite	*Lophoictinia isura*	V		Diverse habitats from woodlands to timbered watercourses	Potential
Black-chinned Honeyeater (eastern subsp.)	*Melithreptus gularis gularis*	V		Drier eucalypt forests, woodlands, timber on water courses, often no understorey, scrubs. Favours ironbark woodlands on w. slopes.	Unlikely
Turquoise Parrot	*Neophema pulchella*	V	E	Open grassy woodland, with dead trees, near permanent water and forested hills.	Unlikely
Barking Owl	*Ninox connivens*	V		Open forests, woodlands, dense scrubs, other large trees near watercourses. Nest in tree hollow.	Potential for foraging, hollows too small to roost
Powerful Owl	*Ninox strenua*	V		Pairs occupy large, probably permanent home ranges in forests to woodlands. Nest in large hollow.	Potential for foraging, hollows too small to roost
Osprey	*Pandion haliaetus*	V		Coasts, estuaries, bays, inlets, islands and surrounding waters.	No
Pink Robin	*Petroica rodinogaster*	V		Drier eucalypt forests, with fallen logs	Unlikely
Superb Fruit-Dove	*Ptilinopus superbus*	V		Rainforests and fringes, scrubs, mangroves, wooded stream margins, lantana thickets, isolated figs, pittosporums, lilly pillies and blackberries.	Unlikely
Little Tern	*Sterna albifrons*	E1		Coastal waters, bays, inlets, saline or brackish lakes.	Unlikely
Freckled Duck	*Stictonetta naevosa*	V		Large permanent water bodies with well vegetated margins.	Unlikely
Grass Owl	*Tyto capensis*	V		Tall grass, swampy sometimes tidal areas, farm lands.	Unlikely
Masked Owl	*Tyto novaehollandiae*	V		Occurs in forests, open woodlands, farmlands with large trees.	Potential for foraging, hollows too small to roost
Regent Honeyeater	*Xanthomyza phrygia*	E1	E, M	Densely timbered woodlands and forests, particularly ironbark, yellow box, yellow gum.	Potential
Invertebrates					
Cumberland Plain Land Snail	*Meridolum corneovirens*	E1		Primarily inhabits Cumberland Plain Woodland (an endangered ecological community). This community is a grassy, open woodland with occasional dense patches of shrubs.	Unlikely (Development Area), Potential (Retained land)

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Common Name	Scientific Name	TSC	EPBC	Habitat	Likelihood of occurrence
Frogs					
Giant Burrowing Frog	*Heleioporus australiacus*	V	V	The vegetation is typically woodland, open woodland and heath and may be associated with 'hanging swamp' seepage lines and where small pools form from the collected water.	No
Green and Golden Bell Frog	*Litoria aurea*	E1	V	Large permanent freshwater wetlands, with dense stands of reeds.	Unlikely
Littlejohn's Tree Frog	*Litoria littlejohni*	V	V	Sclerophyll forest associated with sanstone outcrops at altitudes from 280 to 1000m of the Great Dividing Range. Flowing rocky streams, and also from semi-permanent dams with semi-emergent vegetation	No
Stuttering Frog	*Mixophyes balbus*	E	V	Found in mountain areas in rainforest.	No
Red-crowned Toadlet	*Pseudophryne australis*	V		Hawksbury sandstone and may be found beside temporary creeks, gutters and soaks, and under rocks and logs.	No
Reptiles					
Broad-headed Snake	*Hoplocephalus bungaroides*	E	V	Occur under large exfoliating slabs of sandstone and rock crevices in areas of undisturbed bushland, usually on tops of cliffs. Commonly found in rock on rock situations in this context also includes crevices in cliff faces.	No
Mammals					
Eastern Pygmy-possum	*Cercartetus nanus*	V		Eastern forests and woodlands.	No
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	V	Roosts in caves, mines. Uncommon but observed in wet and dry eucalypt forests.	Potential
Spotted-tailed Quoll	*Dasyurus maculatus*	V	E	Occurs in wide variety of habitats in large remnants. Dens in tree hollows, hollow log or rock crevice.	No
Eastern Quoll	*Dasyurus viverrinus*	E1		Occurs in wide variety of habitats in large remnants. Dens in tree hollows, hollow log or rock crevice.	No
Great Pipistrelle	*Falsistrellus tasmaniensis*	V		Usually roosts in tree hollows in the higher rainfall forests within its range.	Potential
Little Bent-wing Bat	*Miniopterus australis*	V		Coastal north-eastern NSW and eastern Queensland Well timbered areas including rainforest, wet and dry sclerophyll forests, Melaleuca swamps and coastal forests.	Unlikely
Common Bent-wing Bat	*Miniopterus schreibersii*	V		Forages above the canopy and eats mostly moths. Roosts in caves, old mines, road culverts.	Potential
Eastern Bent-wing Bat	*Miniopterus schreibersii oceanensis*	V		Forages above the canopy and eats mostly moths. Roosts in caves, old mines, road culverts.	Potential
Eastern Freetail-bat	*Mormopterus norfolkensis*	V		Evidence suggests that the species depends on hollows and tree fissures for roosting sites.	Potential
Large-footed Myotis	*Myotis adversus*	V		A range of habitats close to water from lakes, small creeks to large lakes and mangrove lined estuaries.	Unlikely
Yellow-bellied Glider	*Petaurus australis*	V		Patchily distributed in wet sclerophyll forest.	No

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Common Name	Scientific Name	TSC	EPBC	Habitat	Likelihood of occurrence
Squirrel Glider	*Petaurus norfolcensis*	V		Mostly in dry sclerophyll forest on inland slopes and nearby riverine corridors. Also in damp coastal eucalypt/banksia forest and woodland.	No
Brush-tailed Rock Wallaby	*Petrogale penicillata*	E1	V	Rocky areas of sclerophyll forest of inland and subcoastal southeastern Australia.	No
Koala	*Phascolarctos cinereus*	V	-	Swamp Mahogany and Tallowwood are of primary importance to this Koala population. Other local native tree species used by Koalas include Broad-leaved Paperbark, Blackbutt, Red Bloodwood, Flooded Gum and Smooth-barked Apple	No
Long-nosed Potoroo	*Potorous tridactylus tridactylus*	V	V	Known from coastal heathy woodland but also occurs in rainforest, wet sclerophyll and coastal wallum. Dense cover for shelter adjacent to open areas for foraging.	No
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	Roosts in large camps in Botanic Gardens.	Potential
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V		In almost all habitats from wet and dry sclerophyll forests, open woodland, Acacia shrubland, mallee, grasslands and desert.	Potential
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V		Moist gullies in mature coastal forests or rainforests. Roosts in hollow tree trunks and branches.	Unlikely
Flora					
Bynoe's Wattle	*Acacia bynoeana*	E1		Found in heath and woodland on sandy soils. Scattered from coast to mountains, uncommon.	No
Downy Wattle	*Acacia pubescens*	V	V	Scattered throught the Cumberland plain where it grows on clay and clay-shale soils.	Yes
Sunshine Wattle	*Acacia terminalis subsp. terminalis*	E1		Between Botany Bay to the northern foreshore of Port Jackson. Coastal scrub and dry sclerophyll woodland on sandy soils	No
-	*Allocasuarina glareicola*	E1		Grows in Castlereagh woodland on lateritic soil. Found in open woodland with *Eucalyptus parramattensis, Eucalyptus fibrosa, Angophora bakeri, Eucalyptus sclerophylla* and *Melaleuca decora*.	Potential
Small Pale-grass Lily	*Caesia parviflora var. minor*	E1		Found in Wollemi region of Hawkesbury/Nepean. Occurs in damp places in open forest on sandstone.	No
Thick Lip Spider Orchid	*Caladenia tessellata*	E1	V	Victoria and smaller patches of coastal NSW. grassy sclerophyll woodland on clay loam or sandy soils.	No

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Common Name	Scientific Name	TSC	EPBC	Habitat	Likelihood of occurrence
-	*Callistemon linearifolius*	V		*Callistemon linearifolius* has been recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. There are currently only 5-6 populations in the Sydney area, of the 22 populations recorded in the past. Three of these are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve, and Spectacle Island Nature Reserve.	No
Leafless tongue orchid	*Cryptostylis hunteriana*	V	V	Favours swamp fringes, scrubby swamp fringes to steep bare hillsides in tall eucalypt forests.	No
-	*Darwinia biflora*	V		Occurs on the edges of weathered shale-capped ridges. Occurs in Sandstone Ridgetop woodland.	Unlikely
-	*Deyeuxia appressa*	E1	E	Recorded from the Georges River, south of Bankstown. Historical records only. May be extinct	Unlikely
-	*Epacris purpurascens var. purpurascens*	V		Found in a range of habitat types, most of which have a strong shale soil influence. Grows on poorly drained clay soils over sandstone or on shales in eucalypt forest among rocks or along creek banks.	Unlikely
Narrow-leaved Black Peppermint	*Eucalyptus nicholii*	E0		confined to the New England Tablelands of NSW in wild. Grows in dry grassy woodland, on shallow and infertile soils, mainly on granite	No
Wallangarra White-gum	*Eucalyptus scoparia*	E1		In NSW it is known from only three locations near Tenterfield, including Bald Rock National Park. Found in open eucalypt forest and woodland on well-drained granite hilltops, slopes and rocky outcrops	No
-	*Genoplesium baueri*	V		A saprophyte, *G. baueri* (midge orchid) is found in shady places in woodlands. Grows in sparse sclerophyll forests in moss gardens on sandstone.	No
-	*Grevillea parviflora subsp. parviflora*	V	V	Grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Often occurs in open, slightly disturbed sites such as along tracks.	Unlikely
-	*Leptospermum deanei*	V		Found in woodland, *L. deanei* has only recently been recognised, it is known from a small area on Sydney's north shore, on either side of the Pymble-Hornsby ridge.	Unlikely
-	*Leucopogon exolasius*	V		Woronora Beard-heath is found along the upper Georges River area and in Heathcote National Park. In woodland on sandstone.	No

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Common Name	Scientific Name	TSC	EPBC	Habitat	Likelihood of occurrence
-	*Melaleuca deanei*	V	V	scattered populations between the far south-east of NSW and the Blue Mountains. Grows in wet heath	No
Hairy Geebung	*Persoonia hirsuta*	E1		Marshy heath on coastal sandstone plateaus.	Unlikely
-	*Persoonia nutans*	E1	E	Confined to aeolian and alluvial sediments and occurs in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland.	Unlikely
-	*Pimelea spicata*	E1	E	Range from the Georges River to Gosford. The species is found on open forest and heath, in sandy soils or very rarely on shales.	Potential
Pomaderris prunifolia in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas	*Pomaderris prunifolia var. prunifolia*	E2		Known from only three sites within the listed local government areas. At Rydalmere it occurs, among grass species on sandstone At Rookwood Cemetery it occurs in a small gully of degraded Cooks River / Castlereagh Ironbark Forest on shale soils	Potential
Sydney Plains Greenhood	*Pterostylis saxicola*	E1	E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. Most commonly found growing in small pockets of shallow soil in depressions on sandstone rock shelves above cliff lines	Unlikely
-	*Pultenaea parviflora*	E1		Endemic to the Cumberland Plain. May be locally abundant, particularly within scrubby/dry heath areas within Castlereagh Ironbark Forest and Shale Gravel Transition Forest on tertiary alluvium or laterised clays.	Potential
Matted Bush-pea	*Pultenaea pedunculata*	E1		In NSW however, it is represented by just three disjunct populations, in the Cumberland Plains in Sydney. Largely confined to loamy soils in dry gullies in populations in the Windellama area.	Unlikely
-	*Syzygium paniculatum*	V		in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. restricted mainly to remnant stands of littoral (coastal) rainforest	No
-	*Tetratheca juncea*	V		Confined to the northern portion of the Sydney Basin bioregion. It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover	No
Tadgell's Bluebell in LGAs of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta, and Strathfield	*Wahlenbergia multicaulis*	E2		There are 13 known sites, two of which are in northern Sydney (i.e. Thornleigh and Mt Ku-Ring-Gai) with the remainder in western Sydney In Western Sydney most sites are closely aligned with the Villawood Soil Series, which is a poorly drained, yellow podsolic extensively permeated with fine, concretionary ironstone	Potential
-	*Wilsonia backhousei*	V		In NSW Narrow-leaf Wilsonia is found on the coast between Mimosa Rocks National Park and Wamberal north of Sydney	No

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APPENDIX 6. Assessment using Criteria provided in Draft Part 3A Guidelines (DEC & DPI, 2005).

This appendix identifies potential effects of the proposal on threatened species, populations or ecological communities, or their habitats of relevance to the Potts Hill site.

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?

Displaces or disturbs threatened species and/or populations
The proposal is not likely to displace or disturb the threatened species on site. The majority of *Acacia pubescens* individuals occur in areas to be retained, with 4 plants within the area proposed as open space. The Grey-Headed Flying-Fox is highly mobile and any loss of foraging habitat is not likely to result in significant disturbance or displacement as the species is able to move to retained vegetation on site or to other remnants in the vicinity of Potts Hill. The Eastern Bent-wing Bat is also highly mobile and for the same reasons is unlikely to be displaced or disturbed by the proposal.

Disrupts the breeding cycle
The proposal is not likely to disrupt the breeding cycle of any of the threatened species on site. *Acacia pubescens* individuals are within areas to be retained, as is surrounding vegetation which may store seed in the soil seed bank, and thus the clonal and seeding breeding cycle of the species is not likely to be disrupted. The Grey-headed Flying Fox has been observed at Potts Hill but there are no campsites on site critical for breeding for this species. As such, its breeding cycle is not likely to be disrupted. The Eastern Bent-wing Bat is not likely to roost on the Potts Hill site due to the previous closure of a historical over-winter roosting site (a tank at Reservoir 1) in 2007 (SMEC, 2007). It is unlikely that the Eastern Bent-wing Bat will use other habitat for roosting (e.g. tree hollows) as this species uses caves and man made structures for roosting. It is unlikely that the proposal will disrupt the breeding cycle for the Eastern Bent-wing Bat.

Disturbs the dormancy period
The proposal is not likely to disturb the dormancy period of any species on site. *Acacia pubescens* has high seed dormancy and it is likely that there is a dormant seed bank on site (probably in the vicinity of the individuals), however the proposal retains land in immediate proximity to where *Acacia pubescens* occurs, and hence there is a low – medium risk of removing a potential soil seed bank. The site has experienced a fire-free period of more than 5 years which is the minimum required length for establishment of a soil seed bank (NPWS, 2003).

Disrupts roosting behaviour
Due to lack of roosting habitat on-site for the Grey-headed Flying Fox and the Common Bent-wing Bat, their respective roosting behaviour is not likely to be disturbed by the proposal.

Changes foraging behaviour

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Some potential foraging habitat (1.60 ha) for the Grey-headed Flying Fox and the Eastern Bent-wing Bat is proposed to be removed. However, given the high mobility of these two species, and the availability of alternate foraging habitat (8.04 ha) in retained lands and within the general vicinity of Potts Hill, any changes to foraging behaviour are likely to be insignificant and are not likely to detrimentally affect the lifecycle of the Grey-headed Flying Fox and the Common Bent-wing Bat.

Affects migration and dispersal ability
The proposal is not likely to affect the dispersal of *Acacia pubescens* as this species is largely vegetatively reproducing (i.e. clonal) and any seed dispersal is by dropping of seed from pod.

The dispersal of the Grey-headed Flying Fox and the Eastern Bent-wing Bat will not be negatively affected as other retained vegetation patches in the area can facilitate migration and dispersal for these species.

Disrupts pollination cycle;
Pollination of *Acacia pubescens* is by insects and birds and it is not expected that the proposal will disrupt pollinators. Furthermore, *Acacia pubescens* often reproduces vegetatively and thus the pollination cycle is not considered critical to its reproductive cycle.

Disturbs seedbanks;
The *Acacia pubescens* population may have a dormant seed bank on site in the vicinity of the existing individuals; however, the proposal retains vegetation in immediately proximity to known plants, therefore the risk of removing a portion of *A. pubescens* soil seed bank is low to moderate.

Disrupts recruitment (ie. germination and establishment of plants);
Acacia pubescens relies more on vegetative reproduction (i.e. clonal) than on germination for recruitment. Dormant seeds in the seed bank could potentially respond well to germination triggers such as fire. Weed management of the areas surrounding the *Acacia pubescens* plants could assist in promoting vegetative recruitment of the species. Fire and weed management are suggested as part of the proposed works and could assist in approximating a natural fire regime and reducing competition from weeds; thus, potentially enhancing rather than disrupting recruitment of *Acacia pubescens* on site.

Affects the interaction between threatened species and other species in the community (eg. pollinators, host species, mychorrizal associations).
The *Acacia pubescens* plants occur in retained lands separate from lands that will be cleared. It is unlikely that the clearing will have a significant effect on interactions provided by mycorrhizal associations, pollinators and other potential ecological factors on site for this species.

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2. How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

Disturbs any permanent, semi-permanent or ephemeral water bodies;
There are two short ephemeral drainage lines close to the western border of the site, shown as 'Creek (riparian)' in Figure 7. These drain to the west, and are dominated by bulrushes (*Typha orientalis*). A grassy drainage swale is also present to the west of Reservoir 2. These ephemeral drainage lines are considered unlikely to constitute habitat for the green and golden bell frog, and survey did not detect this species.

Degrades soil quality;
The proposal is not expected to affect soil quality in retained lands.

Clears or modifies native vegetation;
The proposal includes clearing of vegetation predominantly in the south and west of the site. The total area of CPW to be lost is 0.72 hectares. Scattered patches of Cooks River/Castlereagh Ironbark Forest (totalling 0.26 ha) will also be lost as will part (0.55 ha) of patch of Sydney Turpentine Ironbark Forest. The areas of Cooks River/Castlereagh Ironbark Forest and Sydney Turpentine Ironbark Forest to be lost are classified as Core vegetation in the Conservation Significance Assessment (see Appendix 2). These cleared areas come to a total of 1.60 ha.

Cooks River/Castlereagh Ironbark Forest and Sydney Turpentine Ironbark Forest occur elsewhere on site as Core vegetation and is proposed to be retained and rehabilitated in these areas. The retained and rehabilitated Cooks River/Castlereagh Ironbark Forest will amount to 6.36 ha and the Sydney Turpentine Ironbark Forest to 1.35 ha (total area proposed for rehabilitation 8.04 ha).

Although Cumberland Plain Woodland is not represented in the areas to be retained, it is considered that the cleared stands constitute a negligible loss of this community due to the relatively small and scattered patches and poor condition demonstrated by the exotic dominated understorey. Revegetation areas in the north of the site and the creation of a vegetation corridor is expected to create a positive ecological outcome by consolidating the existing remnant vegetation to be retained in the north and south of the site and creating a habitat corridor to link these two remnant vegetation areas of proposed 'gain'. The location of the proposed retained land, and the consolidation of the small patches will also assist in achieving the east-west corridor along the northern boundary of the site, which is identified in the Bankstown Biodiversity Strategy (BCC, 2002). These proposed positive outcomes are likely to outweigh the negative outcome of loss of 1.60 ha of scattered remnant vegetation communities.

Introduces weeds, vermin or feral species or provides conditions for them to increase and/or spread;
Consolidation and rehabilitation of remnant vegetation within areas to be retained will include the removal and management of weed species, including the noxious weeds found on site (Boneseed, Pampas Grass and

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Blackberry, see Appendix 3). Rehabilitation work will improve habitat values which are likely to provide improved habitat for native fauna.

The proposal may increase the visitation of the site by domestic cats, but it is noted that this is already commonly occurring.

Removes or disturbs key habitat features such as trees with hollows, caves and rock crevices, foraging habitat;
A total of 33 hollow-bearing trees (58%) will be retained (see Appendix 1, Figure 12). Approximately 24 hollow-bearing trees will be lost as a result of the proposal, the majority of which are small planted peppercorn trees.

Affects natural revegetation and recolonisation of existing species following disturbance;
The revegetation or recolonisation of areas to be retained is not likely to be negatively affected by the proposal. The site is already has limited connectivity due to surrounding urban development, and the majority of the site is heavily disturbed, therefore opportunities revegetation or recolonisation are heavily compromised. Furthermore, rehabilitation and revegetation is proposed within identified portions of the SWC retained lands.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

Acacia pubescens occurs in the LGAs of Auburn, Bankstown, Baulkham Hills, Blacktown, Canterbury, Fairfield, Hawkesbury, Holroyd, Liverpool, Parramatta, Rockdale, Strathfield, Sutherland and Wollondilly and as such its occurrence in Potts Hill is not at the limit of its range.

The Grey-headed Flying Fox and the Eastern Bent-wing Bat are found throughout the Sydney area and beyond and as such the Potts Hill site is not at the limit of their distribution.

4. How is the proposal likely to affect current disturbance regimes?

Modifies the intensity and frequency of fires;
The site is in an urban area and is not currently managed for fire. For the retained land, the Environmental Management Plan will include consideration of fire management (eg. asset protection zones), and use of fire for ecological purposes.

Modifies flooding flows.
Flooding is not an issue at the site. The design of any stormwater infrastructure along the drainage line will use Water sensitive Urban Design (WSUD) principles and attempt to restore natural flow regimes.

5. How is the proposal likely to affect habitat connectivity?

Creates a barrier to fauna movement;
The proposal is unlikely to create a barrier to the movements of the mobile threatened fauna recorded on site (Grey-headed Flying Fox and Eastern Bent-wing Bat) and is therefore unlikely to isolate an area of known habitat from currently interconnecting areas of potential habitat

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Removes remnant vegetation or wildlife corridors;
The Grey-headed Flying Fox and Eastern Bent-wing Bat are highly mobile and do not require a continuous canopy for their movement between areas of habitat. Other species potentially using the site are not likely to be affected as the proposed development is not removing wildlife corridors and the proposed removal of remnant vegetation is unlikely to impact negatively on fauna habitat connectivity.

The 1.60 ha of remnant vegetation impacted consists of scattered patches of CPW (totalling 0.72 ha) along the western boundary of the site and part (0.55 ha) of a larger patch of Sydney Turpentine Ironbark forest and 0.26 ha of Cooks River/Castlereagh Ironbark forest in the south of the site (see Figure 7). The scattered patches of the CPW in the west do not link surrounding patches and have a modified understorey and shrub layer and thus do not form a significant fauna wildlife corridor. An anabat survey in November 2007 did not detect the Eastern Bent-wing Bat in potential flyways in this part of the site.

The proposed vegetation of the corridor running north to south (linking the northern and southern patches) will provide potential habitat corridor for fauna in the long term and will provide a strong link between two vegetated patches in the north and south of the site.

Modifies remnant vegetation or wildlife corridors.
The proposed vegetation of the corridor running north to south (linking the northern and southern patches) will provide potential habitat corridor for fauna in the long term and will provide a strong link between two vegetated patches in the north and south of the site.

6. How is the proposal likely to affect critical habitat?
The TSC Act makes provision for the identification and declaration of critical habitat. No critical habitat is present on the Potts Hill site.

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Appendix 7. Shell Document for SWC Property Environmental Management Plan (EMP).

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PROPERTY EMP
NATURAL ENVIRONMENTAL MANAGEMENT PROGRAM

[INSERT PHOTO OR AERIAL]

[PROPERTY NAME]
[PROPERTY LOCATION]

[Month] [Year]

[Property Name]
Property EMP

DOCUMENT CONTROLLER:

Computer file reference:

Prepared by:
Title:
Date:

Reviewed by:
Title:
Date:

Endorsed by:
Title:
Date:

Revision Control Chart

Revision number	Date revised	Approved by	Amended page(s)	Change request number	Description of change
1					
2					
3					
4					
5					
6					
7					

1 Introduction

The objectives of a Property Environmental Management Plan (Property EMP) are to prevent and/or minimise the adverse impacts of Sydney Water operational and maintenance activities on sensitive environments and to ensure compliance with the relevant Commonwealth and State legislation and policy. This Property EMP identifies the environmental risks associated with the general operational and maintenance activities at the site located at [insert site location], and provides guidance on which maintenance activities are appropriate in each area.

2 Site Induction

All personnel, including subcontractors and site visitors, are required to undertake general site induction including safety and environmental issues. All staff and contractors must be familiar with this Property EMP and the relevant safeguards for their work.

3 Key Environmental Issues

Table 1. Significant environment issues recorded within the [insert site name].

FLORA AND FAUNA		
Name	**Status**	**Management Zone**[1]
[Insert any significant flora and fauna recorded within the site] [Scientific Name (Common Name)]	[Endangered Species, Endangered Ecological Community, Noxious weed class, etc.]	[E, B,L, etc]
Refer to the SWEMS0115 OC Weed Management Procedure and vegetation management plan attached in Appendix A for prioritisation of weed management works and guidance on appropriate management techniques.		
SOILS AND CONTAMINATION		
[Insert any key soils and contamination issues/safeguards relevant to the site] [Sydney Water will provide input on contamination]		
FIRE MANAGEMENT		
[Insert details on any key fire management activities relevant to the site.]		
HERITAGE		
[Insert any key Aboriginal and Non-Aboriginal heritage issues/safeguards relevant to the site]		
WATERWAYS		
[Insert any key waterways issues/safeguards relevant to the site]		
WASTE		
[Insert any key waste issues/safeguards relevant to the site]		

[1] Management Zones are described in Section 5 below

4 Environmental Actions

Table 2. Environmental actions required to be conducted for this site and timeframes for completion.

ACTION		RESPONSIBILITY TO IMPLEMENT	TIMEFRAME
[Insert environmental aspect that requires actions]	[Insert any specific environmental actions that need to be undertaken on the site – may be research/survey based, planning based or may be specific weed control, bush regeneration etc.] [Where possible, estimates of the cost of this action to be included.]	[Insert the relevant staff/Contractor]	[Month] [Year]
Review of this plan		All stakeholders	5 years or as required

5 Management Zones and Environmental Requirements

The table below identifies which maintenance activities are permitted in each Management Zone. The Property Plan (Figure 1) provides the location of these Management Zones on the site.

Table 3. Management Zones used on site and the maintenance activities permitted in each zone.

ZONE NAME		ZONE DESCRIPTION	PERMITTED ACTIVITIES
E	**Environmental Protection: Restricted Area**	Contains highly sensitive flora, fauna **OR** Aboriginal heritage protected under legislation. This zone would include areas mapped by DECC with endangered species, populations or ecological communities and their supporting vegetation/habitat. This area may also contain indigenous heritage items (NOTE: the precise location will not be identified to protect the item). No entry permitted without specific approval from the ER[1].	[This column contains a list of permitted activities determined from background data, legislative requirements and assessments]
B	**Bushland: native vegetation and re-vegetation**	Remnant bushland or native vegetation including disturbed bushland with regeneration potential.	[Bush regeneration predominate management activity]
L	**Managed landscape**	Planted landscape with native and/or other exotic plants	[General landscape management activities ie weed control, trimming, dead wooding, replacement planting]
W	**Weed Management**	Significant Weed infestation that must be managed under legislative compliance ie noxious weeds. Current circumstances do not permit other zone use.	[Weed control activities to regenerate to current landscape of the surrounding area.]
A	**Asset Protection**	Maintained in a manner that will protect infrastructure from fire.	[Fuel reduction, slashing, vegetation trimming]
H	**Heritage Protection**	Contains non-indigenous heritage or European heritage	[No soil disturbance permitted, weed control no significant vegetation removal]
O	**Operational**	Operational areas are not subject to any restrictions under this Property EMP. This zone may contain infrastructure, buildings and hardstanding surfaces.	[All general ground maintenance activities]

[1] ER – Environmental Representative, Environmental Planning & Management

Insert Property Plan

Figure 1: Property Plan for [insert property name]. Provides the locations of Environmental Management Zones on the site. Refer to Table 3 for descriptions of each zone.

APPENDIX 1:

VEGETATION MANAGEMENT PLAN

APPENDIX 2:

ENVIRONMENTAL ASSESSMENT
[INSERT PROJECT NAME]

NATURAL ENVIRONMENTAL MANAGEMENT PROGRAM

1 Introduction

1.1 Background

Sydney Water is committed to undertaking all its activities (planning, design, construction, operation, maintenance and contracting) in a manner that protects the natural environment. Sydney Water's Natural Environment Management Program (NEMP) has been developed to manage aspects relating to flora and fauna, both terrestrial and aquatic. The Property Environmental Management Plans (Property EMPs) being progressively developed for individual sites are a key element in implementing the objectives of the NEMP.

The objectives of a Property EMP are to prevent and/or minimise the adverse impacts of Sydney Water operational and maintenance activities on sensitive environments and to ensure compliance with the relevant Commonwealth and State legislation and policy.

1.2 Scope of this Report

Sydney Water is a statutory state-owned corporation and as such, is classified as a public authority under Section 4 of the *Environmental Planning and Assessment (EP&A) Act 1979* and a determining authority under Part 5 of the Act. Under Section III of the Act and Clause 228 of the *EP&A Regulation 2000*, Sydney Water is responsible for assessing the impacts of its activities.

This Environmental Management Plan (EMP) assesses the environmental risks associated with the general operational and maintenance activities at [insert site name]. The purpose of this EMP is to identify areas of environmental significance and provide guidance on which maintenance activities are appropriate in such areas.

2 Property Details

2.1 Location

[insert site name] is located on [insert location, lot & DP, reference the figure which shots the site location] It occupies [insert size of site] and is bordered by [list surroundings] . Vehicular access to the site is by way of [insert name of road which gives access to the site].

2.2 Property Use

[insert what the site is used for and where the facilities extend to. Give a brief description of how the facility works, infrastructure information and other uses for the site]

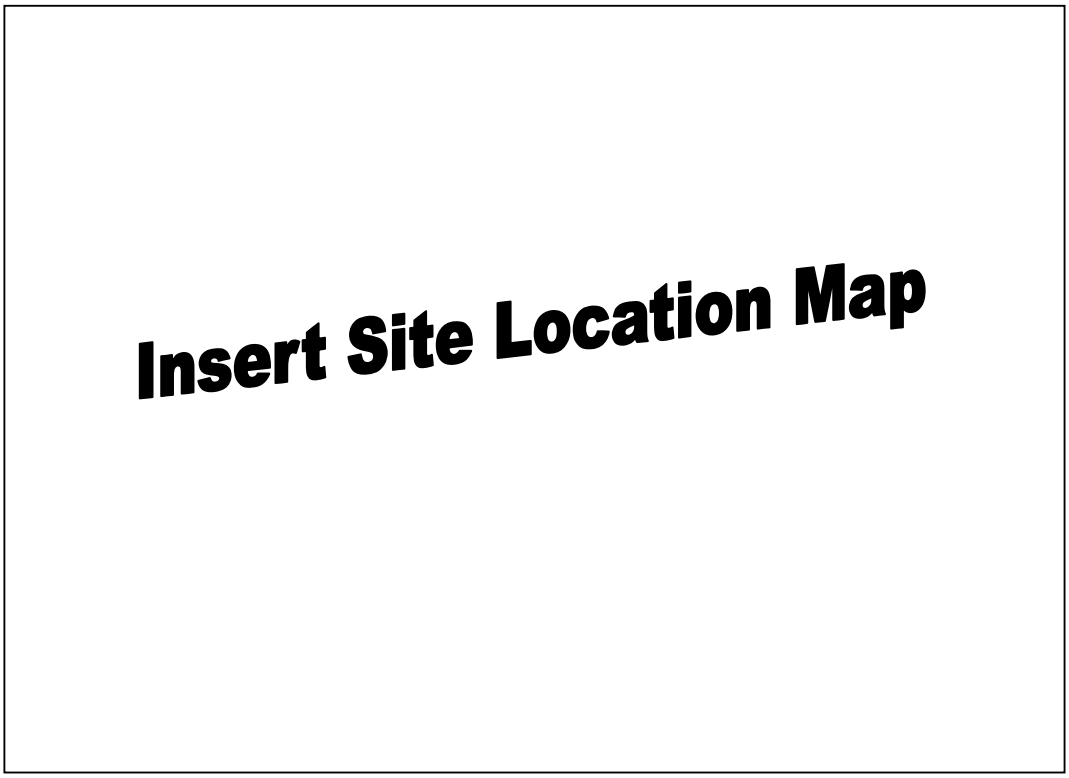

Figure 1. Location of [insert site name]

2.3 Site Induction

All personnel, including subcontractors and site visitors, are required to undertake general site induction including safety and environmental issues. All staff and contractors must be familiar with this Property EMP and the relevant safeguards for their work.

3 Statutory Requirements

Table 1. Statutory requirements for this [insert site name] site

[list appropriate planning instruments and their requirements, if not applicable then justification is needed]

PLANNING INSTRUMENT/POLICY	REQUIREMENT
Environmental Planning & Assessment (EP&A) Act 1979	As a Statutory State Owned Corporation, Sydney Water is a determining authority under Part 5 of the Act. Under Section 111 of the Act, Sydney Water is responsible for the assessment of the impacts of its activities, and determining whether an EIS is required. Sydney Water must consider the effect of activities on: critical habitat; whether there will be a significant effect on threatened species, populations, ecological communities or their habitat as listed under the Threatened Species Conservation Act 1995; or any other protected fauna or flora as specified under the National Parks and Wildlife Act. Clause 228 of the Regulation identifies mandatory factors to be addressed in the environmental impact assessment process.
[Insert LEP]	The site is zoned [list site zoning]. The LEP adopts the [list any provisions]
SEPPs	State Environmental Planning Policy No. 4 – Development Without Consent and Miscellaneous Complying Development applies to sewage treatment plant works and emergency and routine maintenance work carried out by Sydney Water.
SREPs	
Protection of the Environment Operations (PoEO) Act 1997	Water, air and noise pollution are potential risks associated with maintenance activities carried out on site. Appropriate erosion and sedimentation control and use of well maintained equipment on site is required to ensure pollution risks are minimised.
Heritage Act 1977	
National Parks and Wildlife (NPW) Act 1974	No Aboriginal places or objects are known to occur in the STP site. Due to its highly disturbed nature there is minimal potential for any Aboriginal heritage to be found at this site. Accordingly, no approvals would be required under this Act.
Native Vegetation Act 2003	
Threatened Species Conservation (TSC) Act 1995	[List number of threatened species or endangered ecological communities listed under the TSC Act. Do any site activities impact on these species? Is approval needed?]

PLANNING INSTRUMENT/POLICY	REQUIREMENT
Priority Action Statements	
Recovery Plans	
Threat Abatement Plans	
Environment Protection and Biodiversity Conservation Act 1999	
Waste Avoidance and Resource Recovery (WARR) Act 2001	

4 Site Environmental Review

This section outlines the environmental sensitivities within the [insert site name].

4.1 Flora and Fauna

A whole site flora and fauna assessment was undertaken for the [insert site name] by [insert sub contractor name]. The site has a number of sensitive flora and fauna issues. It is almost entirely surrounded by [insert surroundings] and contains a large proportion of native vegetation, some of which is heavily infested by weeds.

[insert information about flora and fauna which are of significance and listed under the threatened species conservation act]

[insert any weeds which are listed under the noxious weeds act]

[list if any domestic pets are or are not permitted on site]

4.2 Vegetation Management Plan

[This section will detail the weed management issues at a site. The weeds will be mapped using the National Trust (Red, Orange, Blue, Green)]

4.3 Soils and Contamination

The soils of the [insert site name] site are of a [insert description] nature with [list if excavation or fill has occurred on the site previously]. [insert information about the type of soils on the site]

[insert any erosion issues]

Refer to the SWEMS0115 OC Weed Management Procedure for advice on minimising soil disturbance during weed management activities. Machinery should be cleaned of soil and debris before entering and before leaving the site to reduce the spread of weeds and the fungal pathogen *Phytophthora cinnamomi*. Machinery should be in good working order to minimise fuel and oil leaks and excessive noise.

[Sydney Water will complete this section on contamination issues]

Should any contamination (eg sheets of asbestos, discoloured soil, strong chemical or petrol odours, refuse or leachate) be discovered, works should be suspended and the environmental representative should be notified immediately to determine the appropriate response measures.

4.4 Fire Management

[insert available fire management information for the site and its surroundings]

4.5 Heritage

Aboriginal Heritage

[insert information on aboriginal heritage and any evidence of remains or field surveys which were conducted]

Non-Aboriginal Heritage

[insert information on non-aboriginal heritage and above ground items of heritage significance, are there any items listed on the water heritage register?]

4.6 Waterways

[insert specific waterways issues associated with the site]

4.7 Waste

As a general rule, waste should be minimised to the fullest extent possible. Recycled materials should be used where available and materials should be reused where possible. Weed-free green waste should be mulched and used on site. Green waste containing weeds should be bagged and disposed of appropriately. Documents and records of the transport and fates of all materials removed from the site are to be kept and submitted to the relevant site supervisor/project manager as proof of correct disposal and for environmental audit purposes.

[Insert any site specific waste disposal requirements]

5 References

[Insert relevant references]

APPENDIX 3:
SPECIES RECORDED ON SITE

Flora

Table 1: Flora Species recorded within the [insert site name] site. [insert flora information as per the fields below, update key as per zoning table]

SCIENTIFIC NAME	COMMON NAME	TSC ACT SCHEDULE	EPBC ACT SCHEDULE	NOXIOUS WEEDS ACT

Key:
EPBC Act – E = Endangered species; V = Vulnerable: M = Migratory
TSC Act – E4 = Presumed extinct; E3= Endangered Ecological Community; E2 = Endangered population; E1 = Endangered species; and V = Vulnerable
* Indicates an introduced species

Fauna

Table 2: Fauna Species recorded within the [insert site name] site. [insert fauna information as per the fields below, update key as per zoning table]

SCIENTIFIC NAME	COMMON NAME	TSC	EPBC

* Indicates an introduced species

TESTS FOR SIGNIFICANCE

[Insert test for significance information. This is written based on the land management activities being undertaken at a site and the sensitive environmental aspect listed under the *TSC Act or EPBC Act*]

Table 3: *TSC Act 1995* test for significance [fill out table]

TEST OF SIGNIFICANCE	[SPECIES]	[SPECIES]	[SPECIES]
(a) in the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction			
(b) in the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction			
(c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: *(i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or* *(ii) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction*			

TEST OF SIGNIFICANCE	[SPECIES]	[SPECIES]	[SPECIES]
(d) in relation to the habitat of a threatened species, population or ecological community: *(i) the extent to which the habitat is likely to be removed or modified as a result of the action proposed, and* *(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and* *(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality*		(i)	(i)
(e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)			

TEST OF SIGNIFICANCE	[SPECIES]	[SPECIES]	[SPECIES]
(f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan			
(g)whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process			

[Add tests for significance for EPBC Act, if required]

Appendix 8. Shell SWC Document for Vegetation Management Plan (VMP).

Vegetation Management Plan Requirements

The purpose of the Vegetation Management Plan is to identify the weedy areas on the Potts Hill site, categorise the level of weed invasion and appropriate treatments techniques. This document is to be supplied as an additional report to the site environmental assessment and/or Property Environmental Management Plan.

1. Native Vegetation Condition

The site should be assessed and mapped using the method detailed in Table 1. These zones should be identified and mapped as per Appendix D (2).

Colour Code	Condition of Bushland	Weed invasion	Description	Intervention required
Green	Good	<5%	Virtually weed free, a healthy native community.	**Minimal** Prevention of future impacts. Removal of possible scattered weed.
Blue	Fair	5-20%	Minor infestations of weeds, natives dominate the site.	**Low** Requires removal of impact (eg overuse) & of low level weed invasion.
Orange	Poor	20-60%	Severely infested, regeneration of native species is being suppressed.	**Medium** Removal of impacts required. Removal of weeds. Additional 'kick start' to promote natural regeneration eg fire, physical disturbance
Red	Very Poor	>60%	Bushland replaced by exotic species OR only mature specimens of highest stratum remain – no seedlings or saplings due to the infestation of understorey with exotics.	**Medium or High** Ability of system to recover is lost or seriously limited. Definitely needs a 'kick-start' or may need reconstruction to approximate original community.

Table 1: Adapted from the National Trust Method of Weed Assessment (The National Trust of NSW, 1999)

2. Recommendations and actions

Recommended vegetation management techniques and timeframes shall be identified for each zone. A Gantt chart for a period of five years shall be prepared to represent the required activities. Activities/actions that should be considered for each zone should incorporate, but not be limited to, the following information:

- Where no action is required (either at all, or for certain stages).
- Weed management techniques within remnant vegetation; revegetation to enhance or expand an existing community; revegetation where fabrication is required to create a new vegetation community where weed invasion is causing a problem to a nearby sensitive community (ie buffer zone); proposed construction activities (including

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tracks, entrance points, stormwater preparation for revegetation activities); and other activities such as ecological burns, signage, etc.;

- Resources required to undertake each task.
- Where planting is required, the number and timing of plantings should be estimated and any additional materials that may be needed;
- Primary, secondary and maintenance periods;
- Costings for each activity and materials required.

Please note: recommendations are to be the most appropriate for the site and any specific weed control issues. Herbicide usage should also be proposed if appropriate to the weed and label requirements.

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Appendix 9. Qualifications of Staff.

Qualifications

Staff Member	Title	Qualifications	Role
Michael Chilcott	Director	• Bachelor of Science, University of Sydney, 1979. • Graduate Diploma in Natural Resource Management, UNSW, 1980. • Master of Science, UNE, 1982.	Project Director and Quality Control.
Dr Steven Ward	Senior Environmental Scientist	• Bachelor of Science, University of Western Australia, 1992. • Honours, University of Wollongong, 1994. • Doctorate of Philosophy, UWS, 2002	Project Manager and Report Writing.
Jayne Tipping	Senior Consultant	• Bachelor of Science (Zoology/Terrestrial Ecology), Sydney University, 1991; • Masters of Environmental Law, Sydney University, 1997	Report Writing.
Bruce Mullins	Senior Ecologist	• Bachelor of Science, UTS, 1992. • Master of Science, UTS, 1999.	Field Work.
Simon Tweed	Ecologist	• Bachelor of Environmental Science (Honours), University of Wollongong, 2004.	Field Work.
Enhua Lee	Ecologist	• PhD in ecology and wildlife management, UNSW 2006. • Bachelor of Advanced Science (First Class Honours), UNSW 2003.	Field Work.
Dr Ailsa Kerswell	Ecologist	• PhD in Marine Biology: *Macroecology and biogeography of benthic marine algae*. • Bachelor of Science (Hons): majors in Zoology and Marine Biology • Bachelor of Arts: major in Statistics	Field Work.
Joanna Lesak	Environmental Scientist	• Bachelor of Environmental Science (Honours), UNSW, 2000.	Report Writing.
Daniel Magdi	Environmental Scientist	• Bachelor of Landscape Management & Conservation, UWS, 2004.	Report Writing.

Licences

Licence	Description	Licence No.
Atlas of NSW Wildlife	Wildlife Atlas searches.	CON03008
Scientific Licence	Flora and fauna surveys.	S10805

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