Biodiversity Impact Assessment

Proposed demolition of existing dwelling house and erection of new dwelling house

9 Wandeen Road, Clareville.

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Aquila Ecological Surveys

Report prepared for:

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1. Introduction and Recommendations

During November 2020, a biodiversity impact assessment was undertaken of a proposed residential development site at 9 Wandeen Road, Clareville (the subject site). The extent of the proposed development is illustrated on the site plan (Attachment A at rear of this report).

The aims of this assessment are to determine:

- whether the proposed development is 'likely to significantly affect threatened species' in relation to Section 7.2 of the NSW *Biodiversity Conservation Act 2016* (*BC Act*); and
- impacts on threatened species and ecological communities, which are matters of National Environmental Significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*);
- impacts in relation to Clause 13 Development on land within the coastal environment area in *State Environmental Planning Policy (Coastal Management) 2018*;
- impacts in relation to the Clause 7.6 Biodiversity in the *Pittwater Local Environment Plan (PLEP) 2014*; and
- impacts in relation to Clause B4.7 of the Pittwater Development Control Plan 21 (PDCP21).

The main findings of the assessment are as follows:

- The site is vegetated with remnant native trees above lawn and garden plantings. The remnant native trees are part of the BC Act listed Endangered Ecological Community, Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion (PWSGF).
- The proposal would result in the removal of three Spotted Gums with a combined canopy area of approximately 150m^2. Given the extent of impact and proposed planting of this and other PWSGF species in the landscape plan accompanying the DA, it is considered that in relation to Section 7.3 of the BC Act (the five-part test) the proposed development is unlikely to significantly affect the community, or its habitat.
- No threatened fauna or flora species listed under either the *BC Act* or the *EPBC Act* were detected or considered likely to occur at the subject site.
- The site is not mapped on the Biodiversity Values Map nor is it an area of outstanding biodiversity under the BC Act.

- In relation to Section 7.2 of the *BC Act*, it is considered that the proposed development would not significantly affect threatened species. The proposal does not exceed the thresholds for entry into the Biodiversity Offsets Scheme and a Biodiversity Assessment Report need not accompany the development application.
- There would be no impact on any matters of national environmental significance listed under the EPBC Act. The proposed action is not a controlled action requiring referral to the Federal Minister for the Environment.
- The proposed development is consistent with the Biodiversity provisions of PLEP2014 and Clause B4.7 of PDCP21.

2. Environmental Setting

The site is illustrated on Figure 1 below. The land covers 698m^2 and is located south of Wandeen Road some 100 metres east of that road's intersection with Hudson Parade. The land has a northerly aspect and slopes gently from the rear of the block to Wandeen Road. It is zoned E4 Environmental Living. It is also subject to the Biodiversity overlay of PLEP 2014 and is mapped as Pittwater Spotted Gum Forest on the maps accompanying PDCP21 . It is surrounded by residential development on similar sized and zoned blocks.

The Watagan soil landscape is mapped as occurring across the site (DECC 2008). This soil landscape is colluvial and in situations such as the site's is characterised by loose, stony, brownish-black sandy loam over hard-setting, brown sandy clay-loam. It is underlain by sandstone of the Narrabeen group.

Figure 1. Aerial Photo of the site (outlined in red). Source: SixMaps.
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3. Methods

3.1 Literature Review

Prior to undertaking the field survey, a review of literature relevant to the subject site and wider local area and region was undertaken. Documents and databases reviewed included:

- Vegetation mapping of the Sydney Metropolitan Catchment Area (OEH 2016).
- Point records of *Bionet* [the Atlas of NSW Wildlife] (OEH 2020a); and
- The Commonwealth Department of Agriculture, Water and the Environment's Protected Matters Search Tool (DAWE 2020a).

3.2 Field Survey

Fieldwork was undertaken by Paul Burcher (B. App. Sc) on 6/11/2020 using the methods discussed below. Conditions during the survey were moderate winds, with high cloud and a temperature of 20^0C.

3.2.1 Vegetation

The vegetation survey involved random meanders through the site and recording plant species present. The vegetation of the site is described based on the dominant tree species and the height and cover of the tree layer (following Specht, 1981). Plants not readily identified in the field were collected for identification using standard texts. Checks were made against the Schedules 1 and 2 of the *BC Act* and the *EPBC Act* for species and communities of conservation significance.

3.2.2 Fauna

The vegetation community descriptions were used to describe the different fauna habitats that occur on the site. The habitat surrounding the site was also investigated to gain an appreciation of the relative importance of the habitat that occurs on the site.

Notes were made of specific sources of native fauna food and shelter, such as dense shrubs, flowering trees, tree hollows and rock outcrops. The presence, or lack, of particular fauna habitat requirements was noted to enable predictions of species that would be likely to utilise the site.

A search was made for indirect evidence of mammal presence such as droppings, burrows, tracks, diggings and bones. Habitat types and the degree of disturbance were assessed to enable predictions of mammal species presence.

A reptile search was undertaken throughout the site. This involved looking under rocks, bark, fallen timber and leaf litter, with particular attention given to rock outcrop areas. Debris found

near moist habitats was checked for the presence of frogs and the type of moist habitats present was noted to allow predictions of frog species likely to occur.

Limitations of the Survey

It is acknowledged that this is not a comprehensive fauna survey of the subject site. However, given the scope of development, the condition of the vegetation and that the habitat requirements of locally occurring threatened fauna species are adequately understood, it is considered that this level of survey is sufficient.

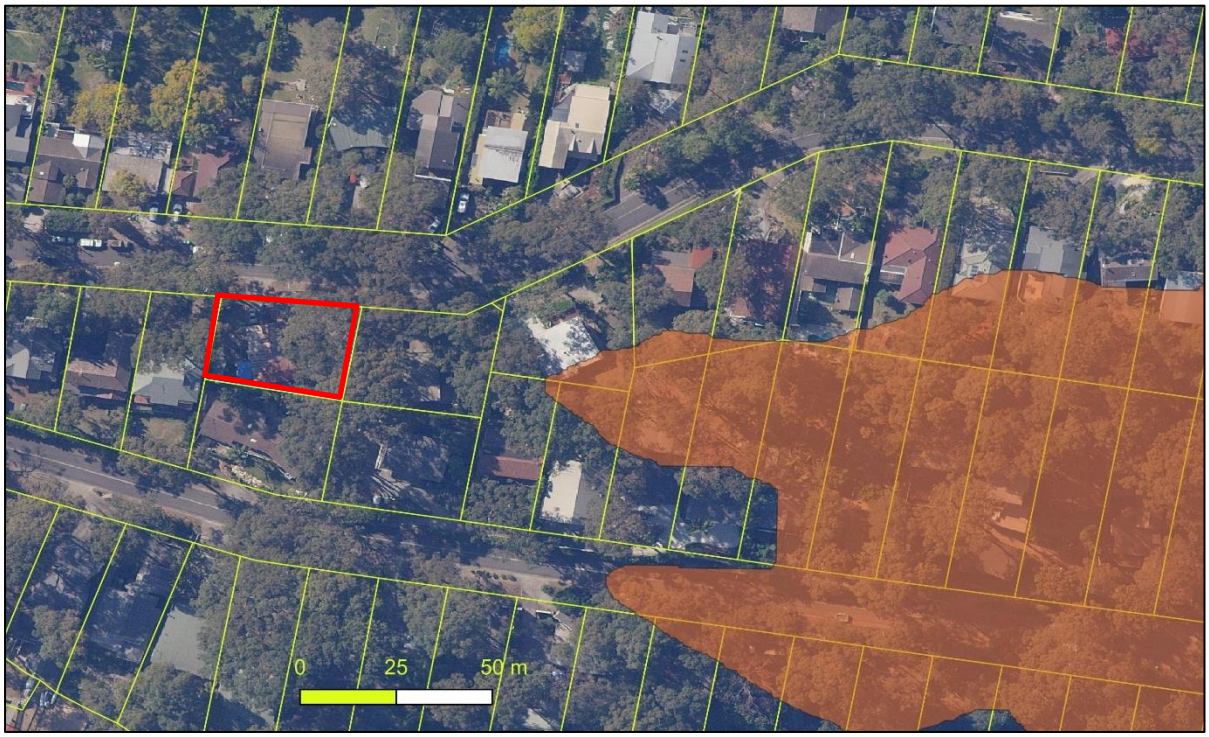
4. Results

4.1 Literature Review

4.1.1 Vegetation Mapping

In 2016 the NSW Office of Environment and Heritage updated 2013 vegetation mapping of the Sydney Catchment Management Area (OEH 2016), which includes the subject site. That mapping did not indicate native vegetation on the site. However, a patch of Pittwater Spotted Gum Forest was mapped as extending to within 50m east of the subject site and included areas clearly affected by residential development (Figure 2). Data accompanying the mapping indicated that the patch had extensive disturbance characterised by 'mixed urban use.'

Figure 2. Vegetation mapping (OEH 2016) of Pittwater Spotted Gum Forest (orange shading) in relation to the site.



4.1.2 Threatened Species

Appendix 1 details the conservation status, habitat requirements and likelihood of occurrence at the site of those threatened flora and fauna species that have been detected or are considered to have suitable habitat within five kilometres of the subject site (OEH 2020a; DAWE, 2020a).

4.2 Survey Results

4.2.1 Flora

4.2.1 (a) Vegetation Description

Vegetation on the site is composed of a number of remnant native trees above untended lawn and landscape plantings. Most of the remnant tees are Spotted Gum (*Corymbia* maculata) with a Grey Gum (*Eucalyptus punctata*) occurring in the north-east corner and a Grey Ironbark (*E.paniculata*) just beyond the north-west corner. Apart from Buffalo Grass (*Stenotaphrum*

secundatum) lawn species are mostly self-sown and include Panic Veldt Grass (*Ehrharta erecta*) and Parramatta Grass (*Sporobolus africanus*) and herbs such as Nasturtium (*Tropaeolum majus*), Slender Celery (*Cyclospermum leptophyllum*), Seaside Daisy (*Erigeron karvinskianus*) and Blackberry Nightshade (*Solanum nigrum*). A few opportunistic native species such as Kidney Weed (*Dichondra repens*), Scurvy Weed (*Commelina cyanea*), Snake Vine (*Stephania japonica*) and Slender Grape (*Cayaratia clematidea*) also occur. Landscape plantings include a Weeping Fig (*Ficus benjamina*), Golden Cane Palms (*Dypsis lutescens*) and hedges of Box (*Buxus sp*) and Blue Lilly Pilly (*Syzygium oleosum*).

Plate 1. View from north-east corner of site.

Tree No 5 is on the right, Tree No.6 on the left, dense Panic Veldt Grass in foreground.

4.2.1 (b) Conservation Significance of the Vegetation

The canopy vegetation of the site is typical of remnant PWSGF in an urban landscape. The final determination of PWSGF as an endangered ecological community (EEC) states:

"The structure of Pittwater and Wagstaffe Spotted Gum Forest in the Sydney Basin Bioregion was originally open-forest however, it now exists outside of reserves as woodland or *remnant trees* with few large stands remaining. Remnant trees may have

particular ecological and genetic significance and may be important sources of propagation material for use in rehabilitation projects" (NSW Scientific Committee 2013).

Therefore, although the community is not intact and not in moderate to good condition, remnant Spotted Gums and other trees typical of the community that occur within the site and surrounds are considered part of the EEC. Accordingly, a five-part test (Section 7.3 of the BC Act) has been conducted on the likely impacts the proposal would have on PWSGF (Appendix B).

4.2.1 (c) Flora Species

No threatened flora species were found at the subject site. Due to its small size and disturbance history, none of those threatened species listed in Appendix A are considered likely to be present in the soil seedbank and not apparent above ground.

4.2.2. Fauna

A narrow range of fauna species was detected during the site survey. This is both a function of the brevity of the survey and the location of the site in the urban matrix. The following species were recorded: Rainbow Lorikeet (*Trichoglossus haematodus*), Noisy Miner (*Manorina melanocephala*), Channel-billed Cuckoo (*Scythrops novaehollandiae*), Garden Skink (*Lampropholis guichenoti*) and Brown-striped Frog (*Limnodynastes peroni*).

No threatened fauna species were found at the subject site. Whilst some wide-ranging species, such as Powerful Owl (*Ninox strenua*) and Grey-headed Flying-fox (*Pteropus poliocephalus*) may forage locally on occasions the amount of habitat affected by the proposed development in relation their requirements is negligible.

4.2.2(a) Fauna Habitat Features

The vegetation description broadly outlines fauna habitat. Other features that influence the range and abundance of fauna are:

- The site is part of an urban bushland matrix that is characterised by residential development amongst remnant native trees amongst. Some forest dwelling fauna species

would occasionally forage in the urban matrix.

- No hollow-bearing trees occur at the subject site.
- Two small ponds occur at the rear of the site providing breeding habitat for urban adapted species such as Brown-striped Frog, tadpoles of which were observed in one of the ponds. No ephemeral or sizeable permanent waterbodies/watercourses occur at the subject site.
- Some outcropping rock and piles of landscape sandstone occur at the subject site affording habitat for a narrow range of small reptile species.
- Introduced predators, such as cats and foxes, are likely to occur on the site due to the site being in close proximity to recent residential development and historic rural land use.

5. Impacts of the Proposed Development

5.1 *Biodiversity Conservation Act*

Under Section 7.7 of the *BC Act*, if a proposed development is likely to significantly affect threatened species, the application for development consent is to be accompanied by a biodiversity development assessment report. Under Section 7.2 of the Act, a development is likely to significantly affect threatened species if:

(a) it is likely to significantly affect threatened species or ecological communities, or their habitats, according to the test in section 7.3 of the Act,

Trees that constitute the *BC Act* endangered ecological community Pittwater Wagstaffe Spotted Gum Forest occur at the subject site, three of which would be removed by the proposed action. From the five-part test (section 7.3 of the Act) it was concluded that such an impact is unlikely to significantly affect the community, or its habitat.

No threatened species were detected or considered likely to occur at the subject site.

(b) or the development exceeds the biodiversity offsets scheme threshold if the biodiversity offsets scheme applies to the impacts of the development on biodiversity values,

In the *Biodiversity Conservation Regulation 2017,* the threshold for clearing in which the minimum lot size under 1ha is 2500m^2. The proposed development would involve the clearing of approximately 150m^2 of native vegetation represented by the canopy cover of Trees 6, 8 and

9.[1] Nor does the proposed development affect land included on the Biodiversity Value Map, which is also a threshold trigger.

(c) or it is carried out in a declared area of outstanding biodiversity value.

The site is not a declared area of outstanding biodiversity value.

Given the above factors, a biodiversity development assessment report is not required to accompany the development application.

5.2 State Environmental Planning Policy (Coastal Management) 2018

A very small area within the south-east corner of the site is within the 'Coastal Environment Area' pursuant to the Coastal Management SEPP.

In relation to ecological considerations, Clause 13 (Development on land within the coastal environment area) requires, amongst a number of factors, that consent must not be granted to development that would have an adverse impact on:

(a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment, and

(d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,

Given the nature of the development and the small area of the Coastal Environment Area affected in which there is no native vegetation, it is considered that the proposed development would not have an adverse impact on these factors.

5.3 *Environment Protection and Biodiversity Conservation Act*

No threatened species or communities listed on the *EPBC Act* were detected or considered likely to occur at the subject site.

[1] Numbering as per Millington (2020)

5.4 Pittwater Local Environment Plan 2014 (PLEP2014)

As the site is within the Biodiversity overlay of the PLEP 2014, Clause 7.6 of the LEP must be addressed.

The objective of this clause is to maintain terrestrial biodiversity by:
(a) protecting native fauna and flora, and
(b) protecting the ecological processes necessary for their continued existence, and
(c) encouraging the conservation and recovery of native fauna and flora and their habitats.

Sub-clause 7.6(3) states *Before determining a development application for development on land to which this clause applies, the consent authority must consider:*
(a) whether the development is likely to have:
(i) any adverse impact on the condition, ecological value and significance of the fauna and flora on the land, and

The vegetation at the site is already in a degraded state due to the past removal of the understorey and groundcover strata and suppression of canopy. There would be an adverse impact due to the removal of three trees. However, this is unlikely to further significantly adversely affect the condition, ecological value or significance of the fauna and flora on the land.

(ii) any adverse impact on the importance of the vegetation on the land to the habitat and survival of native fauna, and

The removal of the three Spotted Gums would have an adverse impact on the habitat of the land due to removal of a foraging and roosting resource for birds and arboreal mammals. However, its loss is unlikely to affect the survival of any local populations of native fauna. Replacement planting of these trees elsewhere on site as well as inclusion of PWSGF understorey and groundcover species would ameliorate this impact over time.

(iii) any potential to fragment, disturb or diminish the biodiversity structure, function and composition of the land, and

The biodiversity structure has been significantly reduced by previous development of the land and adjacent properties. There would be some further loss due to the removal of Trees 6, 8 and 9. However, this would be mitigated by replacement planting of PWSGF species.

(iv) any adverse impact on the habitat elements providing connectivity on the land, and

Whilst the removal of Tree No. 6 and two smaller Spotted Gums would contribute to canopy loss locally, it is considered unlikely that any locally occurring fauna species would be affected in their movements by this. Furthermore, replacement planting will mean that canopy replenishment would occur over the long term.

(b) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development.

The Landscape Plan has been prepared such that 80% of new plantings will be of locally occurring native plant species typical of PWSGF.

Sub-clause 6.5 (4) states *Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:*

(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or

It is considered that there would not be any significant adverse environmental impact. The trees to be removed while having some habitat value are well represented in the local area and are to be replaced by planting of replacement trees as well as shrubs and groundcover species as specified by the Landscape Plan.

(b) if that impact cannot be reasonably avoided by adopting feasible alternatives—the development is designed, sited and will be managed to minimise that impact, or

It is considered that impacts have been reasonably avoided.

(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.

The footprint of the proposed dwelling has been modified to allow the retention of large trees apart from Tree No.6 Therefore, it is considered that impacts have been reasonably minimised.

Given the consideration of Clauses 7.6(3) and 7.6(4) of PLEP 2014, it is considered that the proposed development is in accordance with the objectives of Clause 7.6.

5.5 Pittwater Development Control Plan 21 (PDCP21)

As the site is Pittwater Spotted Gum Forest under PDCP21 it is subject to the following requirements of Control B4.7 (Pittwater Spotted Gum Forest - Endangered Ecological Community) of that plan:

- *Development shall not have an adverse impact on Pittwater Spotted Gum Endangered Ecological Community.*

A 5-part test (S7.3 of the BC Act) was conducted on PWSGF (Appendix B) from which it was concluded that the proposed development is unlikely to significantly affect the community, or its habitat.

- *Development shall restore and/or regenerate Pittwater Spotted Gum Endangered Ecological Community and provide links between remnants.*

  Whilst three Spotted Gum trees (Numbers 6, 8 and 9 in Millington 2020) would be removed by the proposed development, the Landscape Plan includes 80% PWSGF species, which will contribute to restoration of the community.

- *Development shall be in accordance with any Pittwater Spotted Gum Forest[2] Recovery Plan.*

  Recovery plans have been superseded by the Saving our Species (SoS) program. None of the actions prepared under the SoS program for PWSGF are relevant to the proposed development.

- *Development shall result in no significant onsite loss of canopy cover or a net loss in native canopy trees.*

[2] The endangered ecological community formerly known as Pittwater Spotted Gum Forest is now termed Pittwater Wagstaffe Spotted Gum Forest (PWSGF).

The proposed development would result in the loss of approximately 150m^2 of PWSGF represented by the canopies of the three Spotted Gums to be removed (Trees Nos. 6, 8 and 9) . This would be offset by the replacement of these trees and understorey and groundcover planting in available soft landscaped areas.

- *Development shall retain and enhance habitat and wildlife corridors for locally native species, threatened species and endangered populations.*

The loss of canopy cover is unlikely to interrupt the local movement of any fauna species currently inhabiting the local area. Even should Gliders (*Petaurus spp*) occur locally, movement through the urban matrix would still be afforded by the retention of Tree No.7 and other trees on both sides of the road reserve including Tree No.2.

- *Caretakers of domestic animals shall prevent them from entering wildlife habitat.*

There is no significant wildlife habitat in proximity to the site.

- *Fencing shall allow the safe passage of native wildlife.*

Fencing is likely to be similar in character to that existing and would not exacerbate existing barriers to fauna movement.

- *Development shall ensure that at least 80% of any new planting incorporates native vegetation (as per species found on the site or listed in Pittwater Spotted Gum Endangered Ecological Community).*

The Landscape Plan has been prepared in consultation with the author such that the above control is satisfied.

- *Development shall ensure any landscaping works are outside areas of existing Pittwater Spotted Gum Endangered Ecological Community and do not include Environmental Weeds.*

PWSGF on the site is confined to canopy cover provided by Spotted Gums, a Grey Gum and a Grey Ironbark. No intact stands (i.e. where understorey and groundcover strata are extant) of the community occur on the site.

Conclusion

It is considered that the proposed development satisfies the controls of PDCP21 and that the outcomes of Control B4.7 would be met.

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Appendix A – Habitat assessment table

Likelihood of occurrence criteria

Likelihood	Criteria
Recorded	The species was observed in the study area during the current survey
High	It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (i.e. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations; however, may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10 km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the study area.

Key

V - vulnerable E - endangered CE - critically endangered M - migratory

Species underlined are those which only the EPBC PMST predicted as having habitat in the search area. All other species have been recorded within 5 km of the study area.

Given the character of the site, no pelagic, estuarine or wetland species have been considered in the following table. Similarly, as the site is not located within the Commonwealth marine area, this being from 3 to 200 nautical miles from the coast, no species listed as marine under the EPBC Act have been considered; nor has the marine status of any species been acknowledged.

* - habitat requirements were generally extracted from DAWE (2020b) OEH (2020b), Harden (1992-2002), Frith (2007), Churchill (2008), Cogger (2014) and Van Dyck and Strahan (2008), with other references used being identified in the bibliography.

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence[3]
	EPBC Act	BC Act		
PLANTS				
Bynoe's Wattle *Acacia bynoeana*	V	E	Occurs in heath or dry sclerophyll forest on sandy soils.	Low No suitable habitat present.
Asterolasia elegans	E	E	Restricted to the mid Hawkesbury Valley catchment. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest.	Low. Subject site outside species' range.
Thick-leaf Star-hair *Astrotricha crassifolia*	V	V	Occurs in dry sclerophyll woodland on sandstone.	Low No suitable habitat present.
Thick-lipped Spider-orchid *Caladenia tessellata*	V	E	Generally found in grassy sclerophyll woodland on clay loam or sandy soils.	Low No suitable habitat present.
Netted Bottle Brush *Callistemon linearifolius*		V	Usually grows near sandstone outcrops in dry sclerophyll forest on the coast and adjacent ranges.	Low No suitable habitat present.
Sand Spurge *Chamaesyce psammogeton*		E	Fore-dunes, pebbly strandlines and exposed headlands, often with Spinifex (*Spinifex sericeus*) and Prickly Couch (*Zoysia macrantha*)	Low No suitable habitat present.
Leafless Tongue-orchid *Cryptostylis hunteriana*	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland.	Low No suitable habitat present.
White-flowered Wax Plant *Cynanchum elegans*	E	E	Usually occurs on the edge of dry rainforest vegetation but also in littoral rainforest, coastal scrub and aligned open forest and woodland.	Low No suitable habitat present.
Darwinia biflora	V	V	Only occurs between Lane Cove and the Hawkesbury River. Grows on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone.	Low No suitable habitat present.
Camfield's Stringybark *Eucalyptus camfieldii*	V	V	Localised and scattered distribution includes sites near West Head Road in KCNP (among others). Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges. Occurs mostly in small, scattered stands near the boundary of tall coastal heaths and low open woodland of the slightly more fertile inland areas.	Low No suitable habitat present.
Bauer's Midge Orchid *Genoplesium baueri*	E	E	Grows in dry sclerophyll forest and moss gardens over sandstone.	Low No suitable habitat present.
Grevillea caleyi	V	V	In association with laterite soils and a vegetation community of open forest, generally dominated by *Eucalyptus sieberi* and *Corymbia gummifera*.	Low No suitable habitat present.
Grevillea shiressii	V	V	Only known from two populations near Gosford, on tributaries of the lower Hawkesbury River north of Sydney (Mooney Mooney Creek and Mullet Creek). Grows along creek banks in wet sclerophyll forest with a moist understorey in alluvial sandy or loamy soils.	Low No suitable habitat present.
Haloragodendron lucasii	E	E	Restricted to sheltered gullies near St Ives and In Ku-ring-gai Chase National park near North Turramurra	

[3] For the site to support and be important for the lifecycle requirements of a locally viable population of this species.

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence[3]
	EPBC Act	BC Act		
Kunzea rupestris	V	V	Restricted to Maroota to Cowan area. Grows in shallow depressions on large flat sandstone rock outcrops. Characteristically found in short to tall shrubland or heathland.	Low No suitable habitat present.
Lasiopetalum joyceae	V	V	Heath/scrub on clayey ridge-tops and slopes	
Biconvex Paperbark *Melaleuca biconvexa*	V	V	Scattered and dispersed populations of this species are found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Generally, grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	Low No suitable habitat present.
Deane's Paperbark *Melaleuca deanei*	V	V	Occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas. Occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone.	Low No suitable habitat present.
Angus's Onion Orchid *Microtis angusii*	E	E	Currently known from only one site at Ingleside where it grows with the introduced weeds *Hyparrhenia hirta* (Coolatai grass) and *Acacia saligna*.	Low No suitable habitat present.
Tall Knotweed *Persicaria elatior*	V	V	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Low No suitable habitat present.
Hairy Geebung *Persoonia hirsuta*	E	E	Found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	Low
Somersby Mintbush *Prostanthera junonis*	E	E	Restricted to the Somersby Plateau. It occurs on both the Somersby and Sydney Town soil landscapes on gently undulating country over weathered Hawkesbury sandstone within open forest/low woodland/open scrub. It occurs in both disturbed and undisturbed sites.	Low No suitable habitat present.
Eastern Underground Orchid *Rhizanthella slateri*	E	V	Habitat requirements are poorly understood, and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest.	Low
Scrub Turpentine *Rhodamnia rubescens*		CE	Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	Detected adjacent to site
Magenta Lilly Pilly *Syzygium paniculatum*	V	E	Found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. Locally restricted mainly to remnant stands of littoral (coastal) rainforest but also widely planted in gardens.	Low No suitable habitat present.
Tetratheca glandulosa	V	V	Heath, woodland and open forest on duplex soils over sandstone between the Hawkesbury River and Port Jackson.	Low No suitable habitat present.
Austral Toadflax *Thesium australe*	V	V	Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast.	Low No suitable habitat present.
MAMMALS				
Spotted-tailed Quoll *Dasyurus maculatus*	E	V	Recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline.	Moderate. Small area of potential foraging habitat affected.
Southern Brown Bandicoot *Isoodon obesulus obesulus*	E	E	Generally, only found in heath or open forest with a heathy understorey on sandy or friable soils south of the Hawkesbury River.	Low. No suitable habitat present.

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence[3]
	EPBC Act	BC Act		
Koala *Phascolarctos cinereus*	V	V	Open eucalypt forest and woodland, containing a variety of 'preferred' food tree species.	Low. No suitable habitat present.
Long-nosed Potoroo *Potorous tridactylus tridactylus*	V	V	Inhabits coastal heath and dry and wet sclerophyll forests with dense cover which provides diurnal sheltering sites and protection from predators, while foraging in adjacent, open areas.	Moderate. Small area of potential foraging habitat affected.
Eastern Pygmy-possum *Cercartetus nanus*		V	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred.	Low. No suitable habitat present.
Squirrel Glider *Petaurus norfolcensis*		V, E[4]	Occurs on the coast in a range of habitats including low scrubby eucalypt woodlands and banksia thickets to tall, wet eucalypt forests bordering on rainforest. In Pittwater, important food sources are likely to be the winter flowering Coast Banksia (*Banksia integrifolia*) and Spotted Gum (*Corymbia maculata*) and the summer flowering Old Man Banksia (*B. serrata*) and Grey Ironbark (*Eucalyptus paniculata*).	Low. No records on Bionet (OEH 2020a) within 5km since 2006.
Greater Glider *Petauroides volans*	V		Largely restricted to eucalypt forests and woodlands, utilising tree hollows.	Low. No suitable habitat present.
Brush-tailed Rock-wallaby *Petrogale penicillata*	V	E	Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges.	Low. No suitable habitat present.
Grey-headed Flying-fox *Pteropus poliocephalus*	V	V	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops.	Moderate. Small area of potential foraging habitat affected.
Large-eared Pied Bat *Chalinolobus dwyeri*	V	V	Cave-roosting bat that forages in timbered woodland and dry sclerophyll forest.	Moderate. Small area of potential foraging habitat affected.
Eastern Coastal Free-tailed Bat *Micronomus norfolkensis*		V	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in man-made structures.	Moderate. Small area of potential foraging habitat affected.
Eastern False Pipistrelle *Falsistrellus tasmaniensis*		V	Prefers moist habitats, with trees taller than 20 m. Generally, roosts in hollow-bearing trees (eucalypts), but has also been found under loose bark on trees or in buildings. Forages over a range of habitats	Moderate. Small area of potential foraging habitat affected.
Little Bent-winged Bat *Miniopterus australis*		V	Generally found in well-timbered areas. Roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day. Forages over a range of habitats	Moderate. Small area of potential foraging habitat affected.
Large Bent-winged Bat *Miniopterus orianae oceanensis*			Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures.	Moderate. Small area of potential foraging habitat affected.
Southern Myotis *Myotis macropus*		V	Generally, roosts in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in	Moderate. Small area of potential foraging habitat affected.

[4] Population on the Barrenjoey Peninsula north of Bushrangers Hill.

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence[3]
	EPBC Act	BC Act		
			dense foliage. Forage over streams and pools catching insects and small fish by raking their feet across the water surface.	
Greater Broad-nosed Bat *Scoteanax rueppellii*		V	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Usually roosts in tree hollows but also in buildings.	Moderate. Small area of potential foraging habitat affected.
Eastern Cave Bat *Vespadelus troughtoni*		V	Cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.	Moderate. Small area of potential foraging habitat affected.
New Holland Mouse *Pseudomys novaehollandiae*	V		Open heathland, open woodland with a heathland understorey and vegetated sand dunes.	Low. No suitable habitat present.
BIRDS				
Rose-crowned Fruit-Dove *Ptilinopus regina*		V	Mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest, where fruit is plentiful	Low. No suitable habitat present.
Superb Fruit-Dove *Ptilinopus superbus*		V	Rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. At least some of the population, particularly young birds, moves south through Sydney, especially in autumn when occasionally recorded flying into windows	Low. No suitable habitat present.
White-throated Needletail *Hirundapus caudacutus*	V,M		Almost exclusively aerial. Takes insects on wing over a range of habitat types. Recorded most often above wooded areas, including open forest and rainforest.	Low. May forage above canopy on occasions.
Fork-tailed Swift *Apus pacificus*	M		Almost exclusively aerial. Takes insects on wing over a range of habitat types, but also less than 1 m above open areas or over water. Mostly occur over inland plains but sometimes above foothills or in coastal areas.	Low. May forage above canopy on occasions.
Grey Falcon Falco hypoleucos	V	V	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	Low. No suitable habitat present.
Square-tailed Kite *Lophoictinia isura*		V	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses.	Low. No suitable habitat present.
Little Eagle *Hieraaetus morphnoides*		V	Occupies open eucalypt forest, woodland or open woodland. Sheoak or *Acacia* woodlands and riparian woodlands of interior NSW are also used.	Low. No suitable habitat present.
White-bellied Sea-eagle *Haliaeetus leucogaster*		V	Found in coastal habitats, along rivers and around terrestrial wetlands in tropical and temperate regions of mainland Australia.	Low. No suitable habitat present.
Eastern Osprey *Pandion cristatus*	M	V	Occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands.	Low. No suitable habitat present.
Gang-gang Cockatoo *Callocephalon fimbriatum*		V	Prefers tall montane forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests during summer, these being at higher	Moderate. Very small proportion of foraging habitat present.

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence[3]
	EPBC Act	BC Act		
			altitudes. In winter, occurs at lower altitudes in drier, more open eucalypt forests and woodlands, or in dry forest in coastal areas.	
Glossy Black-Cockatoo *Calyptorhynchus lathami*		V	Inhabits eucalypt woodland and feeds almost exclusively on Casuarina fruits.	Moderate. Potential feed trees (Forest Oak) present but no crushed cones indicative of the feeding behaviour of the Glossy Black-Cockatoo recorded.
Little Lorikeet *Glossopsitta pusilla*		V	Forages primarily in the open Eucalypt forest and woodland canopies, particularly along water courses; occasionally in Angophoras, Melaleucas and other tree species, also riparian habitats are used.	Moderate. Very small proportion of foraging habitat present.
Swift Parrot *Lathamus discolor*	CE	E	Eucalypt forests. When over-wintering on the mainland, this species is dependent on winter-flowering eucalypt species.	Low. No suitable habitat present.
Turquoise Parrot *Neophema pulchella*		V	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland.	Low. No suitable habitat present.
Oriental Cuckoo *Cuculus optatus*	M		Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland.	Low. No suitable habitat present.
Powerful Owl *Ninox strenua*		V	Inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest.	Moderate. Very small proportion of foraging habitat present.
Barking Owl *Ninox connivens*		V	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland.	Low. No suitable habitat present.
Eastern Bristlebird *Dasyornis brachypterus*	E	E	Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey.	Low. No suitable habitat present.
Regent Honeyeater *Anthochaera phrygia*	CE	CE	Inhabits dry open forest and woodland. These woodlands have significantly large numbers of mature trees, high canopy cover and abundance of mistletoes.	Low. No suitable habitat present.
Painted Honeyeater *Grantiella picta*	V	V	Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus *Amyema*.	Low. No suitable habitat present.
Dusky Woodswallow *Artamus cyanopterus cyanopterus*		V	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris.	Low. No suitable habitat present.
Scarlet Robin *Petroica boodang*		V	Lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs.	Low. No suitable habitat present.
Yellow Wagtail *Motacilla flava*	M		Open country near swamps, salt marshes and sewage ponds.	Low. No suitable habitat present.
Rufous Fantail *Rhipidura rufifrons*	M		Mainly inhabits wet sclerophyll forests, often in gullies dominated by eucalypts.	Moderate. Very small proportion of potential foraging habitat present.

Common Name	Legislation		Primary habitat requirements	Likelihood of Occurrence[3]
	EPBC Act	BC Act		
Satin Flycatcher *Myiagra cyanoleuca*	M		Mainly inhabits eucalypt forests, often near wetlands or watercourses.	Moderate. Very small proportion of potential foraging habitat present.
Black-faced Monarch *Monarcha melanopsis*	M		Rainforest and wet eucalypt forest.	Moderate. Very small proportion of potential foraging habitat present.
Spectacled Monarch *Monacrha trivirgatus*	M		Rainforest, mangroves and moist gloomy gullies of dense eucalypt forest.	Low. No suitable habitat present.
REPTILES				
Rosenberg's Goanna *Varanus rosenbergi*		V	Found in heath, dry open forest and woodland.	Low. No suitable habitat present.
Broad-headed Snake *Hoplocephalus bungaroides*	V	E	Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring.	Low. No suitable habitat present.
AMPHIBIANS				
Giant Burrowing Frog *Heleioporus australiacus*	V	V	Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based.	Low. No suitable habitat present.
Red-crowned Toadlet *Pseudophryne australis*		V	Almost totally confined to drainage lines in areas of Hawkesbury Sandstone, especially those that support weathered shale lenses.	Low. No suitable habitat present.
Stuttering Frog *Mixophyes balbus*	V	E	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range.	Low. No suitable habitat present.
Green and Golden Bell Frog *Litoria aurea*	V	E	Inhabits a variety of environments, including disturbed sites, ephemeral ponds, wetlands, marshes, dams and stream-sides, particularly those that contain one or more of the following aquatic plants: bullrush (*Typha* spp.), spikerush (*Eleocharis* spp.), *Juncus kraussii*, *Schoenoplectus littoralis* and *Sporobolus virginicus.*	Low. No suitable habitat present.
Littlejohn's Tree Frog *Litoria littlejohni*	V	V	Breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath-based forests and woodlands where it shelters under leaf litter and low vegetation.	Low. No suitable habitat present.

Appendix B. Five-part Test – Pittwater Wagstaffe Spotted Gum Forest

(a) in the case of a threatened species, whether the proposed development or activity 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,

Not applicable to an EEC.

(b) in the case of an endangered ecological community or critically endangered ecological community, whether the proposed development or activity—

(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

At the subject site and surrounds, the ecological community is represented by the canopy of Spotted Gum, Grey Gum and Grey Ironbark trees. There is no intact shrub or groundcover at the site or adjacent to it.

With the removal of Trees No.6, Tree No.8 and Tree No.9 approximately 150m^2 of this canopy cover would be affected. It is considered unlikely that this would place the local occurrence of the community at risk of extinction.

(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,

In the vicinity of the subject site, the community is already substantially and adversely modified by residential development and associated infrastructure (roads, drainage, electricity easements). There would be no adverse modification of the composition of the community as only a small percentage of the local canopy cover would be modified, and its affected component species (Spotted Gum) is well represented locally.

(c) in relation to the habitat of a threatened species or ecological community:

(i) the extent to which habitat is likely to be removed or modified as a result of the proposed development or activity, and

Approximately 150m^2 of PWSGF would be removed. This would be mitigated by the planting of Spotted Gum trees as well as shrub and groundcover species in landscaped areas.

(ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed development or activity, and

The community is already fragmented by residential development, which has left an urban forest consisting of canopy with no understorey or groundcover and little regenerative capacity. As only a small area of canopy cover would be affected there would be no further fragmentation or isolation as a result of the proposed action.

(iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species or ecological community in the locality

The vegetation affected at the subject site is unlikely to be important to the survival of the community in the locality.

(d) *whether the proposed development or activity is likely to have an adverse effect on any declared area of outstanding biodiversity value (either directly or indirectly),*

The subject site is not mapped as an area of outstanding biodiversity value.

(e) whether the proposed development or activity is or is part of a key threatening process or is likely to increase the impact of a key threatening process.

Currently 35 KTP for mainland NSW are listed under Schedule 4 of the BC Act. The proposed work would contribute to the impact of listed KTP such as 'Clearing of native vegetation.' However, this would not be to a degree that the viability of PWSGF would be further compromised.

Expected impact on PWSGF

The proposal is considered unlikely to have a significant effect on PWSGF, or its habitat. Preparation of a BDAR is not required.

Attachment A.

The proposed development (overleaf)