Installation of Traffic Signals at Seaforth Oval, Wakehurst Parkway

Review of Environmental Factors

RTA ENVIRONMENTAL TECHNOLOGY

APRIL 2006

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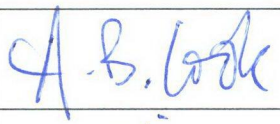
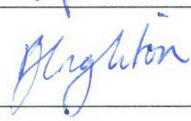
Approving Manager	Andrew Cook		21/4/06
Reviewing Officer	Paula Crighton		21/4/06

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Sydney Region

1.4 Introduction

The NSW Roads and Traffic Authority (RTA) proposes to install traffic signals at the corner of Wakehurst Parkway (MR397), and Burnt Street, Seaforth.

This Proforma 1 Review of Environmental Factors (REF) has been prepared by Environmental Technology on behalf of RTA Operations and Services, Sydney Region. For the purposes of these works, the RTA is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment (EP&A) Act 1979*.

The purpose of the REF is to describe the Proposal, to document the likely impacts of the Proposal on the environment, and to detail protective measures to be implemented.

The description of the proposed works and associated environmental impacts have been undertaken in the context of Clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation (TSC) Act 1995*, the *Fisheries Management (FM) Act 1994*, and the (Commonwealth) *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*. In doing so, the REF helps to fulfil the requirements of Section 111 of the EP&A Act, that the RTA examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

This REF has been prepared in accordance with the RTA's Proforma 1 REF as presented in the RTA's *Environmental Impact Assessment Policy, Guidelines and Procedures, Version 4 2001*.

The findings of the REF would be considered when assessing:

- Whether the Proposal is likely to have a significant impact on the environment and therefore the necessity for an Environmental Impact Statement (EIS) under Section 112 of the EP&A Act.
- The significance of any impact on threatened species as defined by the TSC Act, in Section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement (SIS).

- The potential for the Proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Commonwealth Environment Minister in accordance with the EPBC Act.

1.5 Background and Need for the Proposal

Manly Council is currently undertaking an upgrade of facilities within the vicinity of Seaforth Oval. The area adjacent to the Seaforth Oval contains remnant examples of the Duffy's Forest vegetation unit, an endangered ecological community under the Schedules of the *Threatened Species Conservation Act 1995*. In 2002 Manly Council commissioned a review of the distribution of this vegetation unit in the vicinity of Seaforth Oval. The findings of this report have been considered during the preparation of this REF, and the full reports have been included in Appendix D of this report.

Traffic signals would facilitate improved access as part of the re-development of Seaforth Oval, by Manly Council. The signals would provide a safer ingress and egress arrangement from the Oval and also provide improved conditions for pedestrians wishing to access the Seaforth Oval.

1.6 Methodology

The method in which this document has been prepared is as follows:

1. A discussion was held with the Project Manager to consider the Proposal.

2. An RTA Environmental Technology representative undertook a site visit on 12 April 2006 to provide an overview of the Proposal and to discuss any issues relevant to the completion of the REF.

3. Consultation was undertaken with the RTA's Regional Environmental Adviser, Sydney Region.

4. A desktop search was conducted on the following databases to identify any potential issues:
   - Australian Heritage Database;
   - NSW Heritage Office State Heritage Register and State Heritage Inventory;
   - National Native Title Claims Search;
   - DEC Aboriginal Heritage Information Management System (AHIMS);
   - DEC Atlas of NSW Wildlife - Threatened Flora and Fauna Records;
   - DEH Protected Matters (EPBC Act) Database; and
   - DPI Noxious Weeds List.
   - DEC Contaminated Land Records
   - Acid Sulphate Soil Risk Mapping

5. A literature review and review of documentation was undertaken with regards to the following:
   - Local Environmental Plans;
   - Regional Environmental Plans and State Environmental Planning Policies; and
   - Previous environmental impact assessment (EIS) reports relevant to the Proposal (see Appendix D).

2 Description of Proposal Site and Study Area

2.1 Location

The Proposal is located along the western side of Wakehurst Parkway, at Seaforth Oval, opposite Burnt Street, Seaforth. Seaforth Oval is bordered by Garigal National Park to the north, west and south with residential areas located to the east. Access to the Oval is gained via the Wakehurst Parkway with facilities managed by Manly Council including a car parking area located to the eastern side of the oval adjacent to the roadway and Proposal site.

The Proposal site is the area that would be directly impacted by the proposed works. For the purpose of this REF the Proposal site is defined as the area immediately opposite Burnt Street within the existing road reserve and the western roadside both north and south along the Wakehurst Parkway for a distance of approximately 50m (refer to Figure 2.1 and Appendix A). The Site Compound would be located in the south western corner of the existing car park for Seaforth Oval.

The study area is the larger area that may be indirectly impacted as a result of the Proposal. For this Proposal the study area is defined as the Proposal site plus a buffer zone of 100m.

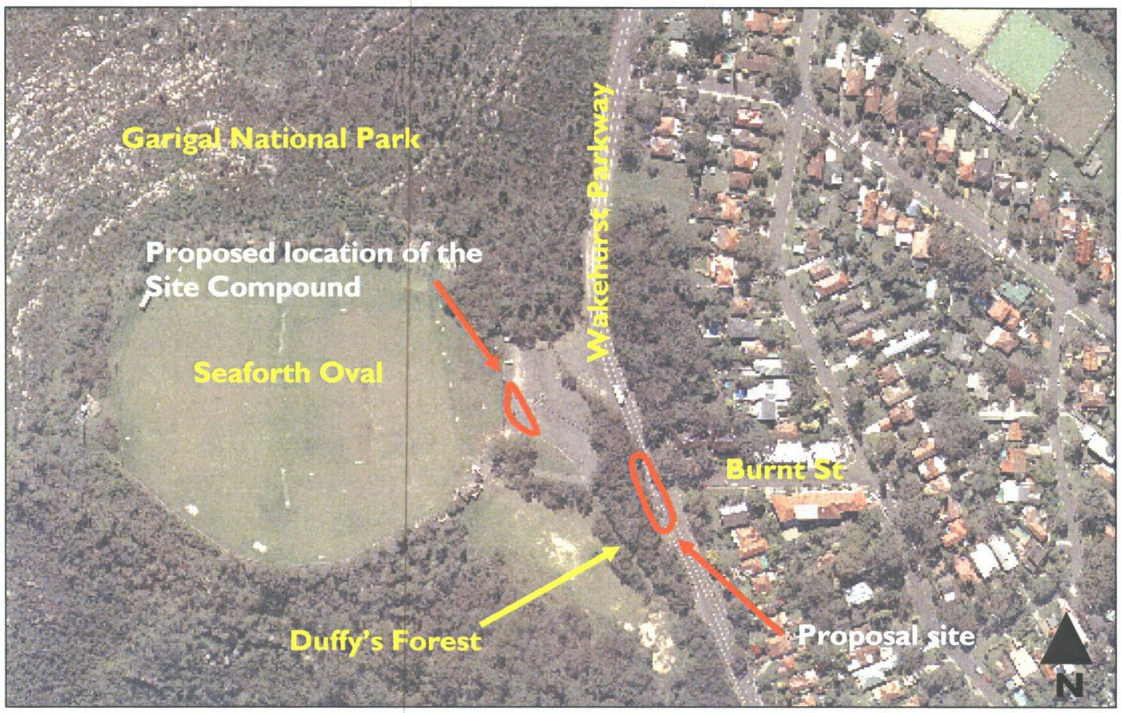

Figure 2.1: Location of the Proposal site (under licence from Department of Lands – Not to Scale)

2.2 Description of the Existing Environment

2.2.1 Landform

The Proposal site occurs on the Somersby Soil Landscape within the Sydney Basin. Landscapes are gently undulating to rolling rises on deeply weathered Hawkesbury Sandstone. Relief is to 40m with slopes generally <15%. Soils are moderate to deep Red and Yellow Earths on upper slopes to Earthy Sands and Siliceous Sands on lower slopes and Drainage lines (Chapman and Murphy, 1989). Within the Proposal site much of the area

exists on fill and spoil material due to the extensive landscaping and infrastructure development of Seaforth Oval and the construction of Wakehurst Parkway.

Drainage in the vicinity of the Proposal is via a constructed kerb and guttering system and piping transporting runoff to the south. Water is transported to Middle Harbour approximately 400m southeast of the Proposal site.

2.2.2 Biodiversity

Vegetation within the Proposal site exists as a highly disturbed stand of eucalypts with minimal understory located to the western side of Wakehurst Parkway (refer to Appendix A). The stand of vegetation has been identified as a remnant of the Duffy's Forest ecological community by Smith and Smith, 2002. Duffy's Forest is a listed Endangered Ecological Community (EEC) on the *Threatened Species Conservation Act* (TSC Act) *1995* which is characterised by the presence of *Eucalyptus pilularis* (Blackbutt) and/or *Syncarpia glomulifera* (Turpentine). Garigal National Park is located to the north, west and south of the study area surrounding Seaforth Oval.

Habitat within the Proposal site is limited due to the proximity of vegetation to the roadway, isolation of the vegetation community and the highly disturbed nature of the existing EEC. No hollow bearing trees were observed within the Proposal site at the time of inspection.

2.2.3 Landuse and Socio-Economic Considerations

The Proposal occurs at a location of moderate scenic amenity to the western side of the Wakehurst Parkway, a major access road for northern beaches area. The Annual Average Daily Traffic (AADT) along Wakehurst Parkway in the vicinity of the Proposal site is 20237 (RTA 2002).

Residential dwellings occur to the eastern side of the roadway with Seaforth Oval to the west. The closest residential building to the Proposal site is located approximately 50m to the east. A bus stop is located to the south eastern side of the Burnt Street intersection and some shops are located approximately 100m along Burnt Street (east of Proposal Site).

Manly Council is currently undertaking works to upgrade the infrastructure of the Oval including redevelopment of the existing parking areas. This redevelopment includes the relocation of utilities within the locality including Telstra cabling which currently passes through the EEC (refer to Appendix A for photographs). This cabling exists as a link to the newly constructed amenity block for the Oval.

3 Description of the Proposal

3.1 Description of the Proposal

The Proposal would involve the construction of a slip lane for northbound traffic on Wakehurst Parkway, providing access to the development being undertaken by Manly Council at Seaforth Oval. Given the local topography of the Proposal site (sloping down to the west), it is proposed to utilise retaining walls for the construction of the slip lane, in order to minimise the footprint of construction, and therefore reduce the impacts on adjacent vegetation.

3.2 Construction Activities

3.2.1 Construction Processes and Work Methodology

The works would be undertaken using the following methodology:

- Removal of approximately 50m^2 of vegetation within the Proposal site. Once vegetation is removed, the topsoil would be scraped and stored in a stockpile within the stockpile and compound site, for re-use during the landscaping works at the completion of the Proposal.
- Installation of appropriate erosion and sedimentation controls.
- Utility adjustments within the Proposal site.
- Earthworks and construction of retaining structure, to support the slip lane
- Drainage works, installation of new pavements, kerb and guttering adjustments, installation of a centre median strip, and line marking.
- Traffic signals installation.
- Provision of new footpath on the western side of the newly constructed pavement.
- Landscaping and reuse of recovered topsoil in accordance with the Bushland Management Plan to be developed as part of the Proposal (see also Section 6.4).

3.2.2 Construction Equipment

The Proposal would require the following construction equipment:

- Excavator
- Rotor mill
- Vibrating roller
- Asphalt paver
- Trucks
- Jackhammers
- Backhoe
- Air compressors
- Grader
- Hand-held gas burner
- Water cart
- Generator
- Manual drum roller
- Suction broom or skidsteer
- Loader
- Hand held tools

3.2.3 Source of Material

All materials would be sourced locally where possible. No materials currently in short supply would be required for the Proposal.

3.2.4 Stockpile and Compound Sites

The compound site would be located in the south western corner of the existing car park at Seaforth Oval. This area is currently paved, and the utilisation of this area for the site compound would therefore not involve any disturbance of soil or vegetation. Portable structures including portaloos and a site office would be placed within the confines of the site compound area. The area would also be used to stockpile any topsoil recovered during the preliminary earthworks. The entire stockpile and compound site would be fenced to preclude public access.

3.3 Workforce and Working Hours

The workforce would comprise approximately 10 personnel. For some specialised tasks, including utility adjustments, additional personnel may be required.

It is anticipated that working hours for the Proposal would be generally undertaken during standard working hours adopted by the RTA as detailed below:

Standard Working Hours:

Monday – Friday:	7.00am to 6.00pm
Saturday:	8.00am to 1.00pm
Sunday and Public Holidays:	No work.

There would be a requirement to undertake some works outside of the standard working hours. During these works, the procedure contained in the RTA's *Environmental Noise Management Manual 2001*, "*Practice Note vii – Roadworks Outside of Normal Working Hours*" would be followed.

3.4 Commencement of Works

Construction would commence in late April 2006.

3.5 Period of Construction

Given ideal working conditions, the period of construction would span approximately 12 months.

4 Statutory Position

4.1 Local Environmental Plans

Development in the Manly LGA is controlled by Manly Council under the *Manly Local Environmental Plan* (LEP) *1988.*

The Proposal site is located within land zoned No 5 – Special Uses Zone. Within this zone roads are permitted with development consent. The site compound is proposed to be located within land zoned No 6 – Open Space Zone. Within this zone roads are permitted with development consent.

Clause 6 of the LEP adopts the *Environmental Planning and Assessment Model Provisions 1980* (The Model Provisions). As such, Clause 35 of the Model Provisions is relevant to the Proposal in stating that:

> *"Nothing in the local environmental plan shall be construed as restricting or prohibiting or enabling the consent authority to restrict or prohibit:*
>
> *(a) the carrying out of development of any description specified in Schedule 1;*
> *(b) the use of existing buildings of the Crown by the Crown; or*
> *(c) home occupations carried on in dwelling-houses".*

Item 8 of Schedule 1 of the Model Provisions states:

> *"The carrying out of any development required in connection with the construction, reconstruction, improvement, maintenance or repair of any road, except the widening, realignment or relocation of such a road".*

The Proposal involves the construction of a slip lane for northbound traffic wishing to turn into Seaforth Oval. As this could be classified as road widening, the Model Provisions do not remove consent for this portion of the Proposal. However, the location of the compound within zone No 6 – Open Space is considered to be 'required in connection with the improvement' of Wakehurst Parkway. Therefore, development consent is not required for the compound site.

State Environmental Planning Policy (SEPP) No. 4 – Development Without Consent and Miscellaneous Exempt and Complying Development operates to remove the need for development consent for the proposed slip lane and traffic signals within zone No 5 – Special Uses. Refer to Section 4.2 below.

4.2 State and Regional Environmental Planning

No Regional Environmental Plans apply to this Proposal. The following State Environmental Planning Policy applies to the Proposal.

State Environmental Planning Policy (SEPP) No 4 - Development Without Consent and Miscellaneous Exempt and Complying Development

Clause 11C(2) states: '*Where, in the absence of this clause, development for the purposes of a classified road or toll work, may be carried out only with development consent being obtained therefore, that development may be carried out without that consent'.*

SEPP 4 applies to the Proposal, as the proposed works are for the purposes of Wakehurst Parkway (MR397). Therefore, consent from Manly Council would not be required for the installation of traffic signals on Wakehurst Parkway.

4.3 Confirmation of Part 5 Position

All relevant statutory planning instruments have been examined for the Proposal. It is concluded that the adoption of the Model Provisions, as outlined in Clause 6 of the Manly LEP and SEPP 4 operate to remove the development consent requirements, thereby permitting assessment of the Proposal under Part 5 of the EP&A Act.

5 Background Investigations and Consultation

5.1 Background Investigations and Database Searches

The following results were obtained from desktop database searches conducted for the study area. Unless otherwise stated, all searches were conducted on 11 April 2006. The information below provides a description of results relevant to the Proposal. Copies of all the search results are provided in Appendix C.

Australian Heritage Database

A search within the Manly Council LGA identified 31 listings on the Australian Heritage Database. The closest listing to the Proposal site is the Bantry Bay Reserve Area located in Killarney Heights approximately 400m northeast.

NSW Heritage Office State Heritage Register/Inventory

A search within the Manly Council LGA identified six items listed on the NSW Heritage Register and 275 items listed on the Inventory. The closest listing to the Proposal site is Bantry Bluff, which is listed on the Heritage Inventory, located to the east of Seaforth Oval approximately 300m from the Proposal site.

RTA Heritage and Conservation Register (s170)

No items listed on the s170 Register occur within the vicinity of the Proposal site.

LEP Heritage Listings

None of the items listed in the Manly LEP heritage listing, Schedule 4 – *Items of the Environmental Heritage* occur within the vicinity of the Proposal site.

National Native Title Tribunal

There are no listings for Native Title claims within 20km of the Proposal site.

NSW DEC Aboriginal Heritage Information Management System (AHIMS)

A search of the AHIMS register on 20 April 2006 found no sites recorded in the vicinity of the Proposal site.

NSW DEC Atlas of NSW Wildlife - Threatened Flora and Fauna Records

A search for any known threatened flora or fauna species occurring within 5km of the Proposal site identified eight flora species, occurring at 38 locations and 20 fauna species occurring at 88 locations (refer to Appendix C). The closest flora listing to the Proposal site is *Pimelea curviflora var. curviflora* located approximately 150m north west of the Proposal site in Garigal National Park. The closest fauna listing is the Grey-headed Flying-fox (*Pteropus poliocephalus*) located approximately 670m south east of the Proposal site.

DEH Protected Matters (EPBC Act) Database

Search results for the EPBC Act Online Database matters of National Environmental Significance (NES) potentially occurring within 5km of the study area are summarised in Table 5.1 overleaf:

Table 5.1: EPBC search results

EPBC Act Protected Matters	Within 5km search area
World Heritage Properties	None present
National Heritage Places	None present
Wetlands of International Importance	Towra Point Nature Reserve (not within 5km, but in the same catchment)
Commonwealth Marine Areas	None present
Threatened Ecological Communities	None present
Threatened Species	37 species potentially occurring
Migratory Species	26 species potentially occurring
Marine Species	47 species potentially occurring
Whales and other Cetaceans	9 species potentially occurring
Critical Habitats	None present
Places on the Register of National Estate (RNE)	*Historic* • Bantry Bay Public Magazine NSW • Innisfallen Castle and Grounds NSW *Natural* • Bantry Bay Reserve Area (former) NSW • Manly Dam and Surrounds NSW
Listed Commonwealth Lands	• Communications, Information Technology and the Arts - Telstra Corporation Limited • Defence - Defence Housing Authority
State and Territory Reserves	Garigal National Park, NSW
Regional Forest Agreements (RFA)	None present

A further discussion of potential environmental impacts to matters of NES is provided in Section 8.2.

NSW DPI Noxious Weeds List

Within the Manly LGA 103 noxious weed species are listed as potentially occurring. None of the listed noxious species were identified during the site visit, however, there is the potential for noxious weeds not identified during the site visit to occur within the study area. Further discussion is provided in Section 6.4.

NSW DEC Contaminated Land Records

There are nine notices relating to two sites listed within the Manly Council LGA. Neither of these sites occur in the vicinity of the Proposal site.

DIPNR Acid Sulphate Soil Risk Mapping

A search of the DIPNR Acid Sulphate Soil Risk mapping did not reveal any potential for Acid sulphate soils in the vicinity of the Proposal site.

5.2 Consultation and Involvement

5.2.1 Government Consultation

As the works would be undertaken in conjunction with Manly Council's redevelopment of Seaforth Oval, extensive consultation has been undertaken with Council representatives. Manly Council has been involved in the planning stages of the proposal and would be involved in further consultation prior to the commencement of works.

5.2.2 Community Consultation and Involvement

To date, no community consultation has been undertaken due to the small scale of the Proposal. A formal community consultation program is currently being developed for consultation with the affected community and residents. The consultation program would be undertaken prior to the commencement of works in accordance with the RTA's *Community Involvement Practice Notes and Resource Manual, 1998.*

6 Environmental Assessment

6.1 General

This section of the REF provides a detailed description of the potential environmental impacts associated with the Proposal during both construction and operation, and provides site-specific safeguards to ameliorate the identified potential impacts. Only sections with potential impacts have been included below. Issues such as air quality, indigenous heritage and non-indigenous heritage are not expected to be impacted by the Proposal and therefore have not been discussed.

The environmental safeguards predominately outline additional site-specific requirements which are not covered by the RTA's QA Specifications – *Environmental Protection (Management Plan) – QA Specification G35, Clearing and Grubbing – QA Specification G40* and *Soil and Water Management (Erosion and Sediment Control Plan) - QA Specification G39* for inclusion into the Contractors Environmental Management Plan (CEMP) and the Project Environmental Management Plan (PEMP). These safeguards would be implemented prior to construction, during construction and post construction. The CEMP and PEMP would be reviewed by the RTA's Regional Environmental Adviser, Sydney Region prior to the commencement of work.

6.2 Geology and Soils

Potential Impacts

The Proposal would result in the disturbance of soils through vegetation removal, translocation of soil material, stockpiling and vehicle movement. As a result there would be the potential for sedimentation and erosion to occur at the Proposal site during the construction stage.

The Proposal site has been altered in past construction activities with a large proportion of the study area occurring on imported fill material. Additionally, stockpiles and spoil dumping has occurred both within and adjacent to the remnant Duffy's Forest EEC. It is anticipated that the affected soils would be a combination of fill material from past activities and disturbed natural soils.

The safeguards listed below would be implemented to ameliorate these potential impacts.

Site Specific Safeguards

- Temporary stormwater control devices or erosion and sedimentation controls would be implemented at stormwater drains to prevent sediment-laden runoff entering the local stormwater system.
- Maintenance and checking of the erosion and sedimentation controls would be undertaken on a regular basis and records kept and provided at anytime upon request. Sediment would be cleared from behind barriers on a regular basis and all controls would be managed in order to work effectively at all times.
- All stockpiles would be designed, established, operated and decommissioned in accordance with the RTA's *Stockpile Management Procedures 2001*. In addition, all stockpiles would be located 50m away from drainage lines and National Park boundaries.
- Any material transported onto pavement surfaces would be swept and removed at the end of each working day.

- The stripping of topsoil and stockpiling activities would not be undertaken during rainfall events.
- Site rehabilitation of disturbed areas would be undertaken progressively as stages are completed.

6.3 Water Quality

Potential Impacts

During the proposed works there would be the potential to impact on water quality through spillages, erosion and sedimentation or leaks from machinery entering the local stormwater system. This could lead to a degraded aquatic environment, increased turbidity or contamination of the local waterways.

The implementation of the safeguards listed below would ameliorate the potential for an incident to occur.

Site Specific Safeguards

- An incident emergency spill plan would be developed and incorporated into the CEMP. The plan would include measures to avoid spillages of fuels, chemicals, and fluids onto any surfaces or into any adjacent/nearby waterways. .
- An emergency spill kit would be kept onsite at all times and all staff would be inducted of the incident emergency procedures and made aware of the location of where the emergency spill kit would be kept.
- Should a spill occur during construction, the incident emergency spill plan would be implemented, and the Regional Environmental Adviser, Sydney Region contacted.
- All fuels, chemicals, and liquids would be stored at least 50m away from drainage lines and would be stored within a bunded area within the compound site.
- The refuelling of plant and maintenance of machinery would be undertaken within bunded areas of the compound site.

6.4 Biodiversity

Potential Impacts

An assessment of the vegetation community within the study area was undertaken by Smith and Smith (November 2000). This assessment identified the presence of the Duffy's Forest (DF) community, a listed EEC on the TSC Act, adjacent to Seaforth Oval. A subsequent eight-part test by Teresa James (2003) assessed the potential impacts of the Proposal on the EEC. The eight part test concluded that the proposed works would have a significant impact to the DF community resulting in the loss or modification of the entire remnant vegetation, therefore, a Species Impact Statement (SIS) would be required.

The SIS was undertaken by Skelton *et al* (February 2005) for the proposed redevelopment of Seaforth Oval. Findings from the SIS described the existing site as highly degraded from indirect impacts and no threatened species were identified at the Proposal site. The Proposal would impact on the entire remnant of DF community within the study area increasing the potential for weed invasion and exposure to edge effects. The Proposal would result in the removal of approximately 50m^2 of Duffy's Forest vegetation. Given the existing condition and isolation of the DF community it is considered that the proposed works would have only a minor increase on segmentation which would be minimised through future regeneration works. The SIS concludes that the Proposal is not likely to impact on any threatened flora species.

Recommendations for minimisation of impacts identified in the SIS include the development of a Bushland Management Plan to manage long term effects such as weed control and regeneration. Additionally, compensatory areas, such as the existing access to Seaforth Oval, would be revegetated/regenerated, using translocated soils, to reduce segmentation. Translocation of soils would be undertaken in accordance with *Guidelines for the Translocation of Threatened Plants in Australia* (Australian Network for Plant Conservation, 1997). There is a potential for the translocation of soils to facilitate the spread of noxious and environmental weeds, however the implementation of management strategies would ameliorate this risk.

No potential habitat for threatened fauna species was identified within the study area at the time of inspection. No hollow bearing trees occur in the Proposal site and the surrounding areas offer superior foraging and roosting areas. It is anticipated that fauna species would utilise the area within the Garigal National Park and surrounding vegetation for primary habitat and travel, given the quality of vegetation and connectivity. Furthermore, due to the degraded nature of the vegetation within the Proposal site, proximity to the roadway and lack of suitable habitat for threatened species, it is not anticipated that the Proposal would impact on any threatened fauna species.

Site Specific Safeguards

- A Bushland Management Plan would be developed to manage long term effects and to ensure weeds are continually destroyed and suppressed in the Duffy's Forest Community.
- Topsoil would be removed from the Proposal site and used in regeneration/revegetation works to facilitate the re-establishment of characteristic Duffy's Forest vegetation members, and therefore reduce segmentation of Duffy's Forest generally.
- An assessment of the weed potential within recovered topsoils would be undertaken by regional environmental staff at the time of translocation. Weed infested or contaminated topsoil would not be reused for the proposed works or for revegetation works and would not be stockpiled adjacent to any areas of native vegetation.
- The area of vegetation to be removed would be clearly marked onsite, and on site plans prior to the commencement of works. Should additional clearing be required, the RTA's Regional Environmental Adviser, Sydney Region would be contacted and consulted to determine the need, or otherwise, for further environmental impact assessment.
- All trimming of mature native trees would be undertaken by a qualified arborist.
- Any fauna species found inhabiting areas to be disturbed would be removed by licensed persons under the NPW Act 1974.

6.5 Noise

Potential Impacts

The Proposal would involve the use of heavy machinery and mulching equipment which would have the potential to increase noise levels in the local area. The distance to the closest residential building is approximately 50m. These residences would generally experience higher noise levels relative to the general bushland locality given their proximity to the Wakehurst Parkway. It is anticipated that the proposed construction activities are likely to exceed the predicted construction noise against the > 26 weeks DEC construction noise criteria (ie. the measured background noise plus 5 dBA). However, it is often recognised that the daytime construction noise goals are sometimes unachievable particularly where noise sensitive receptors are located in close proximity to construction works, and background noise levels are relatively low.

Typical L_{10} noise levels resulting from construction activities (eg. vegetation clearing and grubbing, excavators, vibratory rollers, graders, haul trucks, concrete trucks) would exceed the 10th percentile L_{90} during the day, evening and night time. Where goals are likely to be exceeded, a performance approach would be followed that allows the implementation of best management practice in reducing construction noise levels towards the goals. Additionally, consultation with local residents and the potentially affected community would be undertaken prior to the commencement of works to inform of any potential temporary noise increase.

Site Specific Safeguards

- For works required outside standard working hours, the procedures contained in the RTA's *Environmental Noise Management Manual, 2001* "*Practice Notes vii – Roadworks Outside of Normal Working Hours*" would be followed.
- Potentially affected residents would be contacted prior to the commencement of works and would be informed of the proposed works, working hours, and the period of construction. Residents would also be provided with a contact name and number should any complaints wish to be registered.
- The idling of machinery and equipment when not in use and for prolonged periods of time would be prohibited.
- Best management practices would be adopted that are consistent with the RTA's *Environmental Noise Management Manual, 2001*.
- Noise from reverse alarms would be controlled to the lowest possible levels consistent with safety or, during the night, replaced with flashing lights, or other warning devices. Machines with excessively noisy alarms would be modified or removed from the site. Where possible, noisy construction activities would not be undertaken at night.
- All machines would be in good working condition, with particular attention to exhaust silencers, engine covers and other noise reduction devices.

6.6 Visual Amenity / Landscape

Potential Impacts

Establishment and operation of the compound/stockpile site, construction of the new intersection and removal of vegetation along the Wakehurst Parkway has the potential to reduce the visual amenity of the Proposal site in the short-term. Impacts on the visual amenity for the residences in close proximity to the Proposal site may be expected where visual screening is currently provided by existing vegetation.

Site Specific Safeguards

- Following completion of construction activities, the Proposal site would be revegetated with local native species and translocated soils which would be undertaken to reduce the visual impact within the locality. Revegetation works would be concentrated at the existing access to Seaforth Oval and aim to minimise segmentation of Duffy's Forest.
- A revegetation plan (as part of the Bushland Management Plan) would be prepared for the Proposal, and would be reviewed by the RTA's Regional Environmental Adviser, Sydney Region prior to commencement of revegetation works.
- The construction site would be kept tidy and rubbish free.
- Stockpile and/or compound sites would be screened (eg. with shade cloth) to reduce visual impacts.

6.7 Socio-economic Considerations

Potential Impacts

There is potential for the local community and travelling public to be temporarily inconvenienced as a result of the proposed works. During the construction period there is the potential to delay through-traffic with a reduced speed limit zone and additional heavy vehicles on the road. Temporary single lane closures may be required to safely undertake proposed activities, however these would be undertaken in accordance with RTA's – *Traffic Control at Work Sites Manual 2003.*

These impacts would be considered minor, and it is not anticipated that any adverse comments would be received regarding the Proposal. Additionally, on completion of the works the local residents and the general public would experience a safer intersection with improved access to facilities.

Site Specific Safeguards

- Consultation would be undertaken with potentially affected residences prior to the commencement of works and would be undertaken in accordance with the RTA's *Community Involvement Practice Notes and Resource Manual, 1988.*
- A traffic control plan would be prepared in accordance with the RTA's *Traffic Control at Work Sites Manual* and approved by the RTA prior to construction.

6.8 Waste Minimisation and Management

Potential Impacts

The principles of waste management are to minimise the amount of waste generated, recycle waste wherever possible and dispose of the remainder in a responsible manner in accordance with appropriate RTA policy. The RTA adopts the Resource Management Hierarchy principles embodied in the *Waste Avoidance & Resource Recovery Act 2001* (WARR Act).

The works have the potential to generate various types of waste that can be reused or recycled in accordance with the principles of the WARR Act, and some wastes that would require disposal. Potential sources of waste generated through construction would include the following:

- Vegetation matter;
- Excess soil material; and
- Excess construction material.

Site Specific Safeguards

- All noxious weeds and exotic plant species removed would be bagged and disposed of at a licensed landfill facility.
- All construction materials, surplus soils and wastes generated from the Proposal would be separated, stockpiled and stored prior to reuse, recycling or disposal as a last resort.
- Trees to be removed would be assessed for their value as millable timber.
- Leaf material and small branches of native vegetation would be chipped and used as mulch in revegetation works.
- All working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day.

In addition, the Resource Management Hierarchy principles of the WARR Act would be adopted as follows:

1. Avoid unnecessary resource consumption as a priority;
2. Avoidance is followed by resource recovery (including reuse of materials, reprocessing recycling, and energy recovery; and
3. Disposal is undertaken as a last resort.

7 Implementation Stage

7.1 Summary of Proposed Environmental Safeguards

Environmental safeguards outlined in this document would be incorporated into the detailed design phase of the Proposal and during construction and operation of the Proposal. These safeguards would minimise any potential adverse impacts arising from the proposed works on the surrounding environment. All safeguards described in this REF and the Decision Report/ Conditions of Approval would be incorporated into the Contractor's Environmental Management Plan (CEMP) and the Project Environmental Management Plan (PEMP).

The CEMP and PEMP (if required) would be developed in accordance with the specifications set out in the RTA's *Environmental Protection (Management Plan)* – QA Specification G35 and RTA's *Soil and Water Management (Erosion and Sediment Control Plan)* - QA Specification G39.

Table 8.1: Site Specific Environmental Safeguards.

Impact	Environmental Safeguards
Landform, Geology & Soils	• Temporary stormwater control devices or erosion and sedimentation controls would be implemented at stormwater drains to prevent sediment-laden runoff entering the local stormwater system. • Maintenance and checking of the erosion and sedimentation controls would be undertaken on a regular basis and records kept and provided at anytime upon request. Sediment would be cleared from behind barriers on a regular basis and all controls would be managed in order to work effectively at all times. • All stockpiles would be designed, established, operated and decommissioned in accordance with the RTA's *Stockpile Management Procedures 2001*. In addition, all stockpiles would be located 50m away from drainage lines and National Park boundaries. • Any material transported onto pavement surfaces would be swept and removed at the end of each working day. • The stripping of topsoil and stockpiling activities would not be undertaken during rainfall events. • Site rehabilitation of disturbed areas would be undertaken progressively as stages are completed.
Water Quality	• An incident emergency spill plan would be developed and incorporated into the CEMP. The plan would include measures to avoid spillages of fuels, chemicals, and fluids onto any surfaces or into any adjacent/nearby waterways. . • An emergency spill kit would be kept onsite at all times and all staff would be inducted of the incident emergency procedures and made aware of the location of where the emergency spill kit

Impact	Environmental Safeguards
	would be kept. • Should a spill occur during construction, the incident emergency spill plan would be implemented, and the Regional Environmental Adviser, Sydney Region contacted. • All fuels, chemicals, and liquids would be stored at least 50m away from drainage lines and would be stored within a bunded area within the compound site. • The refuelling of plant and maintenance of machinery would be undertaken within bunded areas of the compound site.
Biodiversity	• A Bushland Management Plan would be developed to manage long term effects and to ensure weeds are continually destroyed and suppressed in the Duffy's Forest Community. • Topsoil would be removed from the Proposal site and used in regeneration/revegetation works to facilitate the re-establishment of characteristic Duffy's Forest vegetation members, and therefore reduce segmentation of Duffy's Forest generally. • An assessment of the weed potential within recovered topsoils would be undertaken by regional environmental staff at the time of translocation. Weed infested or contaminated topsoil would not be reused for the proposed works or for revegetation works and would not be stockpiled adjacent to any areas of native vegetation. • The area of vegetation to be removed would be clearly marked onsite, and on site plans prior to the commencement of works. Should additional clearing be required, the RTA's Regional Environmental Adviser, Sydney Region would be contacted and consulted to determine the need, or otherwise, for further environmental impact assessment. • All trimming of mature native trees would be undertaken by a qualified arborist. • Any fauna species found inhabiting areas to be disturbed would be removed by licensed persons under the NPW Act 1974.
Noise	• For works required outside standard working hours, the procedures contained in the RTA's *Environmental Noise Management Manual, 2001* "*Practice Notes vii – Roadworks Outside of Normal Working Hours*" would be followed. • Potentially affected residents would be contacted prior to the commencement of works and would be informed of the proposed works, working hours, and the period of construction. Residents would also be provided with a contact name and number should any complaints wish to be registered. • The idling of machinery and equipment when not in use and for prolonged periods of time would be prohibited. • Best management practices would be adopted that are consistent with the RTA's *Environmental Noise Management Manual, 2001.* • Noise from reverse alarms would be controlled to the lowest possible levels consistent with safety or, during the night,

Impact	Environmental Safeguards
	replaced with flashing lights, or other warning devices. Machines with excessively noisy alarms would be modified or removed from the site. Where possible, noisy construction activities would not be undertaken at night. • All machines would be in good working condition, with particular attention to exhaust silencers, engine covers and other noise reduction devices.
Visual Amenity / Landscape	• Following completion of construction activities, the Proposal site would be revegetated with local native species and translocated soils which would be undertaken to reduce the visual impact within the locality. Revegetation works would be concentrated at the existing access to Seaforth Oval and aim to minimise segmentation of Duffy's Forest. • A revegetation plan (as part of the Bushland Management Plan) would be prepared for the Proposal, and would be reviewed by the RTA's Regional Environmental Adviser, Sydney Region prior to commencement of revegetation works. • The construction site would be kept tidy and rubbish free. • Stockpile and/or compound sites would be screened (eg. with shade cloth) to reduce visual impacts.
Socio-Economic Considerations	• Consultation would be undertaken with potentially affected residences prior to the commencement of works and would be undertaken in accordance with the RTA's *Community Involvement Practice Notes and Resource Manual, 1988.* • A traffic control plan would be prepared in accordance with the RTA's *Traffic Control at Work Sites Manual* and approved by the RTA prior to construction.
Waste Management & Minimisation	• All noxious weeds and exotic plant species removed would be bagged and disposed of at a licensed landfill facility. • All construction materials, surplus soils and wastes generated from the Proposal would be separated, stockpiled and stored prior to reuse, recycling or disposal as a last resort. • Trees to be removed would be assessed for their value as millable timber. • Leaf material and small branches of native vegetation would be chipped and used as mulch in revegetation works. • All working areas would be maintained, kept free of rubbish and cleaned up at the end of each working day. In addition, the Resource Management Hierarchy principles of the WARR Act would be adopted as follows:

Impact	Environmental Safeguards
	1. Avoid unnecessary resource consumption as a priority; 2. Avoidance is followed by resource recovery (including reuse of materials, reprocessing recycling, and energy recovery; and 3. Disposal is undertaken as a last resort.

7.2 Licences and Approvals

No licences or approvals are relevant to the Proposal.

8 Consideration of State and Commonwealth Environmental Factors

8.1 Clause 228(2) Factors (NSW Legislation)

The factors which need to be taken into account when considering the environmental impact of an activity are listed in Clause 228(2) of the *Environmental Planning and Assessment Regulation, 2000*. Those factors have been addressed in Table 8.1 below to ensure that the likely impacts of the proposed activities on the natural and built environment are fully considered.

Table 8.1: Compliance with Clause 228(2) of the EP&A Regulation 2000.

Clause 228(2) Factors	Impact
a) Any environmental impact on a community?	
In the short term there would be minor impacts on the community, associated with minor disruption to traffic and increased noise levels during construction. The Proposal would involve temporary lane closures and a decreased speed limit in the vicinity of the construction site. These would be minimised with the implementation of the safeguards outlined in Chapter 7.	**Short term (-) ve**
In the long term, there would be no impact to the community as a result of the Proposal.	**Long term Nil**
b) Any transformation of a locality?	
The proposed works involve the removal of vegetation, installation of traffic signals and minor alteration to the roadway. The change in physical characteristics would be negligible at the completion of the works with no change to the use of the locality and improved access to facilities for the general public.	**Negligible**
c) Any environmental impact on the ecosystem of the locality?	
The Proposal would require the removal of small areas of Duffy's Forest vegetation adjacent to Wakehurst Parkway. The area to be affected, although highly disturbed, is a listed EEC on the TSC Act. The Proposal would remove up to approximately 30m^2 of the community. However, safeguards listed in Section 7 of this REF and the SIS undertaken for the Proposal would minimise the potential of the proposed works to impact on the ecosystem of the locality.	**Minor Negative**
d) Any reduction of the aesthetics, recreational, scientific or other environmental quality or value of a locality?	
The Proposal would result in a loss of up to approximately 50m^2 of the Duffy's Forest EEC. Although this community is highly disturbed, the removal of the vegetation would have a minor negative impact to the environmental quality and aesthetics of the locality, however, safeguards listed in Section 7 of this REF and the SIS undertaken for the Proposal would minimise the impact of the proposed works on the environmental quality.	**Minor Negative**

Clause 228(2) Factors	Impact
The Proposal would not result in any reduction of the recreational or scientific value of the locality.	
e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The Proposal would not result in any impacts to the locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.	**Nil**
f) Any impact on habitat of any protected fauna (within the meaning of the *National Parks and Wildlife Act 1974*)? The works would not impact on the habitat of any protected or endangered fauna (within the meaning of the *National Parks and Wildlife Act 1974*).	**Nil**
The proposal would result in a reduction of a small amount of disturbed foraging habitat.	**Minor Negative**
g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The Proposal would not endanger any species of animal, plant or other form of life, whether living on land, in water or in the air.	**Nil**
h) Any long-term effects on the environment? The works would not have any long-term effects on the environment.	**Nil**
i) Any degradation of the quality of the environment? The works would result in a short-term reduction in the quality of the environment during construction within the vicinity of the Proposal site. This would involve removal of vegetation and disturbance of soils associated with the proposed works. However this would be minimised with the implementation of the safeguards outlined in Chapter 7.	**Short term (-) ve**
j) Any risk to the safety of the environment? The works present a potential short term risk to the safety of the environment during construction through increased erosion and sedimentation potential and fuel/chemical spillages associated with the construction activities. However, these would be minimised with the implementation of the safeguards outlined in Chapter 7.	**Short term (-) ve**
k) Any reduction in the range of beneficial uses of the environment? The proposed works would not result in any long term reduction in the range of beneficial uses of the environment. During construction there would be a short term reduction in the range of beneficial uses of the environment.	**Short term – (ve), Long term nil**

Clause 228(2) Factors	Impact
l) Any pollution of the environment? The works have the potential to impact on the water quality within and surrounding the study area during construction. However the risks would be short term and would be minimised by the implementation of the safeguards listed in Chapter 7.	**Short term (-) ve**
m) Any environmental problems associated with the disposal of waste? All waste generated by the works would be reused and recycled where possible, or disposed of in an appropriate manner where recycling is not possible. There would be no environmental problems associated with the disposal of waste.	**Nil**
n) Any increased demands on resources, natural or otherwise which are, or are likely to become, in short supply? There would be no increased demand on resources, natural or otherwise, which are, or are likely to become in short supply as a result of the works.	**Nil**
o) Any cumulative environmental effect with other existing or likely future activities? The works would not have any cumulative environmental effect with other existing or likely future activities.	**Nil**

8.2 EPBC Act 1999 Factors (Commonwealth Legislation)

The EPBC Act requires that the following matters of National Environmental Significance (NES) be considered.

Table 8.2: Compliance with Commonwealth EPBC Act requirements.

EPBC Act Factors	Impact
a) Any environmental impact on World Heritage property? There would be no environmental impact on World Heritage property as a result of the Proposal. No World Heritage Properties occur within the vicinity of the Proposal site.	**Nil**
b) Any environmental impact on National Heritage places? There would be no environmental impact on National Heritage places as a result of the Proposal. No National Heritage Places occur within the vicinity of the Proposal site.	**Nil**
c) Any environmental impact on wetlands of international importance? There would be no environmental impact on wetlands of international importance as a result of the Proposal. No wetlands of international importance occur in the vicinity of the Proposal site.	**Nil**
d) Any environmental impact on Commonwealth listed threatened species or ecological communities? Although 37 threatened species were recorded as potentially within the search area, the minor nature of the works, lack of suitable habitat and the proposed safeguards ensure that there would be no environmental impact on Commonwealth listed threatened species. No threatened ecological communities were listed on the EPBC Act within the search area.	**Nil**
e) Any environmental impact on Commonwealth listed migratory species? Although 26 migratory species were recorded as potentially occurring at within the search area, the minor nature of the works and the proposed safeguards ensure that there would be no environmental impact on Commonwealth listed migratory species as a result of the Proposal.	**Nil**
f) Does any part of the Proposal involve nuclear action? The proposed works would not involve nuclear action.	**Nil**
g) Any environmental impact on a Commonwealth Marine area? There would be no impact to the Commonwealth marine area as a result of the Proposal.	**Nil**
In addition: Any impact on Commonwealth Land? There would be no impact on Commonwealth Land as a result of the Proposal.	**Nil**

9 Certification

This Review of Environmental Factors provides a true and fair review of the Proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the Proposal.

Marcus Sainsbury
Environmental Officer
Date: 21/4/06

I have examined this Review of Environmental Factors and the certification by Marcus Sainsbury and accept the Review of Environmental Factors on behalf of the RTA.

Desigan Udayan
Project Manager
Date:

10 References

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Appendix A

Photographs of the Study Area

Photo 1: looking west from Burnt Street toward proposal site

Photo 2: Looking south toward the Burnt Street Intersection

Photo 3: View of spoil dumping within Duffy's Forest

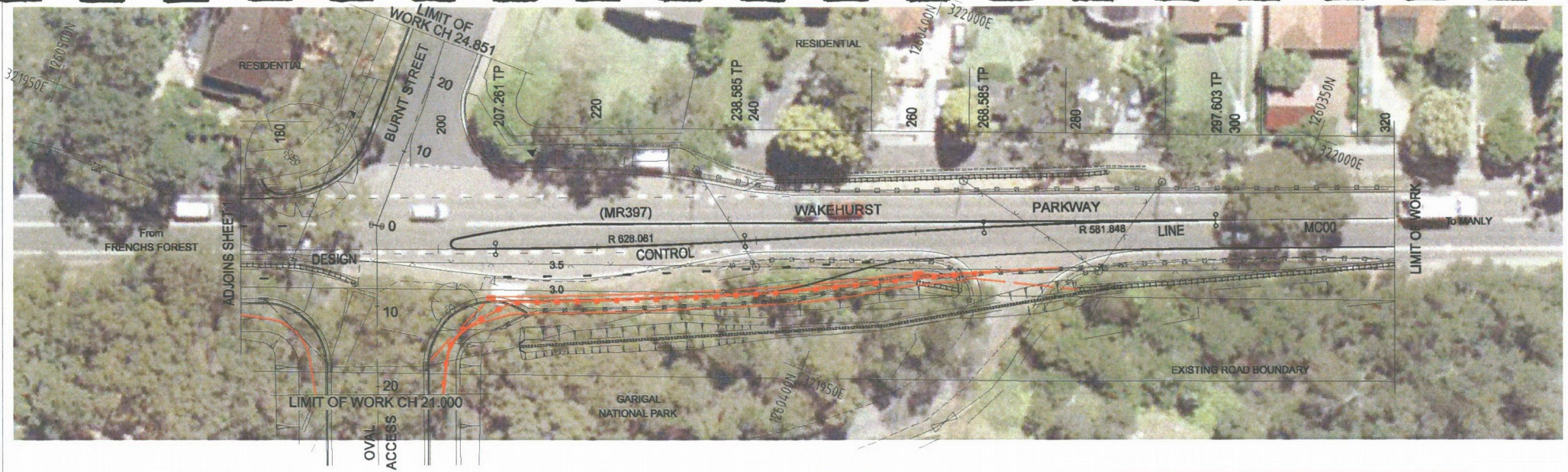
Photo 4: View of Understorey of Duffy's Forest Community

Photo 5: Looking south east toward Duffy's Forest from proposed compound site

Photo 6: Utilities pit within Duffy's Forest Community

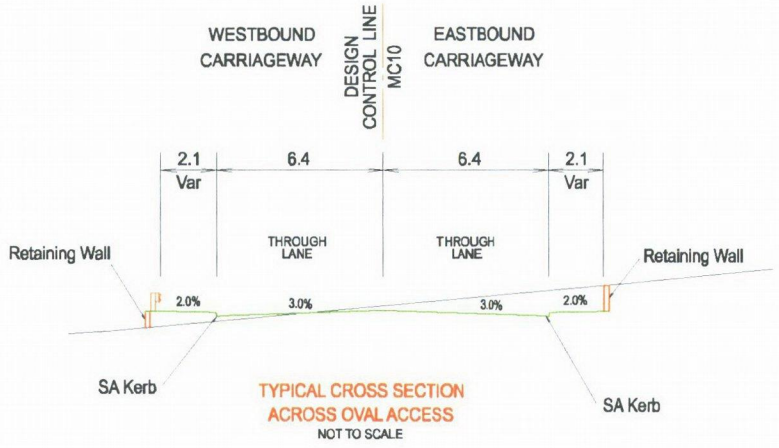
Appendix B

Concept Design

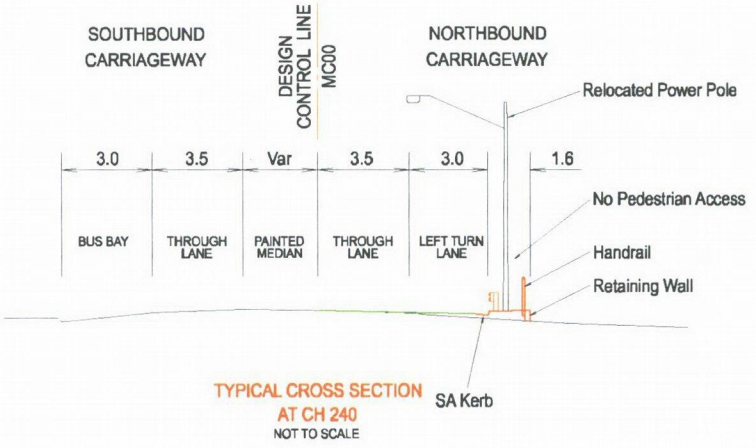


PLAN

Area of vegetation affected by existing design = 1380 m²
Area of vegetation affected by alternative design = 889 m²



TYPICAL CROSS SECTION ACROSS OVAL ACCESS
NOT TO SCALE



TYPICAL CROSS SECTION AT CH 240
NOT TO SCALE

ADVANCE COPY ONLY
29/03/2006

No.	Amendment Description	Initials	Date
A3 original	This sheet may be prepared using colour and may be incomplete if copied	Co-ordinate System: ISG Zone 56/1	Height Datum: A.H.D.

SCALES
0 5 10 15 20 25
PLAN 1:500

RTA PREPARED BY PROJECT DESIGN TECHNOLOGY & TECHNICAL SERVICES OPERATIONS & SERVICES

DESIGNED NAY LIM-HA
REVIEWED RUSSELL LUHR

ROADS AND TRAFFIC AUTHORITY OF NSW

MANLY COUNCIL AREA
MR 397 WAKEHURST PARKWAY
IMPROVEMENTS TO SEAFORTH OVAL ACCESS
PROPOSED ALTERNATIVE
PLAN & TYPICAL CROSS SECTIONS: 175 - 320

FILE No.	DRAWING	PRINTED DATE	SHEET No.
000 000	002_SHT_Alt.dgn	29/03/2006	002

REGISTRATION NUMBER
0397.279.RC.0000

Appendix C

Background Search Results

Legend

- Study Area
- 5km from Study Area
- Classified Roads
- Waterways
- Water Bodys
- NPWS Estate Boundaries

Threatened Flora

Scientific Name, Legal Status

- Acacia bynoeana, E1
- Acacia terminalis subsp. terminalis, E1
- Caladenia tessellata, E1
- Eucalyptus camfieldii, V
- Genoplesium baueri, V
- Pimelea curviflora var. curviflora, V
- Syzygium paniculatum, V
- Tetratheca glandulosa, V

Threatened Fauna

- Please refer to Table of Fauna for species recorded at each location number

Threatened Fauna and Flora species in the vicinity of Study Area, Seaforth Oval, Seaforth

N

0 1 2 4 Kilometers

Map produced by RTA Environmental Technology Branch
Date 12/04/06
OrthoView aerial photography under licence to the RTA by Lands Department NSW

Australian Heritage Database

Search Results

edit search | new search | about the Australian Heritage Database | Heritage home | Australian Heritage Council home

31 results found.

Archbishops House (former) Darley Rd	Manly, NSW	(Registered) Register of the National Estate
Bantry Bay Reserve Area (former) Wakehurst Pkw	Killarney Heights, NSW	(Registered) Register of the National Estate
Crater Cove Huts Dobroyd Scenic Dr	Balgowlah Heights, NSW	(Registered) Register of the National Estate
Dungowan 7 South Steyne	Manly, NSW	(Indicative Place) Register of the National Estate
Fairlight Pool Lauderdale Av	Fairlight, NSW	(Indicative Place) Register of the National Estate
Fairy Bower Pool Bower La	Manly, NSW	(Registered) Register of the National Estate
Gilbert Park Belgrave St	Manly, NSW	(Indicative Place) Register of the National Estate
Glenview Cottage 6 Thornton St	Fairlight, NSW	(Rejected Place) Register of the National Estate
Langwarren 32 Fairlight St	Fairlight, NSW	(Indicative Place) Register of the National Estate
Manly Beach and Surrounds North Steyne	Manly, NSW	(Registered) Register of the National Estate
Manly Fire Station 128 Sydney Rd	Fairlight, NSW	(Indicative Place) Register of the National Estate
Manly Public Baths Remnants East Espl	Manly, NSW	(Indicative Place) Register of the National Estate
Manly Reservoir R64 Fairlight St	Fairlight, NSW	(Indicative Place) Register of the National Estate
Middle Harbour Submarine Sewerage Syphon Parriwi St	The Spit, NSW	(Indicative Place) Register of the National Estate
New Quarantine Cemetery North Head Scenic Dr	Manly, NSW	(Registered) Register of the National Estate
North Head North Head Scenic Dr	Manly, NSW	(Registered) Register of the

North Head Artillery Barracks North Head Scenic Dr	Manly, NSW	National Estate (Registered)
North Head Artillery Barracks North Head Scenic Dr	Manly, NSW	Register of the National Estate (Listed place)
North Head Fortifications North Head Scenic Dr	Manly, NSW	Commonwealth Heritage List (Registered)
North Head Manly North Head Scenic Dr	Manly, NSW	Register of the National Estate (Nominated place)
North Head Military Reserve North Head Scenic Dr	Manly, NSW	National Heritage List (Registered)
North Head Quarantine Station & Reserve (former) North Head Scenic Dr	Manly, NSW	Register of the National Estate (Registered)
North Sydney Harbour Aquatic Reserve	Manly, NSW	Register of the National Estate (Indicative Place)
St Andrews Presbyterian Church Raglan St	Manly, NSW	Register of the National Estate (Registered)
St Patricks Seminary and Grounds (former) Darley Rd	Manly, NSW	Register of the National Estate (Registered)
Sydney Harbour Entrance	Manly, NSW	Register of the National Estate (Indicative Place)
Sydney Harbour Landscape Area	Sydney, NSW	Register of the National Estate (Indicative Place)
Sydney Harbour National Park (1980 Boundary)	Manly, NSW	Register of the National Estate (Registered)
Terrace Houses 41-42 East Esplanade	Manly, NSW	Register of the National Estate (Indicative Place)
Upper Middle Harbour Area Wakehurst Pky	Killarney Heights, NSW	Register of the National Estate (Indicative Place)
Whitehall 37 White St	Balgowlah, NSW	Register of the National Estate (Registered)

Report Produced: Tue Apr 11 15:52:52 2006

Noxious weed declarations

This is a print-friendly page
Return to start page

Noxious weed declarations for Manly Council

The following weeds are declared noxious in the control area of Manly Council:

Weed	Class	Legal requirements
African feathergrass [Pennisetum macrourum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium runcinatum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium thellungii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Alligator weed [Alternanthera philoxeroides]	3	The plant must be fully and continuously suppressed and destroyed
Anchored water hyacinth [Eichhornia azurea]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Annual ragweed [Ambrosia artemisiifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Arrowhead [Sagittaria montevidensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Artichoke thistle [Cynara cardunculus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Asparagus fern [Asparagus aethiopicus]	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 and the plant may not be sold, propagated or knowingly distributed
Athel tree [Tamarix aphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Balloon vine [Cardiospermum grandiflorum]	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 and the plant may not be sold, propagated or knowingly distributed
Bitou bush [Chrysanthemoides monilifera subspecies rotunda]	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

Black knapweed [Centaurea nigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Blackberry [Rubus fruticosus aggregate species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Boneseed [Chrysanthemoides monilifera subspecies monilifera]	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
Bridal creeper [Asparagus asparagoides]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Broomrapes [Orobanche species] Includes all Orobanche species except the native O. cernua variety australiana and O. minor	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Burr ragweed [Ambrosia confertiflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cabomba [Cabomba caroliniana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cape broom [Genista monspessulana]	3	The plant must be fully and continuously suppressed and destroyed
Cape ivy [Delairea odorata]	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 and the plant may not be sold, propagated or knowingly distributed
Castor oil plant [Ricinus communis]	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
Cat's claw creeper [Macfadyena unguis-cati]	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 and the plant may not be sold, propagated or knowingly distributed
Cayenne snakeweed [Stachytarpheta cayennensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Chilean needle grass [Nassella neesiana]	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 and the plant may not be sold, propagated or knowingly distributed
Chinese violet [Asystasia gangetica subspecies	1	The plant must be eradicated from the land and the land must

micrantha]		be kept free of the plant This is an All of NSW declaration
Climbing asparagus fern [Asparagus plumosus]	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 and the plant may not be sold, propagated or knowingly distributed
Clockweed [Gaura lindheimeri]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Clockweed [Gaura parviflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cockspur coraltree [Erythrina crista-galli]	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 and the plant may not be sold, propagated or knowingly distributed
Corn sowthistle [Sonchus arvensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Crofton weed [Ageratina adenophora]	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
Dodder [Cuscuta species] Includes All Cuscuta species except the native species C. australis, C. tasmanica and C. victoriana	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
East Indian hygrophila [Hygrophila polysperma]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Elephant grass [Arundo donax]		See Giant reed
Espartillo [Achnatherum brachychaetum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Eurasian water milfoil [Myriophyllum spicatum]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Fine-bristled burr grass [Cenchrus brownii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Fountain grass [Pennisetum setaceum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Gallon's curse [Cenchrus biflorus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with

		This is an All of NSW declaration
Giant reed [Arundo donax]	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 and the plant may not be sold, propagated or knowingly distributed
Glaucous starthistle [Carthamus glaucus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Golden thistle [Scolymus hispanicus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Green cestrum [Cestrum parqui]	3	The plant must be fully and continuously suppressed and destroyed
Harrisia cactus [Harrisia species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Hawkweed [Hieracium species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Horsetail [Equisetum species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Hygrophila [Hygrophila costata]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Hymenachne [Hymenachne amplexicaulis]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Karoo thorn [Acacia karroo]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Kochia [Bassia scoparia]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lagarosiphon [Lagarosiphon major]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lantana [Lantana species]	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
Lantana [Lantana species]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Long-leaf willow primrose [Ludwigia longifolia]	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
Long-leaf willow primrose [Ludwigia longifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Ludwigia [Ludwigia peruviana]	3	The plant must be fully and continuously suppressed and destroyed
Madeira vine [Anredera cordifolia]	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 and the plant may not be sold, propagated or knowingly distributed
Mexican feather grass [Nassella tenuissima]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mexican poppy [Argemone mexicana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Miconia [Miconia species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mimosa [Mimosa pigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Morning glory (coastal) [Ipomoea cairica]	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 and the plant may not be sold, propagated or knowingly distributed
Morning glory (purple) [Ipomoea indica]	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 and the plant may not be sold, propagated or knowingly distributed
Mossman River grass [Cenchrus echinatus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Ochna [Ochna serrulata]	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 and the plant may not be sold, propagated or knowingly distributed
Onion grass [Romulea species] Includes all Romulea species and varieties except R. rosea var. australis	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Oxalis [Oxalis species and varieties] Includes all Oxalis species and varieties except	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with

the native species O. chnoodes, O. exilis, O. perennans, O. radicosa, O. rubens, and O. thompsoniae		This is an All of NSW declaration
Pampas grass [Cortaderia species]	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
Parthenium weed [Parthenium hysterophorus]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Pellitory [Parietaria judaica]	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
Pond apple [Annona glabra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly acacia [Acacia nilotica]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly pear [Cylindropuntia species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Prickly pear [Opuntia species except O. ficus-indica]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Privet (Broad leaf) [Ligustrum lucidum]	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 and the plant may not be sold, propagated or knowingly distributed
Privet (Narrow-leaf/Chinese) [Ligustrum sinense]	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 and the plant may not be sold, propagated or knowingly distributed
Red rice [Oryza rufipogon]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Rhizomatous bamboo [Phyllostachys spp.]	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 and the plant may not be sold, propagated or knowingly distributed
Rhus tree [Toxicodendron succedanea]	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 This is an All of NSW declaration
Rubbervine [Cryptostegia grandiflora]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Sagittaria [Sagittaria platyphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Salvinia [Salvinia molesta]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Sand oat [Avena strigosa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Senegal tea plant [Gymnocoronis spilanthoides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Senna [Senna pendula]	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
Serrated tussock [Nassella trichotoma]	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 and the plant may not be sold, propagated or knowingly distributed
Siam weed [Chromolaena odorata]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Smooth-stemmed turnip [Brassica barrelieri subspecies oxyrrhina]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Soldier thistle [Picnomon acarna]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Spotted knapweed [Centaurea maculosa]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
St. John's wort [Hypericum perforatum]	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
Texas blueweed [Helianthus ciliaris]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Trad [Tradescantia fluminensis]	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 and the plant may not

		be sold, propagated or knowingly distributed
Wandering Jew [Tradescantia fluminensis]		See Trad
Water caltrop [Trapa species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water hyacinth [Eichhornia crassipes]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Water lettuce [Pistia stratiotes]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water soldier [Stratiotes aloides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Willows [Salix species] Includes all Salix species except S. babylonica, S. x reichardtii, S. x calodendron	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Witchweed [Striga species] Includes all Striga species except native species and Striga parviflora	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow burrhead [Limnocharis flava]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow nutgrass [Cyperus esculentus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Sydney region

In This Section
- Hunter region
- Northern region
- South West region
- Southern region
- Sydney region
- Western region

Sydney Region

Aerial Camera Equipment, Rockdale	4309002
Aerial Camera Negatives and Viewer, Rockdale	4309022
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Alignment Pin, Rose Bay	4309673
Alignment Pin, Waterloo	4309672
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Boundary Marker, Parramatta	4300731
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Cable Ferry, Mortlake	4301056
Cable Ferry, Wisemans Ferry	4300311
Cabramatta Creek Bridge	4305003
Calliper Gauge Equipment, Rockdale	4309008
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Deadmans Creek Bridge	4309505
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Deep Creek Bridge	4309504
Devlins Creek Bridge	4309587
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DMT Rosebery Plaque, Rockdale	4309018
Drain Grate, Rose Bay	4309674
Draughting Machine, Rockdale	4300722
Drawing Equipment, Parramatta	4300720

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ER Watts Abney Level, Parramatta	4300717
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Fifty Link Gunter's Chain, Parramatta	4300714
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Glebe Island Bridge	4301666
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Knapsack Viaduct, Lapstone	4301012

Lansdowne Bridge	4301042
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Lennox Bridge, Parramatta	4300301
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Main Roads Board Bench Mark	4300719
Manly Creek Bridge	4309572
Manly Lagoon Bridge	4305016
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Middle Creek Bridge No. 1	4309578
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Milestone - Hume Highway	4302671
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Monroe Semi-Automatic Calculator, Parramatta	4300724
Mount Tomah Road Cuttings	4310578
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Porters Creek Culvert	4305012
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Queen Anne House, London Terrace, Enmore	4301041
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Resilient Modulus Apparatus (Serial Number MR1038), North Sydney	4310572
Road Cutting, Old Northern Road, Maroota	4300507
RTA Honour Board, Centennial Plaza	4302670
RTA Technical Services Branch Collection, Parramatta	4300732
Ryde Bridge	4301054
Sackville Ferry - cable ferry	4305034
Safety Equipment, Rockdale	4309006
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Sandstone Culvert, approx 200m south of Meurants Lane	4300339
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Sandstone Kerb from Golf Course, Botany Road, Banksmeadow	4309670
Sandstone Kerb, Botany	4309669
Sandstone Kerb, Frederick St, Ashfield	4309676
Sandstone Kerb, Milton St, Ashfield	4309677
Sandstone Kerb, Zetland	4309675
Sandstone Kerbing - Great Western Hwy	4300493
Sandstone Kerbing, Five Dock	4310581
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Semi-detached House	4305626

Semi-detached House	4305623
SHB South-East Pylon Museum Collection	4300733
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Site of Figtree Wharf and Boatshed	4301036
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Souvenir Menu, Auburn	4300711
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Spit Bridge, The	4300307
St Albans Bridge over MacDonald River	4300129
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Stone Retaining Wall, Linden	4300362
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Stringy Bark Creek Bridge	4309502
Surface Texture Measuring Apparatus, North Sydney	4310573
Survey Sign, Rockdale	4309027
Surveying Handbook, Parramatta	4300708
Surveyor's Drafting Equipment, Rockdale	4309009
Sydney Harbour Bridge Memorabilia Collection	4309049
Sydney Harbour Bridge Workshops Collection	4300735
Sydney Harbour Bridge, approaches and viaducts	4301067
Terrace	4305629
Terrys Creek Bridge	4309592
Tom Ugly's Bridge (1987)	4301064
Tom Uglys Bridge over the Georges River	4301677
Tool Chest, Rockdale	4309012
Topcon Level, St Marys	4305414
Topographic Map, Rockdale	4309025
Traffic Light Lenses, Eveleigh	4300729
Traffic Radar, Rockdale	4309003
Tram Track Blaxland Rd, Ryde	4310588
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Unwins Bridge over Cooks River	4301663
Vacant Land on Wolli Creek	4306002
Vacant Lot	4306006
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Wolli Creek Culvert	4305006

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Statutory Listed Items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into two sections.

- Section 1. contains items listed by the **Heritage Council** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 130 of the NSW Heritage Act. This information is provided by the NSW Heritage Office.
- Section 2. contains items listed by **Local Councils & Shires and State Government Agencies**. This section may also contain additional information on some of the items listed in the first section.

Section 1. Items listed under the NSW Heritage Act.

The search results can be re-sorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Listed Under Heritage Act
Manly Cove Pavilion	West Esplanade	Manly	Manly	Yes
Manly Wharf	West Esplanade	Manly	Manly	Yes
Middle Harbour Syphon NSOOS	Monash Crescent (East Side)	The Spit	Mosman	Yes
North Head Quarantine Station & Reserve	North Head Scenic Drive	Manly	Manly	Yes
Substation	34a-36 Whistler Street	Manly	Manly	Yes
Substation	83 Griffiths Street	Balgowlah	Manly	Yes

There were **6** records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Information Source (sort)
2 Monetary Pines Trees	2 Linkmead Street	Clontarf	Manly	LGOV
2 Semi Detatched Houses				

Auckland	Crn Gilbert Street and West Promenade)	Manly	Manly	LGOV
Australian Police Staff College, The	North Head	Manly	Manly	LGOV
Bantry Bluff	Bantry Bay Entrance Middle Harbour	Seaforth	Manly	LGOV
Beach Reserve	(Promenade) North and South Steyne	Manly	Manly	LGOV
Borambil	129 Bower Street	Manly	Manly	LGOV
Bridge (Former)	The Spit	Seaforth	Manly	LGOV
Camden	2 Boyle Street	Balgowlah	Manly	LGOV
Cardinals Palace	Darley Road	Manly	Manly	LGOV
Cemetery	School of Artillary, North Head Scenic Drive	Manly	Manly	LGOV
Cliff Street Group	2-12 Cliff Street	Manly	Manly	LGOV
Clontarf Park	Clontarf Middle Harbour	Manly	Manly	LGOV
Commemorative Tree	Clontarf Park	Middle Harbour	Manly	LGOV
Congregational Church	Crn Whistler St and Sydney Road	Manly	Manly	LGOV
Crater Huts / Depression Huts	Dobroyd Point	Balgowlah	Manly	LGOV
Cumberland	32 The Crescent (crn 1 Laurence St)	Manly	Manly	LGOV
Dalley's Castle Remnants	Sydney Road	Manly	Manly	LGOV
Dalwood	DALWOOD AVENUE	SEAFORTH	Manly	SGOV
Dalwood - Principal Building	21 Dalwood Avenue	Seaforth	Manly	LGOV
Dalwood - Stone Out Building	21 Dalwood Avenue	Seaforth	Manly	LGOV
Denison Street Group	26-38 Denison Street	Manly	Manly	LGOV
Detatched Cottage	63 Pittwater Road	Manly	Manly	LGOV
Dobroyd Headland - Natural Landscape	Dobroyd Headland	Manly	Manly	LGOV
Drummond House, The	22 Wentworh Street	Manly	Manly	LGOV
Dun Aros	10 The Crescent	Fairlight	Manly	LGOV
Elim	44 Addison Road	Manly	Manly	LGOV
Esplanade Park	Fairlight Foreshore North Harbour	Fairlight	Manly	LGOV
Fairlands	2 Ashburner Street	Manly	Manly	LGOV
Fairlight Pool	Lauderdale Avenue	Fairlight	Manly	GAZ

Australian Heritage Database

Search Results

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31 results found.

Archbishops House (former) Darley Rd	Manly, NSW	(Registered) Register of the National Estate
Bantry Bay Reserve Area (former) Wakehurst Pkw	Killarney Heights, NSW	(Registered) Register of the National Estate
Crater Cove Huts Dobroyd Scenic Dr	Balgowlah Heights, NSW	(Registered) Register of the National Estate
Dungowan 7 South Steyne	Manly, NSW	(Indicative Place) Register of the National Estate
Fairlight Pool Lauderdale Av	Fairlight, NSW	(Indicative Place) Register of the National Estate
Fairy Bower Pool Bower La	Manly, NSW	(Registered) Register of the National Estate
Gilbert Park Belgrave St	Manly, NSW	(Indicative Place) Register of the National Estate
Glenview Cottage 6 Thornton St	Fairlight, NSW	(Rejected Place) Register of the National Estate
Langwarren 32 Fairlight St	Fairlight, NSW	(Indicative Place) Register of the National Estate
Manly Beach and Surrounds North Steyne	Manly, NSW	(Registered) Register of the National Estate
Manly Fire Station 128 Sydney Rd	Fairlight, NSW	(Indicative Place) Register of the National Estate
Manly Public Baths Remnants East Espl	Manly, NSW	(Indicative Place) Register of the National Estate
Manly Reservoir R64 Fairlight St	Fairlight, NSW	(Indicative Place) Register of the National Estate
Middle Harbour Submarine Sewerage Syphon Parriwi St	The Spit, NSW	(Indicative Place) Register of the National Estate
New Quarantine Cemetery North Head Scenic Dr	Manly, NSW	(Registered) Register of the National Estate
North Head North Head Scenic Dr	Manly, NSW	(Registered) Register of the

North Head Artillery Barracks	North Head Scenic Dr	Manly, NSW	National Estate (Registered)
North Head Artillery Barracks	North Head Scenic Dr	Manly, NSW	Register of the National Estate (Listed place)
North Head Fortifications	North Head Scenic Dr	Manly, NSW	Commonwealth Heritage List (Registered)
North Head Manly	North Head Scenic Dr	Manly, NSW	Register of the National Estate (Nominated place)
North Head Military Reserve	North Head Scenic Dr	Manly, NSW	National Heritage List (Registered)
North Head Quarantine Station & Reserve (former)	North Head Scenic Dr	Manly, NSW	Register of the National Estate (Registered)
North Sydney Harbour Aquatic Reserve		Manly, NSW	Register of the National Estate (Indicative Place)
St Andrews Presbyterian Church	Raglan St	Manly, NSW	Register of the National Estate (Registered)
St Patricks Seminary and Grounds (former)	Darley Rd	Manly, NSW	Register of the National Estate (Registered)
Sydney Harbour Entrance		Manly, NSW	Register of the National Estate (Indicative Place)
Sydney Harbour Landscape Area		Sydney, NSW	Register of the National Estate (Indicative Place)
Sydney Harbour National Park (1980 Boundary)		Manly, NSW	Register of the National Estate (Registered)
Terrace Houses	41-42 East Esplanade	Manly, NSW	Register of the National Estate (Indicative Place)
Upper Middle Harbour Area	Wakehurst Pky	Killarney Heights, NSW	Register of the National Estate (Indicative Place)
Whitehall	37 White St	Balgowlah, NSW	Register of the National Estate (Registered)

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Noxious weed declarations

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Noxious weed declarations for Manly Council

The following weeds are declared noxious in the control area of Manly Council:

Weed	Class	Legal requirements
African feathergrass [Pennisetum macrourum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium runcinatum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium thellungii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Alligator weed [Alternanthera philoxeroides]	3	The plant must be fully and continuously suppressed and destroyed
Anchored water hyacinth [Eichhornia azurea]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Annual ragweed [Ambrosia artemisiifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Arrowhead [Sagittaria montevidensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Artichoke thistle [Cynara cardunculus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Asparagus fern [Asparagus aethiopicus]	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 and the plant may not be sold, propagated or knowingly distributed
Athel tree [Tamarix aphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Balloon vine [Cardiospermum grandiflorum]	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 and the plant may not be sold, propagated or knowingly distributed
Bitou bush [Chrysanthemoides monilifera subspecies rotunda]	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

Black knapweed [Centaurea nigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Blackberry [Rubus fruticosus aggregate species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Boneseed [Chrysanthemoides monilifera subspecies monilifera]	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
Bridal creeper [Asparagus asparagoides]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Broomrapes [Orobanche species] Includes all Orobanche species except the native O. cernua variety australiana and O. minor	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Burr ragweed [Ambrosia confertiflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cabomba [Cabomba caroliniana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cape broom [Genista monspessulana]	3	The plant must be fully and continuously suppressed and destroyed
Cape ivy [Delairea odorata]	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 and the plant may not be sold, propagated or knowingly distributed
Castor oil plant [Ricinus communis]	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
Cat's claw creeper [Macfadyena unguis-cati]	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 and the plant may not be sold, propagated or knowingly distributed
Cayenne snakeweed [Stachytarpheta cayennensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Chilean needle grass [Nassella neesiana]	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 and the plant may not be sold, propagated or knowingly distributed
Chinese violet [Asystasia gangetica subspecies	1	The plant must be eradicated from the land and the land must

micrantha]		be kept free of the plant This is an All of NSW declaration
Climbing asparagus fern [Asparagus plumosus]	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 and the plant may not be sold, propagated or knowingly distributed
Clockweed [Gaura lindheimeri]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Clockweed [Gaura parviflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cockspur coraltree [Erythrina crista-galli]	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 and the plant may not be sold, propagated or knowingly distributed
Corn sowthistle [Sonchus arvensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Crofton weed [Ageratina adenophora]	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
Dodder [Cuscuta species] Includes All Cuscuta species except the native species C. australis, C. tasmanica and C. victoriana	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
East Indian hygrophila [Hygrophila polysperma]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Elephant grass [Arundo donax]		See Giant reed
Espartillo [Achnatherum brachychaetum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Eurasian water milfoil [Myriophyllum spicatum]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Fine-bristled burr grass [Cenchrus brownii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Fountain grass [Pennisetum setaceum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Gallon's curse [Cenchrus biflorus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with

		This is an All of NSW declaration
Giant reed [Arundo donax]	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 and the plant may not be sold, propagated or knowingly distributed
Glaucous starthistle [Carthamus glaucus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Golden thistle [Scolymus hispanicus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Green cestrum [Cestrum parqui]	3	The plant must be fully and continuously suppressed and destroyed
Harrisia cactus [Harrisia species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Hawkweed [Hieracium species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Horsetail [Equisetum species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Hygrophila [Hygrophila costata]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Hymenachne [Hymenachne amplexicaulis]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Karoo thorn [Acacia karroo]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Kochia [Bassia scoparia]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lagarosiphon [Lagarosiphon major]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lantana [Lantana species]	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
Lantana [Lantana species]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Long-leaf willow primrose [Ludwigia longifolia]	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
Long-leaf willow primrose [Ludwigia longifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Ludwigia [Ludwigia peruviana]	3	The plant must be fully and continuously suppressed and destroyed
Madeira vine [Anredera cordifolia]	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 and the plant may not be sold, propagated or knowingly distributed
Mexican feather grass [Nassella tenuissima]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mexican poppy [Argemone mexicana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Miconia [Miconia species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mimosa [Mimosa pigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Morning glory (coastal) [Ipomoea cairica]	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 and the plant may not be sold, propagated or knowingly distributed
Morning glory (purple) [Ipomoea indica]	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 and the plant may not be sold, propagated or knowingly distributed
Mossman River grass [Cenchrus echinatus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Ochna [Ochna serrulata]	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 and the plant may not be sold, propagated or knowingly distributed
Onion grass [Romulea species] Includes all Romulea species and varieties except R. rosea var. australis	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Oxalis [Oxalis species and varieties] Includes all Oxalis species and varieties except	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with

the native species O. chnoodes, O. exilis, O. perennans, O. radicosa, O. rubens, and O. thompsoniae		This is an All of NSW declaration
Pampas grass [Cortaderia species]	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
Parthenium weed [Parthenium hysterophorus]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Pellitory [Parietaria judaica]	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
Pond apple [Annona glabra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly acacia [Acacia nilotica]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly pear [Cylindropuntia species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Prickly pear [Opuntia species except O. ficus-indica]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Privet (Broad leaf) [Ligustrum lucidum]	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 and the plant may not be sold, propagated or knowingly distributed
Privet (Narrow-leaf/Chinese) [Ligustrum sinense]	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 and the plant may not be sold, propagated or knowingly distributed
Red rice [Oryza rufipogon]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Rhizomatous bamboo [Phyllostachys spp.]	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 and the plant may not be sold, propagated or knowingly distributed
Rhus tree [Toxicodendron succedanea]	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 This is an All of NSW declaration
Rubbervine [Cryptostegia grandiflora]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Sagittaria [Sagittaria platyphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Salvinia [Salvinia molesta]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Sand oat [Avena strigosa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Senegal tea plant [Gymnocoronis spilanthoides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Senna [Senna pendula]	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
Serrated tussock [Nassella trichotoma]	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 and the plant may not be sold, propagated or knowingly distributed
Siam weed [Chromolaena odorata]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Smooth-stemmed turnip [Brassica barrelieri subspecies oxyrrhina]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Soldier thistle [Picnomon acarna]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Spotted knapweed [Centaurea maculosa]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
St. John's wort [Hypericum perforatum]	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
Texas blueweed [Helianthus ciliaris]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Trad [Tradescantia fluminensis]	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 and the plant may not

		be sold, propagated or knowingly distributed
Wandering Jew [Tradescantia fluminensis]		See Trad
Water caltrop [Trapa species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water hyacinth [Eichhornia crassipes]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Water lettuce [Pistia stratiotes]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water soldier [Stratiotes aloides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Willows [Salix species] Includes all Salix species except S. babylonica, S. x reichardtii, S. x calodendron	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Witchweed [Striga species] Includes all Striga species except native species and Striga parviflora	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow burrhead [Limnocharis flava]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow nutgrass [Cyperus esculentus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Sydney region

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- South West region
- Southern region
- Sydney region
- Western region

Sydney Region

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Sydney Harbour Bridge Workshops Collection	4300735
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Traffic Light Lenses, Eveleigh	4300729
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Statutory Listed Items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into two sections.

- Section 1. contains items listed by the **Heritage Council** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 130 of the NSW Heritage Act. This information is provided by the NSW Heritage Office.
- Section 2. contains items listed by **Local Councils & Shires and State Government Agencies**. This section may also contain additional information on some of the items listed in the first section.

Section 1. Items listed under the NSW Heritage Act.

The search results can be re-sorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Listed Under Heritage Act
Manly Cove Pavilion	West Esplanade	Manly	Manly	Yes
Manly Wharf	West Esplanade	Manly	Manly	Yes
Middle Harbour Syphon NSOOS	Monash Crescent (East Side)	The Spit	Mosman	Yes
North Head Quarantine Station & Reserve	North Head Scenic Drive	Manly	Manly	Yes
Substation	34a-36 Whistler Street	Manly	Manly	Yes
Substation	83 Griffiths Street	Balgowlah	Manly	Yes

There were **6** records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Information Source (sort)
2 Monetary Pines Trees	2 Linkmead Street	Clontarf	Manly	LGOV
2 Semi Detatched Houses				

Auckland	Crn Gilbert Street and West Promenade)	Manly	Manly	LGOV
Australian Police Staff College, The	North Head	Manly	Manly	LGOV
Bantry Bluff	Bantry Bay Entrance Middle Harbour	Seaforth	Manly	LGOV
Beach Reserve	(Promenade) North and South Steyne	Manly	Manly	LGOV
Borambil	129 Bower Street	Manly	Manly	LGOV
Bridge (Former)	The Spit	Seaforth	Manly	LGOV
Camden	2 Boyle Street	Balgowlah	Manly	LGOV
Cardinals Palace	Darley Road	Manly	Manly	LGOV
Cemetery	School of Artillary, North Head Scenic Drive	Manly	Manly	LGOV
Cliff Street Group	2-12 Cliff Street	Manly	Manly	LGOV
Clontarf Park	Clontarf Middle Harbour	Manly	Manly	LGOV
Commemorative Tree	Clontarf Park	Middle Harbour	Manly	LGOV
Congregational Church	Crn Whistler St and Sydney Road	Manly	Manly	LGOV
Crater Huts / Depression Huts	Dobroyd Point	Balgowlah	Manly	LGOV
Cumberland	32 The Crescent (crn 1 Laurence St)	Manly	Manly	LGOV
Dalley's Castle Remnants	Sydney Road	Manly	Manly	LGOV
Dalwood	DALWOOD AVENUE	SEAFORTH	Manly	SGOV
Dalwood - Principal Building	21 Dalwood Avenue	Seaforth	Manly	LGOV
Dalwood - Stone Out Building	21 Dalwood Avenue	Seaforth	Manly	LGOV
Denison Street Group	26-38 Denison Street	Manly	Manly	LGOV
Detatched Cottage	63 Pittwater Road	Manly	Manly	LGOV
Dobroyd Headland - Natural Landscape	Dobroyd Headland	Manly	Manly	LGOV
Drummond House, The	22 Wentworh Street	Manly	Manly	LGOV
Dun Aros	10 The Crescent	Fairlight	Manly	LGOV
Elim	44 Addison Road	Manly	Manly	LGOV
Esplanade Park	Fairlight Foreshore North Harbour	Fairlight	Manly	LGOV
Fairlands	2 Ashburner Street	Manly	Manly	LGOV
Fairlight Pool	Lauderdale Avenue	Fairlight	Manly	GAZ

Australian Heritage Database

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Archbishops House (former) Darley Rd	Manly, NSW	(Registered) Register of the National Estate
Bantry Bay Reserve Area (former) Wakehurst Pkw	Killarney Heights, NSW	(Registered) Register of the National Estate
Crater Cove Huts Dobroyd Scenic Dr	Balgowlah Heights, NSW	(Registered) Register of the National Estate
Dungowan 7 South Steyne	Manly, NSW	(Indicative Place) Register of the National Estate
Fairlight Pool Lauderdale Av	Fairlight, NSW	(Indicative Place) Register of the National Estate
Fairy Bower Pool Bower La	Manly, NSW	(Registered) Register of the National Estate
Gilbert Park Belgrave St	Manly, NSW	(Indicative Place) Register of the National Estate
Glenview Cottage 6 Thornton St	Fairlight, NSW	(Rejected Place) Register of the National Estate
Langwarren 32 Fairlight St	Fairlight, NSW	(Indicative Place) Register of the National Estate
Manly Beach and Surrounds North Steyne	Manly, NSW	(Registered) Register of the National Estate
Manly Fire Station 128 Sydney Rd	Fairlight, NSW	(Indicative Place) Register of the National Estate
Manly Public Baths Remnants East Espl	Manly, NSW	(Indicative Place) Register of the National Estate
Manly Reservoir R64 Fairlight St	Fairlight, NSW	(Indicative Place) Register of the National Estate
Middle Harbour Submarine Sewerage Syphon Parriwi St	The Spit, NSW	(Indicative Place) Register of the National Estate
New Quarantine Cemetery North Head Scenic Dr	Manly, NSW	(Registered) Register of the National Estate
North Head North Head Scenic Dr	Manly, NSW	(Registered) Register of the

North Head Artillery Barracks	North Head Scenic Dr	Manly, NSW	National Estate (Registered)
North Head Artillery Barracks	North Head Scenic Dr	Manly, NSW	Register of the National Estate (Listed place)
North Head Fortifications	North Head Scenic Dr	Manly, NSW	Commonwealth Heritage List (Registered)
North Head Manly	North Head Scenic Dr	Manly, NSW	Register of the National Estate (Nominated place)
North Head Military Reserve	North Head Scenic Dr	Manly, NSW	National Heritage List (Registered)
North Head Quarantine Station & Reserve (former)	North Head Scenic Dr	Manly, NSW	Register of the National Estate (Registered)
North Sydney Harbour Aquatic Reserve		Manly, NSW	Register of the National Estate (Indicative Place)
St Andrews Presbyterian Church	Raglan St	Manly, NSW	Register of the National Estate (Registered)
St Patricks Seminary and Grounds (former)	Darley Rd	Manly, NSW	Register of the National Estate (Registered)
Sydney Harbour Entrance		Manly, NSW	Register of the National Estate (Indicative Place)
Sydney Harbour Landscape Area		Sydney, NSW	Register of the National Estate (Indicative Place)
Sydney Harbour National Park (1980 Boundary)		Manly, NSW	Register of the National Estate (Registered)
Terrace Houses	41-42 East Esplanade	Manly, NSW	Register of the National Estate (Indicative Place)
Upper Middle Harbour Area	Wakehurst Pky	Killarney Heights, NSW	Register of the National Estate (Indicative Place)
Whitehall	37 White St	Balgowlah, NSW	Register of the National Estate (Registered)

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Noxious weed declarations

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Noxious weed declarations for Manly Council

The following weeds are declared noxious in the control area of Manly Council:

Weed	Class	Legal requirements
African feathergrass [Pennisetum macrourum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium runcinatum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium thellungii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Alligator weed [Alternanthera philoxeroides]	3	The plant must be fully and continuously suppressed and destroyed
Anchored water hyacinth [Eichhornia azurea]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Annual ragweed [Ambrosia artemisiifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Arrowhead [Sagittaria montevidensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Artichoke thistle [Cynara cardunculus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Asparagus fern [Asparagus aethiopicus]	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 and the plant may not be sold, propagated or knowingly distributed
Athel tree [Tamarix aphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Balloon vine [Cardiospermum grandiflorum]	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 and the plant may not be sold, propagated or knowingly distributed
Bitou bush [Chrysanthemoides monilifera subspecies rotunda]	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

Black knapweed [Centaurea nigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Blackberry [Rubus fruticosus aggregate species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Boneseed [Chrysanthemoides monilifera subspecies monilifera]	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
Bridal creeper [Asparagus asparagoides]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Broomrapes [Orobanche species] Includes all Orobanche species except the native O. cernua variety australiana and O. minor	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Burr ragweed [Ambrosia confertiflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cabomba [Cabomba caroliniana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cape broom [Genista monspessulana]	3	The plant must be fully and continuously suppressed and destroyed
Cape ivy [Delairea odorata]	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 and the plant may not be sold, propagated or knowingly distributed
Castor oil plant [Ricinus communis]	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
Cat's claw creeper [Macfadyena unguis-cati]	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 and the plant may not be sold, propagated or knowingly distributed
Cayenne snakeweed [Stachytarpheta cayennensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Chilean needle grass [Nassella neesiana]	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 and the plant may not be sold, propagated or knowingly distributed
Chinese violet [Asystasia gangetica subspecies	1	The plant must be eradicated from the land and the land must

micrantha]		be kept free of the plant This is an All of NSW declaration
Climbing asparagus fern [Asparagus plumosus]	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 and the plant may not be sold, propagated or knowingly distributed
Clockweed [Gaura lindheimeri]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Clockweed [Gaura parviflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cockspur coraltree [Erythrina crista -galli]	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 and the plant may not be sold, propagated or knowingly distributed
Corn sowthistle [Sonchus arvensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Crofton weed [Ageratina adenophora]	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
Dodder [Cuscuta species] Includes All Cuscuta species except the native species C. australis, C. tasmanica and C. victoriana	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
East Indian hygrophila [Hygrophila polysperma]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Elephant grass [Arundo donax]		See Giant reed
Espartillo [Achnatherum brachychaetum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Eurasian water milfoil [Myriophyllum spicatum]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Fine-bristled burr grass [Cenchrus brownii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Fountain grass [Pennisetum setaceum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Gallon's curse [Cenchrus biflorus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with

		This is an All of NSW declaration
Giant reed [Arundo donax]	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 and the plant may not be sold, propagated or knowingly distributed
Glaucous starthistle [Carthamus glaucus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Golden thistle [Scolymus hispanicus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Green cestrum [Cestrum parqui]	3	The plant must be fully and continuously suppressed and destroyed
Harrisia cactus [Harrisia species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Hawkweed [Hieracium species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Horsetail [Equisetum species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Hygrophila [Hygrophila costata]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Hymenachne [Hymenachne amplexicaulis]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Karoo thorn [Acacia karroo]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Kochia [Bassia scoparia]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lagarosiphon [Lagarosiphon major]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lantana [Lantana species]	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
Lantana [Lantana species]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Long-leaf willow primrose [Ludwigia longifolia]	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
Long-leaf willow primrose [Ludwigia longifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Ludwigia [Ludwigia peruviana]	3	The plant must be fully and continuously suppressed and destroyed
Madeira vine [Anredera cordifolia]	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 and the plant may not be sold, propagated or knowingly distributed
Mexican feather grass [Nassella tenuissima]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mexican poppy [Argemone mexicana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Miconia [Miconia species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mimosa [Mimosa pigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Morning glory (coastal) [Ipomoea cairica]	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 and the plant may not be sold, propagated or knowingly distributed
Morning glory (purple) [Ipomoea indica]	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 and the plant may not be sold, propagated or knowingly distributed
Mossman River grass [Cenchrus echinatus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Ochna [Ochna serrulata]	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 and the plant may not be sold, propagated or knowingly distributed
Onion grass [Romulea species] Includes all Romulea species and varieties except R. rosea var. australis	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Oxalis [Oxalis species and varieties] Includes all Oxalis species and varieties except	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with

the native species O. chnoodes, O. exilis, O. perennans, O. radicosa, O. rubens, and O. thompsoniae		This is an All of NSW declaration
Pampas grass [Cortaderia species]	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
Parthenium weed [Parthenium hysterophorus]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Pellitory [Parietaria judaica]	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
Pond apple [Annona glabra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly acacia [Acacia nilotica]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly pear [Cylindropuntia species]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Prickly pear [Opuntia species except O. ficus-indica]	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 and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Privet (Broad leaf) [Ligustrum lucidum]	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 and the plant may not be sold, propagated or knowingly distributed
Privet (Narrow-leaf/Chinese) [Ligustrum sinense]	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 and the plant may not be sold, propagated or knowingly distributed
Red rice [Oryza rufipogon]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Rhizomatous bamboo [Phyllostachys spp.]	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 and the plant may not be sold, propagated or knowingly distributed
Rhus tree [Toxicodendron succedanea]	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 This is an All of NSW declaration
Rubbervine [Cryptostegia grandiflora]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Sagittaria [Sagittaria platyphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Salvinia [Salvinia molesta]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Sand oat [Avena strigosa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Senegal tea plant [Gymnocoronis spilanthoides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Senna [Senna pendula]	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
Serrated tussock [Nassella trichotoma]	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 and the plant may not be sold, propagated or knowingly distributed
Siam weed [Chromolaena odorata]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Smooth-stemmed turnip [Brassica barrelieri subspecies oxyrrhina]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Soldier thistle [Picnomon acarna]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Spotted knapweed [Centaurea maculosa]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
St. John's wort [Hypericum perforatum]	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
Texas blueweed [Helianthus ciliaris]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Trad [Tradescantia fluminensis]	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 and the plant may not

		be sold, propagated or knowingly distributed
Wandering Jew [Tradescantia fluminensis]		See Trad
Water caltrop [Trapa species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water hyacinth [Eichhornia crassipes]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Water lettuce [Pistia stratiotes]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water soldier [Stratiotes aloides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Willows [Salix species] Includes all Salix species except S. babylonica, S. x reichardtii, S. x calodendron	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Witchweed [Striga species] Includes all Striga species except native species and Striga parviflora	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow burrhead [Limnocharis flava]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow nutgrass [Cyperus esculentus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

Sydney region

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Sandstone Kerb, Botany	4309669
Sandstone Kerb, Frederick St, Ashfield	4309676
Sandstone Kerb, Milton St, Ashfield	4309677
Sandstone Kerb, Zetland	4309675
Sandstone Kerbing - Great Western Hwy	4300493
Sandstone Kerbing, Five Dock	4310581
Scale Model, Rockdale	4309015
Semi-detached House	4305625
Semi-detached House	4305626

Semi-detached House	4305623
SHB South-East Pylon Museum Collection	4300733
Site of Figtree Tea Rooms & Aquatic Tea Rooms	4301035
Site of Figtree Wharf and Boatshed	4301036
South Creek Bridge (Eastbound)	4309584
Souvenir Menu, Auburn	4300711
Spit Bridge Movable Heritage Collection	4305402
Spit Bridge, The	4300307
St Albans Bridge over MacDonald River	4300129
Staff Photograph, Auburn	4300709
Stereoscope, Rockdale	4309007
Stone kerbs - Manly Municipality	4310583
Stone Retaining Wall, Linden	4300362
Stone Wall and Culvert - Bells Line of Road	4310585
Stone Wall, Mount Victoria	4309685
Stringy Bark Creek Bridge	4309502
Surface Texture Measuring Apparatus, North Sydney	4310573
Survey Sign, Rockdale	4309027
Surveying Handbook, Parramatta	4300708
Surveyor's Drafting Equipment, Rockdale	4309009
Sydney Harbour Bridge Memorabilia Collection	4309049
Sydney Harbour Bridge Workshops Collection	4300735
Sydney Harbour Bridge, approaches and viaducts	4301067
Terrace	4305629
Terrys Creek Bridge	4309592
Tom Ugly's Bridge (1987)	4301064
Tom Uglys Bridge over the Georges River	4301677
Tool Chest, Rockdale	4309012
Topcon Level, St Marys	4305414
Topographic Map, Rockdale	4309025
Traffic Light Lenses, Eveleigh	4300729
Traffic Radar, Rockdale	4309003
Tram Track Blaxland Rd, Ryde	4310588
Trophies and Memorabilia, Rockdale	4309014
Universal Testing Machine (Serial Number E50348), North Sydney	4310575
Unwins Bridge over Cooks River	4301663
Vacant Land on Wolli Creek	4306002
Vacant Lot	4306006
Victoria Bridge over Nepean River	4301653
West Ryde Bridge	4309510
Williams Creek Bridge	4309512
Wolli Creek Culvert	4305006

↑ Back to top

Click on the BACK button of your browser to return to the search.

Statutory Listed Items

Information and items listed in the State Heritage Inventory come from a number of sources. This means that there may be several entries for the same heritage item in the database. For clarity, the search results have been divided into two sections.

- Section 1. contains items listed by the **Heritage Council** under the NSW Heritage Act. This includes listing on the State Heritage Register, an Interim Heritage Order or protected under section 130 of the NSW Heritage Act. This information is provided by the NSW Heritage Office.
- Section 2. contains items listed by **Local Councils & Shires and State Government Agencies**. This section may also contain additional information on some of the items listed in the first section.

Section 1. Items listed under the NSW Heritage Act.

The search results can be re-sorted by clicking on the **(sort)** option at the top of each column.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Listed Under Heritage Act
Manly Cove Pavilion	West Esplanade	Manly	Manly	Yes
Manly Wharf	West Esplanade	Manly	Manly	Yes
Middle Harbour Syphon NSOOS	Monash Crescent (East Side)	The Spit	Mosman	Yes
North Head Quarantine Station & Reserve	North Head Scenic Drive	Manly	Manly	Yes
Substation	34a-36 Whistler Street	Manly	Manly	Yes
Substation	83 Griffiths Street	Balgowlah	Manly	Yes

There were **6** records in this section matching your search criteria.

Section 2. Items listed by Local Government and State agencies.

Item Name (sort)	Address (sort)	Suburb (sort)	LGA (sort)	Information Source (sort)
2 Monetary Pines Trees	2 Linkmead Street	Clontarf	Manly	LGOV
2 Semi Detatched Houses				

Auckland	Crn Gilbert Street and West Promenade)	Manly	Manly	LGOV
Australian Police Staff College, The	North Head	Manly	Manly	LGOV
Bantry Bluff	Bantry Bay Entrance Middle Harbour	Seaforth	Manly	LGOV
Beach Reserve	(Promenade) North and South Steyne	Manly	Manly	LGOV
Borambil	129 Bower Street	Manly	Manly	LGOV
Bridge (Former)	The Spit	Seaforth	Manly	LGOV
Camden	2 Boyle Street	Balgowlah	Manly	LGOV
Cardinals Palace	Darley Road	Manly	Manly	LGOV
Cemetery	School of Artillary, North Head Scenic Drive	Manly	Manly	LGOV
Cliff Street Group	2-12 Cliff Street	Manly	Manly	LGOV
Clontarf Park	Clontarf Middle Harbour	Manly	Manly	LGOV
Commemorative Tree	Clontarf Park	Middle Harbour	Manly	LGOV
Congregational Church	Crn Whistler St and Sydney Road	Manly	Manly	LGOV
Crater Huts / Depression Huts	Dobroyd Point	Balgowlah	Manly	LGOV
Cumberland	32 The Crescent (crn 1 Laurence St)	Manly	Manly	LGOV
Dalley's Castle Remnants	Sydney Road	Manly	Manly	LGOV
Dalwood	DALWOOD AVENUE	SEAFORTH	Manly	SGOV
Dalwood - Principal Building	21 Dalwood Avenue	Seaforth	Manly	LGOV
Dalwood - Stone Out Building	21 Dalwood Avenue	Seaforth	Manly	LGOV
Denison Street Group	26-38 Denison Street	Manly	Manly	LGOV
Detatched Cottage	63 Pittwater Road	Manly	Manly	LGOV
Dobroyd Headland - Natural Landscape	Dobroyd Headland	Manly	Manly	LGOV
Drummond House, The	22 Wentworh Street	Manly	Manly	LGOV
Dun Aros	10 The Crescent	Fairlight	Manly	LGOV
Elim	44 Addison Road	Manly	Manly	LGOV
Esplanade Park	Fairlight Foreshore North Harbour	Fairlight	Manly	LGOV
Fairlands	2 Ashburner Street	Manly	Manly	LGOV
Fairlight Pool	Lauderdale Avenue	Fairlight	Manly	GAZ

Appendix D

Previous Environmental Impact Assessment Reports

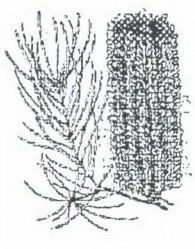
Species Impact Statement for Seaforth Oval Access, Seaforth

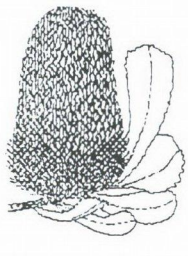
By

Nicholas Skelton, B. Sc. (Hons), M. App. Sc.,
Susan Westcott, B. Sc., M. App. Sc.
&
Cassandra Thompson, B. Sc., M. App. Sc.

February 2005

Prepared for
Manly Council





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Acknowledgments and Responsibilities

The survey and project were lead by Nicholas Skelton B. Sc. (Hons), M. App. Sc., the Director of GIS Environmental Consultants. Nicholas has been an environmental scientist for 14 years and has an extensive knowledge of the environment, ecology and species of the Sydney Basin. Susan Westcott (B. Sc., M. App. Sc.) and Tony Gilson (B. Env. Sc.) assisted with field work, Susan Westcott and Cassandra Thompson (B.Sc., M. App. Sc.) assisted with editing and project management.

A.I Signatures

Signature of Principal Author:

Date:

Nicholas Skelton

Director of GIS Environmental Consultants
45 Austin Avenue, Dee Why, 2099.

Ph (02) 9939 5129

Signature of Land Manager or Representative:

Name:

Position: Date:

Manly Council
1 Belgrave Street, Manly, NSW, 2085
Ph (02) 9986 3577

B Introduction

B.I Background

This Species Impact Statement is an update of a previous Species Impact Statement based on revised plans received in January 2005. The proposal assessed is the construction of a new access road, walkway, cycleway and replacement parking area which are part of Manly Council's upgrade of recreational facilities at Seaforth Oval (see Map 1). Construction of this new access road, walkway, parking area and the walk/cycleway (as shown on Map 2) requires the removal of a section of bushland that meets the definition of the endangered Duffys Forest Ecological Community (*Threatened Species Conservation (TSC) Act* 1995).

A survey (Skelton *et al.* 2004) and subsequent Natural Environment Assessment report by Skelton *et al.* (2003) described this vegetation as likely (if burnt) to "meet the description of the endangered Ecological Community known as Duffys Forest and threatened species may regenerate from the seed bank". A subsequent flora survey of this section of bush, undertaken by Smith & Smith in 2002 concluded that the area was degraded Duffys Forest (see Map 2). A later survey and impact assessment by James (2003) also concluded that the site contains disturbed Duffys Forest and that the proposed development may have a significant impact on the ecological community.

As a consequence of these assessments, for Council to proceed with this proposal, then a Species Impact Statement (SIS) is required by Section 5H of the *EP&A Act* 1979). Council has requested that the Director General (DG) of the Department of the Environment and Conservation (DEC) supply his/her requirements for the SIS. This report is the SIS that addresses these requirements. If the DA is to be approved by the determining authority then concurrence by the DEC is also required.

B.II The Brevity of this Document

This Species Impact Statement has been made as concise as possible without omitting any required information. Some consultants produce very thick SIS documents that include and repeat non-essential information that wastes the time of Council and the DEC. This document is made brief for the benefit of the reader, to reduce the work required to review the document and to maintain the focus on the important information. If database printouts, NPWS information, determinations and other bulky non-essential items are required, please contact the authors directly for an immediate hardcopy or copy via email.

The heading numbering of this document has been kept the same as in the Director General's Requirements to allow easy checking of compliance and to give the SIS a standard structure.

B.III Purpose of an SIS

The purpose of this SIS is to:

- Allow the applicant or proponent to identify threatened species issues and provide appropriate amelioration for adverse impacts resulting from the proposal;
- Assist determining authorities in the assessment of a development application to decide if consent should be granted under Part 4 or request for Part 5 approval under the *Environmental Planning and Assessment* (*EP&A*) *Act* 1979;

- Assist the Director-General of National Parks and Wildlife (NPWS), now the DEC, in deciding whether or not concurrence should be granted for the purposes of Part 4 or 5 of the *EP&A Act* 1979;
- Assist the Director-General of NPWS (now DEC) or the Minister for the Environment when consulted for the purposes of Part 4 or 5 of the *EP&A Act* 1979; and
- Assist the Director-General of NPWS (now DEC) in the assessment of Section 91 Licence applications lodged under the *Threatened Species Conservation (TSC) Act* 1995.

B.IV Legislative Requirements

The proposed construction of a new access road, cycleway, walkway and parking area at Seaforth Oval, Manly constitutes 'development' under Part 4 of the *EP&A Act* 1979. As a result, development consent from the determining authority is required prior to the commencement of development works at this site. The proposed development may have a significant effect, as defined in the *EP&A Act* 1979, on an endangered ecological community, population or threatened species, thus, a review of this SIS by the Director-General of NPWS is required before development consent can be granted.

This SIS addresses the requirements of the Director-General of the NPWS (DEC) and has been prepared in accordance with Sections 109 and 110 of the *TSC Act* 1995. These requirements include the use of relevant LGA listings of known threatened species and NPWS Environmental Impact Assessment guidelines. Use of these profiles can be taken to have satisfied the requirements of ss.110(2)&(3) of the *TSC Act* 1995 in relation to the state-wide conservation status of the listed species, populations and ecological communities.

C Director-General's Requirements for a Species Impact Statement: Matters to be Addressed

The requirements of the Director-General of the Department Environment and Conservation (DEC), formally the NPWS for the preparation of this SIS are addressed below under sub-headings with numbers corresponding directly to those in the Director-General's requirements issued by NPWS for this development proposal (dated 13th March 2003).

C.I Matters which have been limited or modified

According to the letter issued by Robert Humphries of the DEC the following Section 110 matters need not be addressed by this SIS.

- Section 110(2)(e). This section is a replication of Section 110(2)(a).
- Section 110(2)(g) and 110(3)(d). The matters raised in these sections of the *TSC Act* 1995 have been clarified by the requirements below.

The NPWS considers that the following Section 110 matters need only be addressed where relevant:

- *All reference to threat abatement plans. No threat abatement plans have currently been approved in accordance with the TSC Act 1995 that are relevant to this proposal.*
- *All reference to recovery plans. No recovery plans have been approved that are likely to be relevant to the proposal. It should be noted, however that a draft Recovery plan for Duffys Forest Ecological Community is currently being prepared.*
- *With regards to key threatening processes, the following key threatening processes are considered relevant to this proposal:*
  - *Clearing of native vegetation;*

  This key threatening process is relevant to the current proposal. The construction of a new access road, foot/cycle paths and car parking area at Seaforth Oval involves the removal of approximately 0.12 ha of native vegetation.

  - *High frequency fire resulting in the disruption of life cycle processes in plants, animals, and loss of vegetation structure and composition;*

  This key threatening process is not relevant to the current proposal. Field inspection revealed that the site has not experienced fire in the past 30 years, and high frequency burning is not recommended for the management of this area.

  - *Bushrock removal (as described in the final determination of the Scientific Committee to list the threatening process);*

  This key threatening process is not relevant to the current proposal. There is no natural bush rock on the site. Currently there is introduced bush-rock on site in the form of construction waste, which will be removed.

  - *Infection of native plants by Phytophthora cinnamomi; and*

  This key threatening process is not relevant to the current proposal. There are no creeks or drainage lines at the site, which is predominantly dry. *Phytophthora cinnamomi* is not likely to pose a threat under the current conditions.

- *Invasion of native plant communities by exotic perennial grasses (currently a Preliminary Determination).*

  This key threatening process is considered relevant to the current proposal. During field survey there was evidence of garden clippings being dumped on site. Management of this area (in the form of a Bushland Management Plan) will need to consider appropriate deterrents to the dumping of garden waste on this site.

- *All reference to critical habitat. There is currently no declared critical habitat in NSW that is relevant to this proposal.*

  Recovery plans may be approved, critical habitat may be declared and key threatening processes may be listed between the issue of the requirements and the granting of consent. If this occurs, these additional matters will need to be addressed in the SIS and considered by the consent, determining or concurrence authority.

C.II Matters to be Addressed

The *TSC Act* 1995 provides that the SIS must meet all the matters specified in Sections 109 and 110 of the *TSC Act* 1995 with the exception of those matters limited above. The specific Director-General's Requirements for this proposal are addressed below.

1 Form of the species impact statement

This SIS is provided in written form with relevant maps, tables, figures and appendices. Page 3, the Preface of this SIS, bears the signature of the principal author (Nicholas Skelton, The Director, GIS Environmental Consultants Pty Ltd) and the applicant for the licence

(_____, for Manly Council).

2 Contextual information

2.1 Description of proposal, subject site and study area

The Site Locality

The study site is immediately west of Wakehurst Parkway and surrounded by Garigal National Park to the north, west and south and the built-up suburb of Seaforth lies to east. The study site is located within the Manly Council Local Government Area. The adjacent Garigal National Park is 2,150 ha in area and encompasses the upper reaches of Middle Harbour including Bantry Bay and part of the catchment of Narrabeen Lakes (NSW NPWS 1998). Garigal National Park has a current Plan of Management. Map 1 shows the location of the site and the relation of adjacent areas of bushland and national park.

The Subject Site

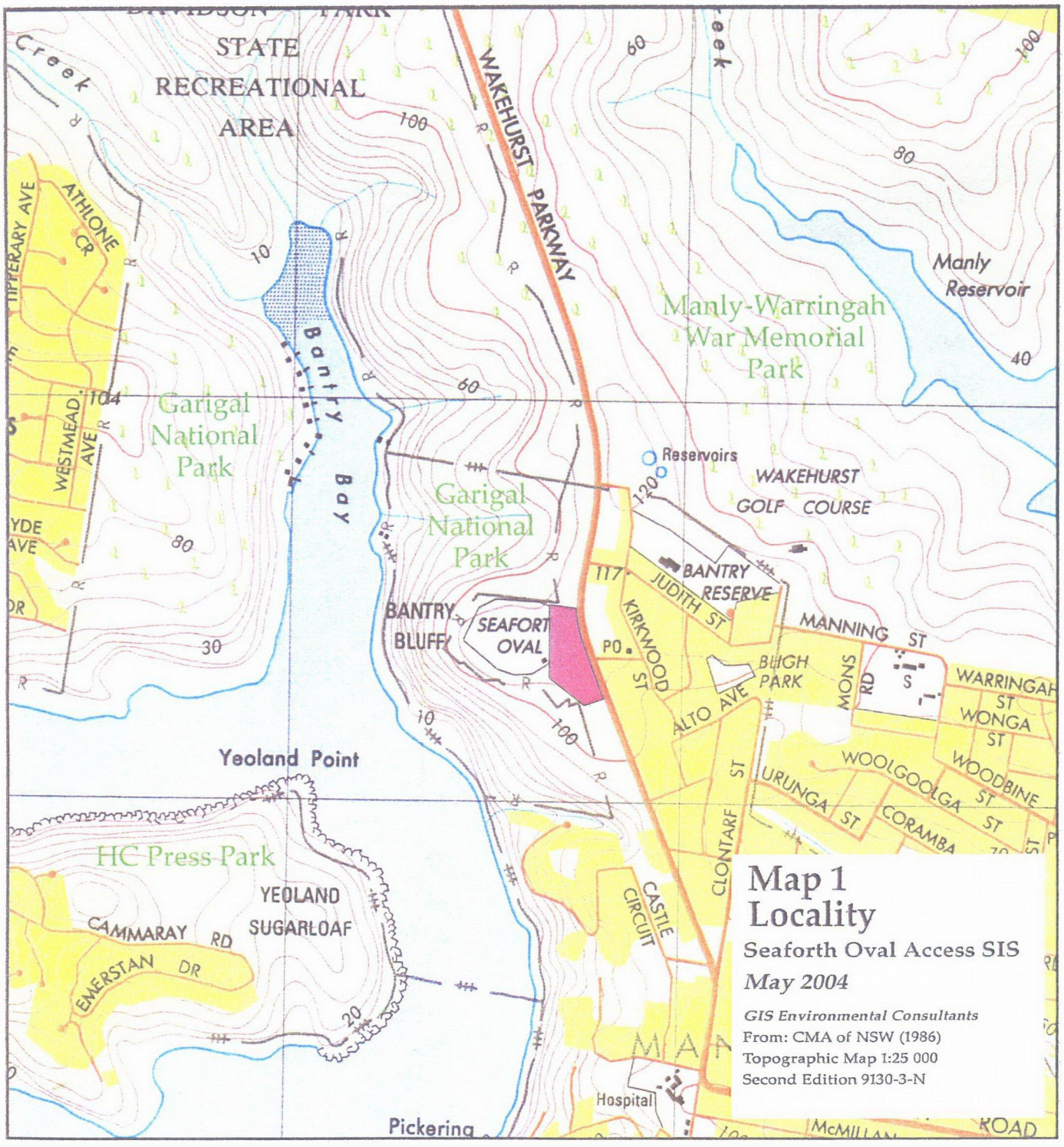
The study site is east of the existing Seaforth Oval, which includes a playing field and the adjacent car parking area and grassed sport fields. The tenure of the study site is "unreserved Crown land until required for road widening". Seaforth Oval is a Crown Reserve (Reserve No. 89212) and managed by Manly Council. The oval is heavily used by team sports. Sports groups with formal arrangements with Council include soccer (senior and junior) rugby union, cricket (senior and junior) and athletics (athletic carnivals). The Oval is used for organised sport on weekends in summer and winter. The oval is also used for training purposes 3 nights per week, and is used for passive recreation such as dog walking and informal sports (Skelton *et al.* 2003, Skelton *et al.* 2004).

Soils

The soils of the study site are a deeply-weathered clay with ironstone inclusions and areas of laterite. These soils are derived from a Wianamatta Shale cap which overlays Hawkesbury Sandstone, a Triassic sandstone which covers large areas of the Sydney Basin. The heavy clay soil is now very uncommon in Sydney due to construction of roads, gravel extraction and ridge-top urban development.

Location of Duffys Forest on the Study Site

Within the study site a cluster of three remnant patches of Duffys Forest Ecological Community have been (at one time or another) identified as meeting the definition of Duffys Forest (Smith & Smith 2000 & 2002, James(2003 and Skelton *et al.* 2003). In this SIS only two of the patches within the site are considered to meet the definition of Duffys forest. These are shown in purple on Map 2. These two patches are the subject of this SIS. The larger remnant patch is approximately 0.19 ha in area and is adjacent to Wakehurst Parkway. The other smaller patch is approximately 0.06 ha in size and is further to the south west (see Map 2). Vegetation outside the study site on the other (eastern) side of the Wakehurst Parkway and the to north of the study site is also Duffys Forest Ecological Community.



Map 1
Locality

Seaforth Oval Access SIS

May 2004

GIS Environmental Consultants

From: CMA of NSW (1986)
Topographic Map 1:25 000
Second Edition 9130-3-N

The Proposal

The proposal will construct; a new access road to Seaforth Oval from Wakehurst Parkway, a new car-parking area, an overflow parking area, a playground, information centre, cycleway and pathway. It is proposed to install traffic signals at the new cross-intersection of Wakehurst Parkway, Burnt Street and the new access road. At present, there is a separate entry and exit for the car park (see Map 2).

Draft plans used in the preparation of the 2004 SIS were:

- Draft Seaforth Oval Carpark Layout Seaforth, dated 05/03, Planning, Design & Environment, Manly Council.
- Hand drawn Seaforth Oval, Seaforth, Plan of Management Landscape Master Plan, undated, Clouston Associates.

Revised plans with changes to the proposal were received in January 2005. This Species Impact Statement has been updated and reassessed in light of the changes to the proposal. Our initial report recommended changes to the design, the plans now reflect some of those recommendations and other changes have been made. There was also public consultation between the two sets of plans.

The new proposal plans are:

- Seaforth Oval Carpark Layout Seaforth, dated 06/04, Draft Copy Only - Issued for Comments, Planning, Design & Environment, Manly Council, and
- Sketch Plan 1:1000 Layout Seaforth Oval, undated and unauthored.

Modifications to the original design include:

- Widening of the access way to accommodate a walkway/cycleway on both sides;
- Removal of slip lanes on the access way where it meets Wakehurst Parkway;
- Stormwater drainage is now shown;
- The north east carpark has moved eastward;
- There is a new amenities block/club;
- There is a new playground in the south western section;
- There is a new bus parking area;
- The south carpark has been made an overflow carpark which is turfed and basketball courts have been added to this area;
- A bush shelter has been recently installed in Duffys Forest vegetation, south of the proposed access way and is proposed to be moved;
- The plans do not show revegetation of the existing bitumen road; and
- There is a new information shelter and bike racks in the north eastern corner of the proposal.

Footpaths and Cycleways

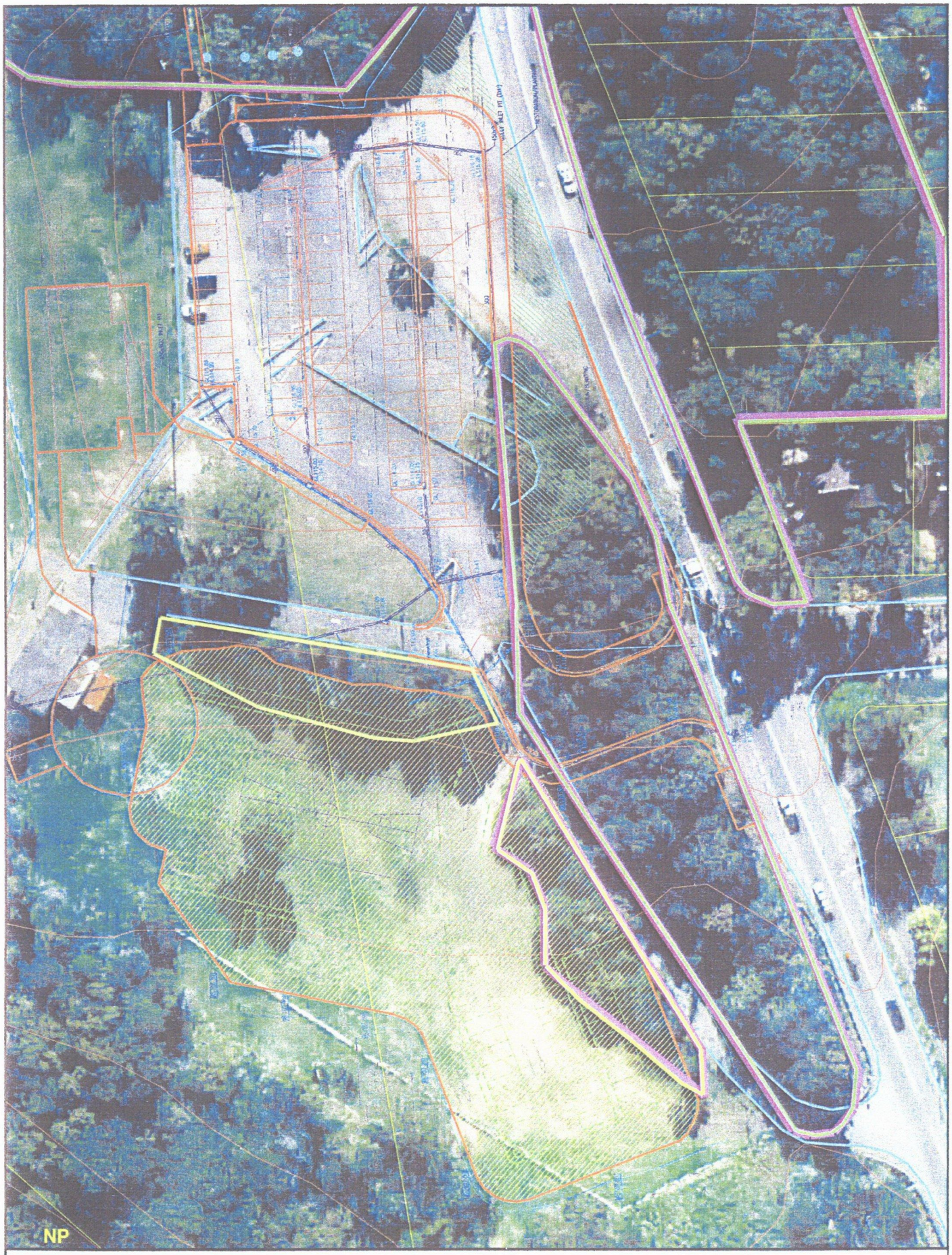
The new proposal includes a 2.5m wide footpath and cycleway along both sides of the access road and along the eastern side of the north carpark. These cycleways/pathways on the access way and along the eastern side of the northern car park will remove a further 251m^2 or 13% of the largest remnant patch of Duffys Forest.

Proposed Action - Disturbance to the existing bushland

There are currently two remnants of Duffys Forest Ecological Community on the site, one large (1875m^2) and one small (600m^2). The proposal will totally remove the smaller remnant and the proposed new access road and walk/cycleways will bisect the largest remnant. See Map 2. There is the potential to restore disturbed areas of the site to Duffys Forest Ecological Community.

The proposed new access road and car-park area will involve removal of the smaller patch of Duffys Forest Endangered Ecological Community and fragmenting the larger patch into two smaller patches. Of the 0.25ha of remnant Duffys Forest on the study site, a total of 0.12 ha (approximately 47%) is to be cleared. The larger patch of Duffys Forest will be divided into two patches, separated by a 17.5 m-wide bitumen road.

The proposal will also remove a patch of native bushland in the middle of the site (toward the existing amenities block). This patch of vegetation was described by James (2003) to be highly disturbed Duffys Forest.



Map 2
Existing Features and Proposal

January 2005

GIS Environmental Consultants by Nicholas Skelton, Ph: 041 943 8672

Duffys Forest Vegetation
Skelton et, al. 2005
Duffys Forest as described
by Smith & Smith 2000 and 2002
Additional Duffys Forest as described
by James 2003
Proposed Development
Existing Features

2.2 Provision of relevant plans and maps

Map 1 shows the locality of the site and the location of important nearby ecological features and habitat such as the surrounding bushland (*i.e.* Garigal National Park and "unreserved Crown land until required for road widening"), urban areas, recreation areas and major roads.

Map 2 shows the existing site features and the proposal over-laying an aerial photograph of the site.

Map 3 shows recommended modifications to the plans to reduce environmental impact.

2.3 Land tenure information

The study site, and the land directly north and south it is RTA managed land with the official tenure of "unreserved Crown land until required for road widening".

The adjacent Seaforth Oval to the west is a Crown Reserve (Reserve No. 89212) managed by Manly Council.

3 *Initial assessment*

The flora, and to a lesser extent the fauna, of this site and the adjacent land has been surveyed on a number of occasions. The environmental values of Seaforth Oval were assessed in 2001 as part of a larger study of the bushland reserves within the Manly Local Government Area (LGA) (Skelton *et al.* 2004). The remnant bushland of this site was assessed by Smith & Smith in 2002 and the subject area was classified as Duffys Forest Ecological Community (DFEC). Flora and fauna and other ecological values were assessed in greater detail in October 2002 by Skelton *et al.* (2003), and recommendations for improving their management were made in the "Natural Environment Assessment and Recommendations for the Plan of Management for Seaforth Oval". This document recommended that the DFEC be burnt to promote regeneration and to improve the ecological values of the remnant. A flora assessment and 8-part test for this proposal was then carried out by James (2003). This assessment concluded that the impact on the DFEC would be significant and that a Species Impact Statement is needed. These past studies are considered to be the initial assessment.

3.1 Identifying subject species

3.1.1 Assessment of available information

In determining the subject species, consideration was given to the list provided in the Director General's requirements and the suitability of the habitat present within the study area, records of threatened species or populations in the locality, and the extensive local knowledge of the authors.

Flora and fauna records from Skelton *et al.* (2003 & 2004), Smith & Smith (2000 & 2002), James (2003), along with electronic databases including the NPWS Atlas of NSW Wildlife, Australian Museum and Royal Botanic Gardens were used.

Table 2. Potential Threatened Fauna Species				
Species	**Status (*TSC Act*)**	**Status (*EPBC Act*)**	**Habitat**	**Assessment**
Amphibians and Reptiles				
Heleioporus australiacus Giant Burrowing Frog	V	V	Associated with small headwater creeklines and along slow flowing to intermittent creeklines, the Giant Burrowing Frog favours sandstone ridgetop habitat (woodland, open woodland and heath) and broader upland valleys (NPWS 2001).	• No suitable habitat is present. • Species not likely to occur •No further assessment required
Litoria aurea Green and Golden Bell Frog	E	V	Inhabits stream sides, marshes and dams, especially those containing *Eleocharis spp.* or *Typha spp.* Sometimes found in areas of high disturbance, such as brick pits, landfill areas, disused industrial sites and cleared land (NPWS 1999).	• No suitable habitat is present. • Species not likely to occur • No further assessment required
Pseudophryne australis Red-crowned Toadlet	V		Known from Triassic sandstones of the Sydney Basin, Red-crowned Toadlets are mainly found in open woodland and heath areas, within the upper 100 m of the tops of ridges along steep escarpment areas and plateaus, and low undulating ranges with benched outcroppings. Red-crowned Toadlets prefer permanently moist soaks and the areas of dense litter or ground vegetative cover near or along head-water stream beds ("feeder-creeks") (NPWS 2001).	• No suitable habitat is present. • Species not likely to occur • No further assessment required
Varanus rosenbergi Rosenberg's Goanna	V	V	Rosenberg's Goanna is associated with both wet and dry sclerophyll forests, coastal heaths and humid woodlands (Cogger 2000).	• No suitable habitat is present • Species not likely to occur • No further assessment required

Table 2. Potential Threatened Fauna Species				
Species	**Status (*TSC Act*)**	**Status (*EPBC Act*)**	**Habitat**	**Assessment**
Avifauna				
Dasyornis brachypterus Eastern Bristlebird	E		Cover-dependent and fire-sensitive, the Eastern Bristlebird is restricted to coastal eastern Australia in eucalypt forest, rainforest, woodland, swamp, shrub-land, mallee, heathland and sedgeland where low dense cover is present (Baker in press)	• No suitable habitat is present. • Species not likely to occur • No further assessment required
Ixobrychus flavicollis Black Bittern	V		Inhabiting both terrestrial and estuarine wetlands, the Black Bittern is generally found in areas of dense vegetation and permanent water (Marchant & Higgins 1990).	• No suitable habitat is present. • Species not likely to occur • No further assessment required
Neophema pulchella Turquoise Parrot	V		Inhabiting the steep, rocky ridges and gullies, hills, river-flats, valleys and nearby plains of the Great Dividing Range (Higgins 1999), the Turquoise Parrot is found in open forest and eucalyptus woodlands with a low shrub understorey and grassy ground-cover (Jarman 1973, Morris 1980)	• Very limited potential habitat present. • Species not likely to occur • No further assessment required
Ninox connivens Barking Owl	V		Barking Owls are found in woodlands, open forests, foothills, dense scrubs, paperbark woodlands, and in river red gums and other large trees close to watercourses (Pizzey 1997)	• No suitable roosting habitat present; very limited amount of foraging habitat present • Species not likely to occur • No further assessment required
Ninox strenua	V		Powerful Owls are found close to riparian or rainforest vegetation, in areas of either	• Habitat suitable for

Table 2. Potential Threatened Fauna Species				
Species	**Status (*TSC Act*)**	**Status (*EPBC Act*)**	**Habitat**	**Assessment**
Powerful Owl			wet or dry *Eucalyptus* sclerophyll woodland, forest or tall open forest (Greenyer 1999).	foraging only; very limited amount of foraging habitat present • Species could possibly occur • **8 part test Required**
Pezoporus wallicus wallicus Ground Parrot (eastern subsp.)	V		Ground Parrots are found in coastal heath, dry ridges, swamps and pastureland around the southern half of Australia, on Fraser Island and all through Tasmania (Pizzey 1997). Nest in tussock grass/ bush well overhung by sheltering vegetation (Schodde & Tidemann 1997)	• No suitable nesting habitat present • Species not likely to occur • No further assessment required
Polytelis swainsonii Superb Parrot	V	V	Superb Parrot habitat is Black box, yellow box, red river gums and river oaks mostly close to rivers, and open woodland, pastures and gardens (Pizzey 1997).	• Study site is considered to be outside the known distribution of the species • Species not likely to occur • No further assessment required
Tyto tenebricosa Sooty Owl	V		Sooty Owl-habitat is tall, wet old-growth forest on fertile soils with dense understorey and emergent tall eucalypts (Garnett 1992). For breeding, the Sooty Owl requires very large hollows found in old mature trees (Hyem 1979).	• No suitable habitat present • Species not likely to occur • No further assessment required

Table 2. Potential Threatened Fauna Species				
Species	**Status (*TSC Act*)**	**Status (*EPBC Act*)**	**Habitat**	**Assessment**
Xanthomyza phrygia Regent Honeyeater	E	E	Found in dry open forest and woodland (especially red ironbark, yellow gum, yellow box), mistletoe on river oaks, streets and gardens (Pizzey 1997).	• Very limited suitable habitat is present. • Species not likely to occur • No further assessment required
Mammals				
Dasyurus maculatus Spotted-tailed Quoll	V	V	Uses habitat ranging from woodlands and sclerophyll forest, to rainforests and coastal heathlands (Dickman & Read 1992, Edgar & Belcher 1995). The Spotted-tailed Quoll requires hollows, rock outcrops or caves as suitable den sites, as well as food resources such as small mammals and birds (NPWS 1999). Large areas of relatively intact vegetation are required by individual animals for foraging (NPWS 1999).	• Very little suitable habitat is present. • Species not likely to occur often; proposal will not have a negative impact • No further assessment required
Miniopterus schreibersii Common Bent-wing Bat	V		Moths being the major component of their diet, the Common Bent-wing Bat utilise habitats ranging from rainforest, to wet and dry sclerophyll, open woodland, paperbark and monsoon forests, and open grasslands (Churchill 1998).	• Suitable foraging habitat is present. • Species could possibly occur • Considered a **Subject Species. 8 part test required**
Nyctophilus timoriensis Greater Long-eared Bat	V	V	Preferring semi-arid areas, the Greater Long-eared Bat is found in Black box woodland, open savanna and mallee (Churchill 1998).	• Study site is outside the normal distribution of the species • Species not likely to occur • No further assessment required
Phascolarctos cinereus Koala	V		Inhabiting eucalypt forest and woodland, the Koala is found throughout eastern Australia, from the Eyre Peninsula in South Australia to north-east Queensland in a	• No suitable habitat is present.

Table 2. Potential Threatened Fauna Species

Species	Status (*TSC Act*)	Status (*EPBC Act*)	Habitat	Assessment
			fragmented distribution (Martin & Handasyde 1995). Size of trees present and the disturbance history of a site are factors that influence the suitability of a site as habitat (Reed *et al.* 1990).	• Species not likely to occur • No further assessment required
Pteropus poliocephalus Grey-headed Flying Fox	V	V	Occurring along the east coast of Australia, the Grey-headed Flying-fox inhabits a wide range of habitats including rainforest, mangroves, paperbark forests, wet and dry sclerophyll forests and cultivated areas (Eby 1998). The fruit from native figs (*Ficus* spp.) form a large part of their diet (Churchill 1998).	• Possible foraging habitat present • Species could possibly occur • Considered a **Subject Species. 8 part test required**

Table 3 Potential Threatened Flora Species				
Species	Status (*TSC Act* 1995)	Status (*EPBC Act* 1979)	Habitat	Assessment
Acacia bynoeana	E	V	Endemic to the Sydney region, *Acacia bynoeana* is a low prostrate shrub that requires light to full sun, and is found in Eucalypt open-forest, shrubland and woodland on well-drained, highly infertile sand and sandy-clay substrate (Benson & McDougall 1996).	• Suitable habitat is present. • Absence of species during field survey deemed reflective of its occurrence • Species not likely to be affected, no further assessment required
Caladenia tessellata	V	V	This species is found in low open woodland and shrubland, normally only seen after fire (Bishop 2000).	• Suitable habitat is present • Species could possibly occur. • Considered a **Subject Species. 8 part test required**
Eucalyptus camfieldii	V	V	This species occurs as either a small tree or as a mallee on poorly drained, shallowed soiled Sydney sandstone or laterite tops amongst *Angophora hispida, Eucalyptus haemastoma* and *E. oblonga* (Robinson 1994).	• Suitable habitat is present. • Absence of species during field survey deemed reflective of its occurrence • Species not likely to be affected, no further assessment required
Microtis angusii	E	E	This terrestrial orchid is known from only one population in the Warringah/ Pittwater area, which is in close proximity to a major road. It is in low woodland to scrub/ heath with Sydney sandstone geology (DEC 2004).	• Suitable habitat is present. • Absence of species during the various detailed field surveys over several seasons deemed reflective of its occurrence • Species not likely to be affected, no further assessment required
Pimelea curviflora var. curviflora	E	E	This species is restricted to the northern coastal area of Sydney on sandstone and laterite soils (Threlfal 1982, Harden 1990, Rye 1990)	• Suitable habitat is present. • Absence of species during the various detailed field surveys over several seasons deemed reflective of its occurrence • Species not likely to be affected, no further assessment required

Table 3 Potential Threatened Flora Species				
Species	Status (*TSC Act* 1995)	Status (*EPBC Act* 1979)	Habitat	Assessment
Tetratheca glandulosa	V		A spreading low shrub found in sandy or rocky heath, woodland or scrub.	• Suitable habitat is present. • Absence of species during the various detailed field surveys over several seasons deemed reflective of its occurrence • Species not likely to be affected, no further assessment required
Syzygium paniculatum	V		Growing on sandy soils or stabilised dunes near the sea or in tropical and littoral rainforest, near estuaries or coastal lagoons, this shrub or small tree is found between Bulahdelah and Jervis Bay.	• No suitable habitat present • Species not likely to occur. • No further assessment required
Prostanthera sp. 'Manly Dam' (Conn 4444)	#		This species is only known from 2 populations in Seaforth in the Manly Local Government Area, growing on deeply weathered soils with Ironstone inclusions (Skelton *et al.* 2004).	• Suitable habitat is present. • Species found near site • **8 Part Test required**

This is a recently discovered new species that is being proposed for listing by this Author. There is very limited information on this species. The Author of this report, Nicholas Skelton, found the species in 2001 and has been monitoring the populations and their ecology and is considered the ecological expert on this species. This species is being nominated for addition to the schedules of the *TSC Act* 1995. Barry Conn is the taxonomist who is formally naming the species.

Endangered populations

None

Endangered ecological communities

Duffys Forest Ecological Community is listed as an endangered ecological community under the NSW *Threatened Species Conservation Act* 1995 since 1998. It occurs on ridge-tops on lateritic soils associated with shale lenses within the Hawkesbury Sandstone geological unit. The approximate distribution of Duffys Forest has been mapped by Smith and Smith (2000) who found that only 16% of the pre-1750 extent of this vegetation community remained in 2000. As such the DEC considers that all remaining remnants are significant and those on public lands should be managed for conservation purposes (Environmental Assessment Guidelines).

4 Survey

4.1 Requirement to survey

A fauna and flora survey was conducted in the study area including targeted surveys of species listed in Section 3.

4.2 Documentation of survey effort and technique

4.2.1 Description of survey techniques and survey sites

All surveys were carried out by ecologists with tertiary qualifications and extensive experience in ecology, flora/fauna identification and bush regeneration/management. The writing of this report and the field survey were both personally supervised by Nicholas Skelton B.Sc. (Hons) M.Sc. with 15 years experience in ecological surveys, ecology, flora/fauna identification and bush regeneration/management. See Section 9.1 for details of experience and qualifications of personnel. A field survey was conducted to determine the presence of suitable habitat.

Fauna Survey

A diurnal and nocturnal fauna survey of Seaforth Oval was conducted by Marcus Baseler, of GIS Environmental Consultants, over all four seasons for a period of 12 months from June 2001. In addition, opportunistic and targeted diurnal fauna surveys were conducted on the 16th and 23rd of April 2004. All fauna encountered was recorded and the study area was systematically searched for indirect evidence of fauna including scats, scratches, diggings and feathers etc.

An nocturnal fauna survey was conducted on the 2nd and 7th of May 2004, and consisted of spotlighting and bat call analysis using a hand-held Anabat system along existing tracks. Spotlighting was conducted by two observers using 100 Watt hand-held spotlights. All vocalisations were recorded and identified using reference material. The Anabat recordings were analysed by Glenn Hoye, Fly By Night Bat Surveys Pty Ltd. A complete fauna list is included in Appendix C.

During the flora and fauna surveys the site was also surveyed for important habitat features. This involved locating potential habitat features such as groups of boulders, nests, hollows, dreys, creeklines *etc.*, then describing and mapping these features.

Flora Survey

A flora and fauna survey of Seaforth Oval was conducted by GIS Environmental Consultants, over all four season for a period of 12 months from June 2001 (Skelton *et al.* 2004) and (Skelton 2003). Subsequent to this survey, the flora of the site was surveyed by Smith & Smith (2002) and James (2003). Additional flora and fauna surveys for the purpose of this SIS were conducted by GIS Environmental Consultants on the 16th and 23rd of April, 2004 for a total of 16.5 person-hours. Due to the small size of the remnants only three 20 m x 20 m quadrats were able to be used. All plant species were identified and recorded from the whole of the remnants. Species in the remnants and outside were recorded as individuals in Appendix D. Plant species recorded by previous surveys are also included in Appendix D. The quadrats were used to compare the vegetation community with the definition in the *TSC Act* 1995, the Smith & Smith (2002) report and Duffys Forest vegetation elsewhere that has also been recorded by GIS Environmental Consultants.

Digital photographs were taken of the each quadrat and the site. These are available on request. The following characteristics were recorded within each quadrat:

- Vegetation Structure: the growth form, height and density of plants that occur in the quadrat. The vegetation was visually divided into strata. The average height of these strata were recorded.
- Genus and Species: all vascular plants in the quadrat were identified to species level. Nomenclature follows that of the Flora of NSW (Harden 1990-1994). For each species the following is given in Appendix D:
    - Order, family, common name and habitat;
    - Relative abundance within the quadrat. For each taxon the cover of live plant material in the plot was recorded using a modified Daubenmire (Braun-Blanquet) scale;
    - Conservation status;
    - Whether the species is typical of a threatened ecological community or is a remnant area of such communities; and
    - Whether the species is of particular habitat or food importance for native fauna.
- Physical characteristics of the quadrat:
    - Aspect: measured with a compass or the survey plans for the. The aspect of the area influences the climatic conditions, such as the amount of sun that the site receives;
    - Slope: a measure of the steepness of the landscape, it is measured across the quadrat from highest point to the lowest point using a clinometer or from the survey plans;
    - Topography: was used to describe the landform in terms of the morphological attributes that exists for the area including the crest, mid-slope, ridge, lower slope, gully or flat. The topography is used with other parameters such as slope, geology, soil and aspect to determine the factors that are influencing the condition that exist in the area where the quadrat is located;
    - Rocks: any rocks observed in the quadrat were categorised into loose rocks or solid bedrock in order to assess habitat for reptiles;
    - Soil colour: describes the colour of the soil;

- Soil Texture: described as a percentage of clay, silt, and sand content that constitutes the soil. This test also considers other influences such as organic content;
- Soil Depth: is determined by the distance from the soil surface through its horizon down to the parent material. Soil depth is best described as the amount of soil that is available to plants and microfauna. Soil depth is used to also estimate the amount of weathering that has occurred in the area. Soil depth was measured in cm;
- Erosion: this report is concerned with accelerated erosion rather than natural erosion. The erosion is described as the type and rate of topsoil removal that is or has occurred within the quadrat. Two main categories were used to distinguish the type of erosion that is occurring, these are wind erosion or water erosion (which also can be categorised as sheet, gully or wave) and the timing of the erosion activity (*e.g.* is it current or did it occur in the past);
- Ground surface habitat: assesses the amount of ground habitat available for ground dwelling animals such as frogs and lizards. It assesses the amount (as a %) of the ground surface that contains bare soil, loose rocks/stone, solid rock, covered with litter, or as other. On this site the large proportions of casuarina needles reduces the habitat value of the leaf litter.
- Dead timber (trunk diameter >20 cm at chest height): the amount of dead timber that is in the quadrat indicates the habitat available for local fauna. It is assessed using the number of dead trees that are standing, number of dead standing trees with hollows, number of fallen logs and the number of fallen logs with hollows;
- Disturbance and fire history of the site: this is an estimate of the time since the last fire.

4.2.2 Documenting survey effort and results

Task	Hours	No. people	Person hours
Fauna Survey 2001/ 2002	2-4	1	>10
Flora Survey 2001/ 2002	2	4	8
Flora Survey 2004	5.5	3	16.5
Threatened Species Search 2004	0.5	2	1
Fauna Habitat Assessment 2004	0.5	1	0.5
Nocturnal Fauna Survey 2004	1.5	2	3
Smith and Smith Flora Survey 2002	?	?	?
James Flora Survey 2003	4	1	4

The weather during the 2004 survey was fine and warm during the day, and cool to mild during the night.

4.3 Specific survey requirements

The targeted potential threatened species were specifically recorded for.

Microtis angusii

While surveys for this species were not conducted during its flowering period, the easiest time for identification, we are still confident that this species is not present on the site as the remains of the leaves and stems are normally evident for more than 12 months. Nicholas Skelton is suitably qualified to search for evidence of this species due to past experience with this species and genera. There was no evidence of microtis like species found on the site. Some plants that may be *Microtis angusii* were found in 2003, 400m to the north-east. The confirmation of the genetic identification of the species at the nearby Seaforth Bowling Club potential population is not known at the time of writing.

Prostanthera **sp. 'Manly Dam' (Conn 4444)**

This is a recently discovered new species that is being proposed for nomination for addition to the schedules of the TSC Act 1995 by this author. There is very limited information on this species. The author of this report, Nicholas Skelton, found the species in 2001 and has been monitoring the populations and their ecology every year since and is now likely to be an ecological expert on this species. Barry Conn is the taxonomist, from the Royal Botanic Gardens Sydney, who is formally naming the species.

Six individual plants were found in bushland directly opposite Seaforth Oval on the 23rd April, 2004. These plants were in flower and photographs were taken. The known population is located 20 m away to the north across Wakehurst Parkway, in a patch of Duffys Forest Ecological Community which is in fair condition. The six individual *Prostanthera sp.* "Manly Dam" plants are located 10 m into the roadside bushland, and are currently being swamped by *Dodonaea* plants. In 2004 this population was found to have increased and was flowering well. All parts of this site were searched for in detail and no *Prostanthera* species were found.

5 *Assessment of likely impacts on threatened species, populations*

The assessment of impact of the proposed development on threatened species includes the assessment of indirect impacts and those of associated activities, including: clearing, materials storage and dumping, installation and maintenance of utilities, fire protection zones, access and egress routes, changes in surface water flows, introduction of exotic species and weeds, nutrient and other forms of pollution were considered on and off the subject land in this SIS.

The Director General considers any impact on threatened species resulting from this proposal most likely to arise from the following:

- Loss of habitat from direct removal through clearing of native vegetation;

The proposal will result in the loss of 0.12 ha of native vegetation and revegetation and bush regeneration. This SIS contains strong recommendations for bush regenerating this area which will improve the habitat of the site. No threatened species were found on the site. However, the site is potential habitat for several threatened species. Assessment of the impact of the proposal on these threatened species is given below.

- Degradation of habitat from indirect impacts (*e.g.* edge effects, sedimentation and erosion) to retained vegetation;

The remnant vegetation at the site is currently experiencing edge effects. A comprehensive Bushland Management Plan should be produced for the site to mitigate factors leading to the degradation of this habitat. Recommendations in this SIS will produce a larger and less isolated area of bushland that will have less edge effects. Due to the ridge top location of this site there is minimal sedimentation or erosion issues. Recommendations are made to divert water and revegetate the adjacent land to the north.

- Possible infection of native plants by *Phytophthora cinnamomi*; and

There are no creeks or drainage lines at the site, which is predominantly dry. *Phytophthora cinnamomi* is not likely to pose a threat to native plants under the current conditions. Recommendations are made to revegetate or appropriately drain the adjacent land to the north.

- Possible invasion of native plant communities by exotic perennial grasses.

Invasion of native plant communities by exotic perennial grasses is a potential threat at this site. During the field survey there was evidence that garden clippings were being dumped on the site and some Kikuyu was found on the eastern edge. A comprehensive Bushland Management Plan is recommended for this site, outlining appropriate bush regeneration, weed control and deterrents for the dumping of such waste on this site.

Other potential impacts are addressed in Section 7.

5.1 Assessment of species likely to be affected

Tables 2 and 3 identifies the species that may be affected by the proposal and the reasons for this conclusion. Lists of all flora and fauna species found during surveys are Appendices C and D.

Threatened Species assessed

- Subject Fauna Species:

  Miniopterus schreibersii (Common Bent-wing Bat);
  Ninox strenua (Powerful Owl);
  Pteropus poliocephalus (Grey-headed Flying Fox); and

- Subject Flora Species:

  Caladenia tessellata;
  Prostanthera sp. 'Manly Dam' (Conn 4444).

Assessment of Impact on Threatened Fauna

To assist in the assessment of the impact of this proposal on these 5 species, 8 part tests are given below.

Miniopterus schreibersii (Common Bent-wing Bat)

(a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The Common Bent-wing Bat roosts in caves, mine adits and road culverts (Churchill 1998). This species was found foraging in and around the study site. A major component of their diet being moths (Churchill 1998). It is highly likely that the flood-lights in the existing car-parking area are attracting the moths on which the Common Bent-wing Bats are feeding. The proposal will not affect any potential roost sites for this species of bat and the life cycle of this species is not likely to be disrupted such that a viable local population is placed at risk of extinction. The proposal is likely to increase the amount of artificial lighting which would increase the local availability of food.

(b) in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

The Common Bent-wing Bat is a threatened species, not a population, and therefore this question is not applicable.

(c) in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or remove,

South Australia, Victoria, New South Wales and Queensland, and is also found in the Northern Territory and the northern parts of Western Australia (Bourne undated). Within the Sydney region, winter roost sites for this species of bat are in historic fortifications within Sydney Harbour and Botany Bay National Parks (Bourne undated). No significant amount of area of known habitat will be modified or removed by the proposed new access road and car parking area at Seaforth Oval.

(d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

The Common Bent-wing Bat is highly mobile and the construction of the new access road and car parking area at Seaforth Oval is not likely to further isolate any areas of known Common Bent-wing Bat habitat.

(e) whether critical habitat will be affected

Critical habitat has not been declared for this species.

(f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

Threats to the Common Bent-wing Bat include the loss of habitat for wintering sites and excessive disturbance during torpor (Bourne undated). Within the Sydney region, winter roost sites for this species of bat are in historic fortifications within the Sydney Harbour and Botany Bay National Parks (Bourne undated). Many of these buildings are heritage-listed and cannot be demolished. However, conservation and maintenance works on these buildings do present significant threats to this species within the Sydney region. A

Conservation Plan has been produced for this species in this region (Bourne undated), and recommendations made in this report should be implemented by NPWS for the management of these important roost sites within National Parks.

(g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The *TSC Act* 1995 defines "*threatening process*" as "*a process that threatens or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*". The proposed construction of a new access road and car-parking area at Seaforth Oval is not likely to threaten the survival or evolutionary development of the Common Bent-wing Bat.

(h) whether any threatened species, population or ecological community is at the limit of its known distribution

The Common Bent-wing Bat is distributed along the coast and ranges from southeast South Australia, Victoria, New South Wales and Queensland, and is also found in the Northern Territory and the northern parts of Western Australia (Bourne undated). The study site is not at the limit of the known distribution of the Common Bent-wing Bat.

Impact Assessment Conclusions:
Based on the information available, the proposed development at this site is not likely to have a significant effect on the conservation of the Common Bent-wing Bat.

***Ninox strenua* (Powerful Owl)**

(a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

The Powerful Owl was not detected during the field survey for this report. However, there are widespread frequent reports of this species in the local and nearby areas (Kavanagh 2004), and the study site is potential foraging habitat for this species. Arboreal mammals are the main component of the Powerful Owl's diet (Debus & Chafer 1994), and several Ringtail Possums were located in the study site during the nocturnal survey. Although a small area of potential foraging habitat will be removed by the proposed development, the amount of habitat loss is not considered significant and is not likely to disrupt the life cycle of the species in such a way that the local population of the Powerful Owl would be placed at risk of extinction. There are no hollow-bearing trees on the site for Powerful Owls to nest in and there are no suitable roost sites.

(b) in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

The Powerful Owl is a threatened species, not a population, and therefore this question is not applicable.

(c) in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

Powerful Owls require large home ranges (Pizzey 1997) and occupy the remaining areas of intact bushland found in the Sydney Region (Kavanagh 2004). Given the surrounding

and nearby large areas of intact bushland, the loss of potential foraging habitat resulting from the proposed new access road and car parking areas is not considered significant in relation to the regional distribution of Powerful Owl habitat.

(d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community
The Powerful Owl is highly mobile and the construction of the new access road and car parking area at Seaforth Oval is not likely to further isolate any areas of known Powerful Owl habitat.

(e) whether critical habitat will be affected

Critical habitat has not been declared for this species.

(f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region
Powerful Owls were previously classified as "rare" largely due to the lack of information available on owls in National Parks and State Forests. There are now regarded nationally as being threatened species of "least concern" in terms of their conservation status (Garnett & Crowley 2000). Populations of Powerful Owls have been recorded in the nearby Ku-ring-gai Chase and Garigal National Parks. It is considered that the Powerful Owl is adequately represented in conservation reserves within the Sydney Basin Bioregion.

(g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The *TSC Act 1995* defines "*threatening process*" as "*a process that threatens or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*".

High or inappropriate fire frequency and the clearing of native vegetation are key threatening processes for the Powerful Owl. Both these processes have the potential to destroy tree hollows (used by the Powerful Owl as roost sites) and cause a decline in food availability. Field surveys have revealed that the site has not experienced fire for at least 25 years. Clearing of native vegetation will occur with the proposed development. This could result in slightly fewer ringtail possums on site, and hence a small reduction in food resources for the Powerful Owl, but this is not considered significant. The site does not contain any hollow-bearing trees, therefore no roost sites will be removed.

(h) whether any threatened species, population or ecological community is at the limit of its known distribution
Powerful Owl distribution is from Eungella National Park in Queensland, to Mt Burr in far-east South Australia, mostly within 200 km of the coast. The study site is not at the limit of the known distribution of this species.

Impact Assessment Conclusions:

Based on the information available, the proposed development at this site is not likely to have a significant effect on the conservation of the Powerful Owl.

Pteropus poliocephalus (Grey-headed Flying Fox)

(a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

It is unlikely that Grey-headed Flying Foxes are using the site for foraging due to the absence of food sources on the site, and given the small area contained in the site, and the availability of resources nearby it is unlikely that the loss of this small area of potential foraging habitat will disrupt the life-cycle of this species such that a viable population of this species is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised

The Grey-headed Flying-fox is an endangered species, not a population, and therefore this point is not applicable.

(c) in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed

Given the availability of Grey-headed Flying-fox habitat in the surrounding and nearby areas, the removal of this small section of bushland, containing potential foraging habitat, is not likely to be significant in relation to the regional distribution of the habitat of the Grey-headed Flying-fox.

(d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community

Grey-headed Flying-foxes are highly mobile and the proposal will not cause any further isolation of any areas of habitat for this threatened species.

(e) whether critical habitat will be affected

Critical habitat has not been declared for this species.

(f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

Grey-headed Flying-foxes were estimated to number less than 400,000 in 2001, which was a decline of around 30 % from 560,000 animals in 1989 (NSW NPWS 2001). They were listed as Vulnerable due to their sharp decline in numbers over a relatively short period of time. Loss of habitat is the primary reason for their decline in numbers (NSW NPWS 2001), due to the reduced availability of food resources. Although this species is well-represented within protected areas of this region, it is important to protect all food and shelter resources throughout the area to prevent further decline in numbers of this species in the local area.

(g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The *TSC Act* 1995 defines "*threatening process*" as "*a process that threatens or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*".

'Loss of biodiversity as a result of loss and/or degradation of habitat following clearing and fragmentation of native vegetation for development' is a *"key threatening process"* listed under Schedule 3 of the *TSC Act* that is relevant to this threatened species. The proposed construction of a new access road and parking area at Seaforth Oval is not considered a threat to the survival or evolutionary development of the Grey-headed Flying-fox.

(h) whether any threatened species, population or ecological community is at the limit of its known distribution
This species has a known distribution north to Queensland and south to Victoria, along the eastern coastal plains. This site is not at the limit of the known distribution of the Grey-headed Flying-fox.

Impact Assessment Conclusions

Based on the information available, the proposed development at this site is not likely have a significant effect on the conservation of the Grey-headed Flying-fox.

Assessment of Impact on Threatened Flora

Caladenia tessellata

(a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction
There was no evidence of this species or similar terrestrial orchid species were found on this site.
This tuberous terrestrial orchid is fire-resistant and likely to be disadvantaged by prolonged intervals between fire events. Not much is known of its biology. This species was not located at the study site. It is usually only seen after fire, and the study site has been unburnt for the past 30 years. Pollination is mediated by flying insects, seeds are microscopic in size and an ectomycorrhizal association is required on germination. The proposed development is not likely to disrupt the life cycle of this species such that a viable local population of this species is likely to be placed at risk of extinction.

(b) in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised
Caladenia tessellata is a threatened species, not a population, and therefore this question is not applicable.

(c) in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed
At present, *Caladenia tessellata* is known from only four small and isolated populations within NSW; near Braidwood on the Southern Tablelands and on the Central Coast (Hogbin 2002). No *Caladenia tessellata* plants are known to be present on this site. No area of known habitat is to be modified or removed with the proposed development.

(d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community,
At present, *Caladenia tessellata* is known from only four small and isolated populations within NSW: near Braidwood on the Southern Tablelands and on the Central Coast

(Hogbin 2002). The proposal is not likely to isolate an area of known habitat from currently interconnecting or proximate areas of habitat for this threatened species.

(e) whether critical habitat will be affected

Critical habitat has not been declared for this species.

(f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region

Due to the cryptic nature of this species, it is not known whether or not this species is adequately represented in conservation reserves (or other similar protected areas) in the region.

(g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The *TSC Act* 1995 defines "*threatening process*" as "*a process that threatens or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*". The proposed clearing of a small area of vegetation for construction of a new access road and car-parking area at Seaforth Oval is not likely to threaten the survival or evolutionary development of *Caladenia tessellata*.

(h) whether any threatened species, population or ecological community is at the limit of its known distribution

At present, *Caladenia tessellata* is known from only four small and isolated populations within NSW: near Braidwood on the Southern Tablelands and on the Central Coast (Hogbin 2002). This species also occurs in Victoria. The study site is not at the limit of the known distribution of *Caladenia tessellata*.

Impact Assessment Conclusions

Based on the information available, the proposed development at this site is not likely to have a significant effect on the conservation of *Caladenia tessellata*.

Prostanthera sp. 'Manly Dam' (Conn 4444)

No *Prostanthera sp.* 'Manly Dam' (Conn 4444) plants were found on the site; the nearest plants are 30 m away, across the Wakehurst Parkway. The site is suitable habitat for this species, and this site has potential for assisting with the recovery of the species. The proposed management of this area should take into account of the future needs of this species. This species is not currently listed in the schedules of the TSC Act.

(a) in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction

This species is perennial and it is likely the seed is not dormant for a long period of time. The site was thoroughly searched. It is not likely that this species occurs on this site. The plants across the road are an adjunct population that is likely to be particularly important in ensuring the survival of this species if a chance event threatens the survival of the plants in the only other known population further to the east. The population across the road from the study site is a viable population. It has been monitored by the author for the past 3 years and the population has increased over this period. The

viability of the population is not likely to be significantly compromised by the proposed development.

(b) in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised
This species is likely to be listed under the *TSC Act* 1995 as an endangered species, not an endangered population.

(c) in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed,
This species is only known to occur in the population across the road from the study site and in the population adjacent to Wakehurst Golf Course to the east. The study site is not known habitat for this species. However with the appropriate management this site may be important to the conservation of this species, recommendations are made in this SIS.

(d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community
The known habitat on the eastern side of Wakehurst Parkway is diagonally adjacent to this site (30m away) and directly opposite to Garigal National Park. It is not considered that the construction of a new access road and car parking area at Seaforth Oval will further isolate any known habitat from currently interconnecting or proximate areas of habitat for this species.

(e) whether critical habitat will be affected

Critical habitat has not been declared for this species. However with the appropriate management this site may be important to the conservation of this species, recommendations are made in this SIS.

(f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region
This species is not adequately conserved in any Reserve or National Park.

(g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process

The *TSC Act* 1995 defines "*threatening process*" as "*a process that threatens or may have the capability to threaten, the survival or evolutionary development of species, populations or ecological communities*". 'Loss of biodiversity as a result of loss and /or degradation of habitat following clearing and fragmentation of native vegetation for development' is a "*key threatening process*" listed under Schedule 3 of the *TSC Act* 1995 that is relevant to this threatened species. The proposed construction of a new access road and parking area at Seaforth Oval is not considered to be a threat to the survival or evolutionary development of *Prostanthera sp.* 'Manly Dam' (Conn 4444). However, the future management of this area could enhance the survival of the population of this species that lies 30 m away, across the Wakehurst Parkway.

(h) whether any threatened species, population or ecological community is at the limit of its known distribution

The population 30 m from the study site across the Wakehurst Parkway is at the limit of its known distribution.

Impact Assessment Conclusions (Prostanthera sp. *'Manly Dam' (Conn 4444)*): Based on the information available, the proposed development is not likely to have a significant effect on the conservation of *Prostanthera sp.* 'Manly Dam' (Conn 4444). It is recommended, the proposed management of this area should take account of the future needs for the recovery of this species.

Conclusions of the Threatened Species and Populations Impact Assessments
The assessment of the impact of the proposal on threatened species came to the conclusion that there is not likely to be a significant impact on any threatened species, therefore, the remaining requirements in this section are not further discussed.

6 *Assessment of likely impacts on endangered ecological communities*

It is likely that the entire remnant of Duffys Forest Ecological Community (DFEC) will be impacted either directly or indirectly as a result of the current proposal. Approximately 0.12 ha of Duffys Forest vegetation will be directly removed as a result of the proposal. The 'loss of biodiversity as a result of loss and/or degradation of habitat following clearing and fragmentation of native vegetation' is listed as a Key Threatening Process under the *Threatened Species Conservation Act 1995*. The NSW National Parks and Wildlife Service (now DEC) consider that the loss of any Duffys Forest Ecological Community is a significant impact on the population because less than 16% of the original distribution remains and much of this is in poor or average condition (Environmental Assessment Guidelines). Smith and Smith (2000) considered that "The Duffys Forest community has been so heavily depleted that all remaining examples warrant retention".

Approximately 0.12 ha of Duffys Forest vegetation will be retained in two patches under the current proposal. It is likely that this vegetation will be affected by indirect impacts unless considerable management is undertaken. The indirect impacts likely to affect the retained vegetation include invasion by weedy species including perennial grasses, edge effects, possible infection of native plants by *Phytophthora cinnamomi* and degradation of habitat due to edge effects, sedimentation and erosion.

The area of DFEC under consideration in this SIS is already degraded by invasions of weedy species. By reducing the size of the patches and fragmenting them further the area to perimeter ratio will be increased and this will increase the exposure to edge effects such as weed invasion. Invasion of native vegetation by perennial grasses may occur is edging is inadequate.

This report includes recommendations to reduce this impact and potentially improve the conservation of this ecological community (see Map 3).

6.1 Assessment of endangered ecological communities likely to be affected

The Duffys Forest Ecological Community is the only ecological community that may be impacted by this proposal. The Duffys Forest that will be affected by the current proposal is considered to be in poor condition (Smith & Smith 2000, Smith & Smith 2002, James 2003, Skelton *et al.* 2003) but is able to be improved with appropriate management.

6.2 Assessment of habitat

6.2.1 Description of disturbance history

This remnant is highly disturbed due to fragmentation by roads, pathways and weed invasion. The disturbance has been mostly carried out when the oval was established on a gravel quarry site more than 30 years ago. The use of the adjacent car park has contributed in a small way to the disturbance. The low fences have helped prevent some vehicular damage. There have been no fires in this patch for more than 30 years and the remnant is senescent (James 2002, Skelton et al. 2003). Building materials, grass clippings, and household rubbish and garden waste continue to be dumped on this site.

The vegetation has poor species richness, even compared to other poor condition remnants in the area. This remnant would require considerable management including prescribed burning to regenerate into good quality Duffys Forest.

6.2.2 Extent of habitat removal

A number of assessments have determined that this site contains a total of 0.25 ha of poor quality Duffys Forest Ecological Community. The current proposal would result in the loss of approximately 0.12 ha of Duffys Forest and leave 0.12 ha in two small patches that will be further isolated and fragmented. See Map 2.

6.3 Discussion of conservation status

Duffys Forest Ecological Community is now represented by less that 16% of its original distribution. The remaining 240 ha are spread across 33 patches, many of which are fragmented and isolated. Of the 16 % remaining only 64% is protected in reserves managed by State or Local Governments (Smith & Smith 2000). In 2000, 60% of the community was deemed to be in good condition.

Due to the highly depleted nature of this community the National Parks and Wildlife Service considers all remnants of DFEC to be significant and that those on public land should be managed for conservation. The remnant on the study site is at the southern most limit of the distribution of this community giving this site high conservation value.

6.3.1 Significance within a local context

A survey of the Duffys Forest Ecological Community by Smith & Smith (2000) identified a total of 33 areas of this vegetation type remaining, mentioning Seaforth Oval as the southern most area. Other nearby local populations described by Smith & Smith (2000) include Forest Way, Garrigal National Park; Manning Street, Manly Dam Reserve; Park Circuit Track, Manly Dam Reserve, Warringah Road, Frenchs Forest and Aquatic Drive, Frenchs Forest.

The Forest Way and Garigal National Park patches are 17.3 ha in size made up of a 16.1 ha patch and a 1.2 ha patch. The condition of those areas is good with small amounts of weeds along the edges adjacent to roads.

The area of DFEC at Manning Street, Manly Dam is 2.6 ha in size and described as having an average condition. It is dissected by several formal and informal walking tracks and weed invasion is occurring on the edges of the area and along tracks. This area is managed by Warringah Council.

The Park Circuit Track, Manly Dam Reserve DFEC area is a total of 2.3 ha in two patches either side of the creek crossing. This patch was considered in good condition with some weeds on the immediate edge of the track. This area is managed by Warringah Council

The Warringah Road, Frenchs Forest area is a total of 5.4 ha of which 0.8 ha is protected within the Warringah Council managed Blinking Light Reserve. This area is in poor condition due to isolation and fragmentation, rubbish dumping and a high level weed infestation.

The area of DFEC at Aquatic Drive, Frenchs Forest is a total of 7.6 ha in size, of which 2.3 ha is in Manly Dam Reserve, 0.4 ha is west of Wakehurst Parkway on Anglican Church land and 0.3 is beside Allambie Road on Energy Australia land. The remainder is spread between the road reserves along Wakehurst Parkway and Aquatic Drive. The condition of the vegetation in this area ranges from poor to average due to weeds, fragmentation and isolation of the vegetation.

Of the 5 nearby patches, most are in poor to average condition because of isolation and fragmentation and weed infestations. Approximately 80% of the DFEC in the local area is protected within Council or State managed reserves. The area within Garigal National Park is within 50-100 m of the study population and would provide the potential for some limited dispersal and genetic exchange to occur.

6.3.2 Discussion of corridor values

Currently the vegetation to be removed has limited value as a habitat corridor for fauna species because it is separated from other bushland by either roads or car parks. Other patches of DFEC may still be close enough for limited dispersal of pollen and seed from other nearby remnants, functioning as a habitat corridor and a potential source of genetic variation for other local populations.

The fragment of Duffys Forest that will remain with the proposal is already isolated by the Wakehurst Parkway and the adjacent car-park area. This development will only slightly increase the fragmentation, isolation and edge effects of this patch of Duffys Forest and Duffys Forest in general. There is potential to re-link these patches to other native vegetation patches. Recommendations are made in this report.

Map 3 shows the potential for the rehabilitation of the north east corner of the development site. It is recommended that the gravel road base be removed and the area regenerated with topsoil translocated from nearby areas of Duffys Forest that are planned to be cleared. This would then provide a corridor between the remaining Duffys Forest on the site and the National Park. There are guidelines for translocation of material, "Guidelines for the Translocation of Threatened Plants in Australia" produced by the Australian Network for Plant Conservation (1997), Translocation of biotic material from Duffys Forest Vegetation Community, Final Report on the translocation of biotic material from Lot 906 DP 867091, 10 Narabang Way, Belrose" Prepared by Kate Low & Associates and J. Harkin Consulting (November 2001) and Works Protection Program for Lot 501, D.P. 875858 Minna Close, Austlink Corporate Park, Belrose by Nicholas Skelton (September 2002).

6.4 Description of feasible alternatives

Alternatives to the current plans for a new access road and car parking area at Seaforth Oval include:

- No change to the current access to Seaforth Oval;
- Alternative locations for the access road have been investigated by Council: see report by others. The other suggested locations for the road access all include this patch of vegetation. The proposed route has the least impact of the other suggestions due to the past disturbance history of the area being impacted;

7 Ameliorative measures

7.1 Description of ameliorative measures

Alterations/ Additions to the Plans

Recommended changes to the existing plans (See Map 3 for Areas 1-10):

Area 1. Relocate bike racks and shelter further south to not be in the native vegetation but in the adjacent already disturbed area;

Area 2. 2a & 2b. Revegetate already disturbed areas using translocated topsoil from the access way and/or other Duffys Forest sites that are to be developed. A gap has been left in this area for a cycle way to Wakehurst Parkway;

Area 3. Move the northern car park west to prevent loss of Duffys Forest on the eastern side;

Area 4. Remove the footpath on the northern side of the access way;

Area 5. Revegetation and re-establishment of most of the Duffys Forest along the old roadway OR use part of the road as a cycleway with a reduced width;

Area 6. Leave the bus shelter where it is located rather than move it and disturb more vegetation;

Area 7. Reduce the width of the south footpath/cycleway to just a footpath (1.5m wide) and use the existing road as a cycleway as discussed in Area 5;

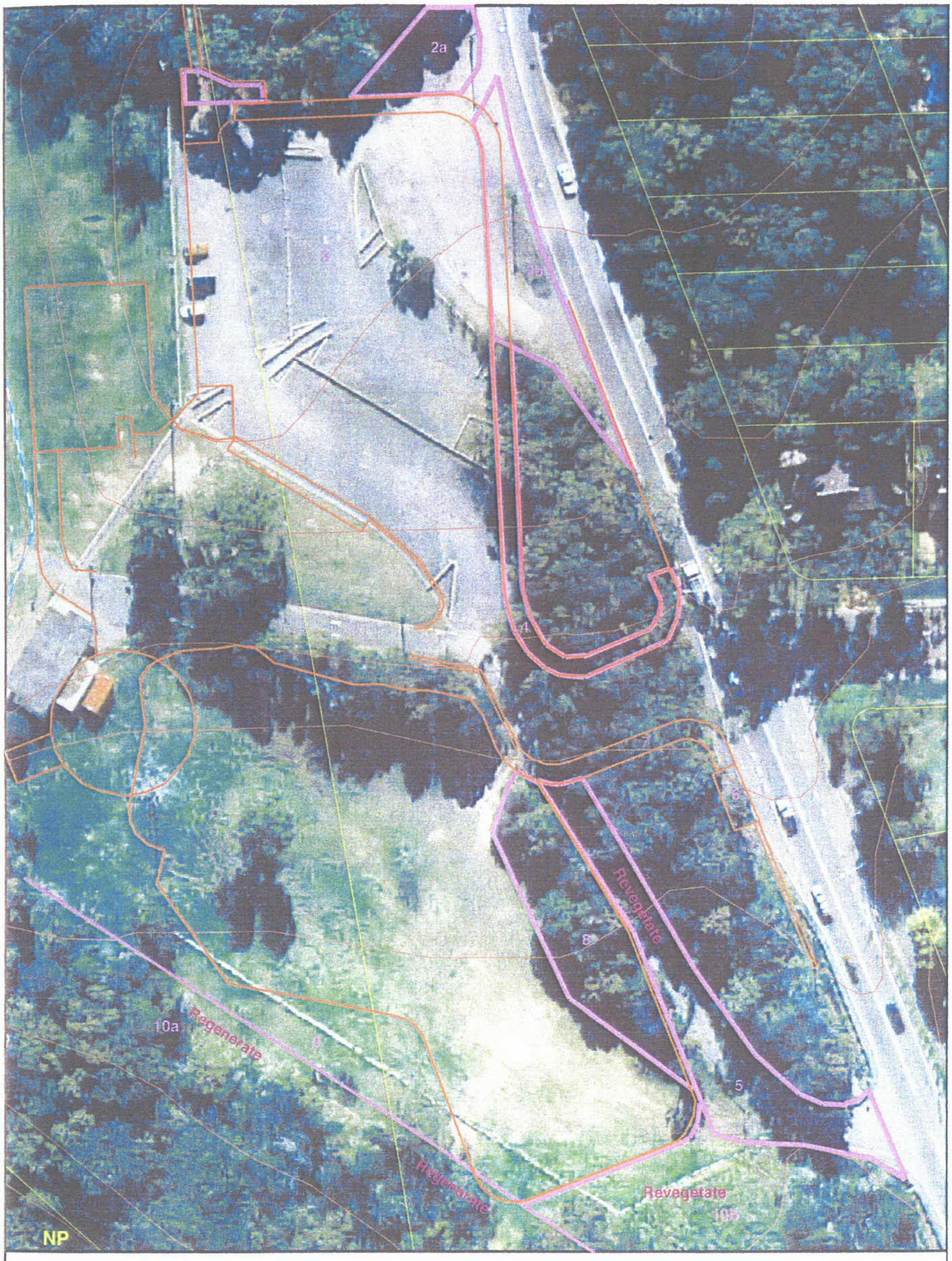
Area 8. Do not remove the Duffys Forest patch on the western side of the overflow car park;

Area 9. Substantial, well defined edging, a retaining wall and fence needs to be installed between the bushland and the playing fields in the southern car park. It is preferable to have an easily manageable straight line rather than the curve proposed. This also gives an option for the extension of the southern car park to the south west;

Area 10. 10a & 10b. Control weeds and regenerate bushland.

General Recommendations

- It is recommended that appropriate species grown from local stock are planted in all parts of the landscaping, for example *Eucalyptus seiberi*.
- A working draft recovery plan for Duffys Forest Ecological Community is not available as a public document. It is likely to include an objective to prevent the loss and increase the protection of Duffys Forest Ecological Community remnants on public and private lands. The recommended changes to the existing plans (Area 8 above); not removing the Duffys Forest patch on the western side of the overflow car park, is consistent with this objective.
- It is recommended that the 'Draft guidelines for the management of Duffys Forest Ecological Community remnants: ecological restoration and reconstruction' and the 'Draft guidelines for the management of Duffys Forest Ecological Community remnants: buffers an adjoining vegetation', both by DEC, are adhered to when Duffys Forest remnants are being regenerated and revegetated.
- It is recommended that any future fire management practices at the site adhere to the 'Draft guidelines for the management of Duffys Forest Ecological Community remnants: fire management practices.'



Map 3
Recommended Modifications to Plans

— Recommendations
— Proposed Development

January 2005

GIS Environmental Consultants by Nicholas Skelton, Ph: 041 943 8672

Works Protection Plan

A Works Protection Plan is recommended for the construction of the new access road and car park area. The plan should be tailored to the specific conditions of this site and the proposed development. The Works Protection Plan should describe the restrictions on work practises that are relevant to protecting the bushland to be retained. The Works Protection Program should be prepared by an appropriately qualified person in consultation with the Duffys Forest recovery team and Council and approved before the construction certificate is issued.

The Works Protection Plan should include:

Installation of temporary fences for the construction period.

Delineation of the area for environmental protection (EPA)

Appropriate fire regimes

A list of things that cannot be done in the Environment Protection Area

Clearing of moving equipment to prevent pathogens from being introduced

Weed control before earthworks

Plant Propagule collection

Recovery of habitat logs and rocks

Tree removal techniques

Supervision of earthworks

Propagation of appropriate plant material for any bush regeneration required on the site after construction

Installation of the permanent environmental protection fences

A long term Bush Regeneration Plan maintenance program

7.1.1 Long term management strategies

Bushland Management Plan

It is recommended that a Bushland Management Plan that describes the most appropriate methods to be used for the long term maintenance of the ecological values of the bushland to be retained be made.

The Bushland Management Plan should include:

Appropriate signage to reduce access to Environmental Protection Areas and for public education

Weed control and bush regeneration

Guidelines on ecologically responsible landscaping and grounds maintenance

A list of things that cannot be done in the Environment Protection Area

Monitoring program and monitoring data sheets

7.1.2 Compensatory strategies

There are opportunities to revegetate areas of the site to Duffys Forest that includes the section of the current access road from Wakehurst Parkway to the proposed new access road and the gravel area to the North East. It is recommended that the existing surfaces be scraped back to the original clay/laterite substrate swept and then overlaid with Duffys Forest topsoil. This soil can be translocated from nearby sites that are being developed and contain Duffys Forest that is in good condition. The rehabilitation strategies for the proposed roads to be closed should be included.

The regeneration of the north-east corner of the development site would provide an ecologically important connection between the remnant Duffys Forest on the site and the National Park (See section *6.3.2 Discussion of corridor values* above).

The recommended Bushland Management Plan (BMP) will describe how to better manage this remnant patch of Duffys Forest. The BMP will detail appropriate fire regimes, drainage & weed control, and will make recommendations on ways to discourage the illegal dumping of household garbage, including garden clippings, in this important ecological remnant.

7.1.3 Ongoing monitoring

The Bushland Management Plan and the Works Protection Plan need to include short term monitoring and ongoing monitoring.

7.1.4 Translocation

This translocation should be performed in accordance with the draft guidelines set down by the Duffys Forest Recovery Team (2003) and "Guidelines for the Translocation of Threatened Plants in Australia" by the Australian Network for Plant Conservation (1997).

8 Assessment of significance of likely effect of proposed action

8 part Test of Significance of Impact for Duffys Forest Ecological Community at the site of a proposed development at Seaforth Oval, Seaforth, as required by section 5A of the EP&A Act 1979

(a) *in the case of a threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction*

This is a threatened Ecological Community, not a Species, and therefore this question is not applicable.

(b) *in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised*

This is a threatened Ecological Community, not a Population, and therefore this question is not applicable

(c) *in relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed*

The estimated original extent of the community, before 1770, was about 1450 ha (Smith and Smith 2000). The amount of Duffys Forest that existed in 2000 was estimated to be 236.5 ha which is approximately 16% of the original extent. Of this current distribution half is reserved in nearby National Parks and 15% is managed by Local Councils or trusts, leaving 36% unreserved. This ecological community occurs in the Local Government areas; Warringah, Pittwater, Manly, Ku-ring-gai and Hornsby. 59% of the current distribution is considered to be in good condition. The community on this site is in poor condition. The amount of Duffys Forest that will be removed by this proposal is approximately 0.12 ha. This report includes recommendations for changes to the plans to reduce the amount of disturbance if the recommendations are fully adapted, it is considered that the proposal would not remove a significant area of habitat. There is an opportunity to revegetate previously disturbed areas of Duffs Forest.

(d) *whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community*

These remnant patches are currently isolated from nearby remnant Duffys Forest Ecological Community by sealed roads to the east and north. The proposal will remove some remnants of Duffys Forest Ecological Community, and the new access road will divide the one remaining remnant into two parts, separated by approximately 12 m of bitumen road. It is not considered that the separation of these two areas will significantly increase the isolation of the Duffys Forest Ecolgical Community on this site. There is an opportunity to reduce isolation by relinking these areas to the adjacent National Park.

(e) *whether critical habitat will be affected*

No critical habitat has been identified for this ecological community.

(f) *whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region*

The estimated original extent of the community, before 1770 was about 1450 ha (Smith and Smith 2000) the amount of Duffys Forest that existed in 2000 was estimated to be 236.5 ha which is approximately 16%of the original extent. Of this current distribution half is reserved in nearby National Parks and 15% is managed by Local Councils or trusts, leaving 36% unreserved. This ecological community is not considered to be adequately conserved.

(g) *whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process*

Loss of biodiversity due to land clearing is recognised as a threatening process, the land is already subject to changed fire regimes which is also a key threatening process.

(h) *whether any threatened species, population or ecological community is at the limit of its known distribution*

This ecological community occurs in the Local Government areas; Warringah, Pittwater, Manly, Ku-ring-gai and Hornsby. This site is at the southern limit of the known distribution of this ecological community.

Impact Assessment Conclusions:
The proposal may cause a significant impact on Duffys Forest Ecological Community. The recommendations made in this report including changes to the plans as well as a Works Protection Plan and a Bushland Management Plan will reduce the scale of the impact.

9 *Additional Information*

9.1 Qualifications and experience

The author and main field worker was Nicholas Skelton. His formal qualifications include a Bachelor of Science (Honours) from The University of Sydney and a Master of Applied Science (Wildlife Management) from The University of New South Wales. He is currently completing a PhD investigating the distribution of threatened species in the northern part of the Sydney Basin.

Nicholas has 19 years experience in environmental management, having worked both as a consultant and as an employee of several government environmental agencies, including the NSW National Parks and Wildlife Service, State Forests of NSW, University of New South Wales, University of Sydney and the Royal Botanic Gardens.

Nicholas is a veteran of more than 250 flora and fauna surveys and environmental assessment projects Appendix E is a list of projects completed 2001-2003. He has also been an author on 12 published scientific papers and has undertaken a number of temporary academic lecturing contracts at The University of New South Wales and the University of Western Sydney.

Nicholas has a great deal of experience in project management, having managed projects of ranging timescales and sizes. Some of these have involved the co-ordination of large-scale multi-disciplinary work and the supervision and organisation of specialist sub-contractors. Nicholas's own special areas of expertise include: flora and fauna survey, field survey design, management planning, GIS data capture and analysis, and digital mapping. He also has considerable experience in the preparation and presentation of evidence for the Land and Environment court as an expert witness.

Nicholas was assisted in the field on 2 occasions by Tony Gilson and Susan Westcott. Cassandra Thompson and Susan Westcott assisted in the writing of this report.

Tony Gilson
Tony Gilson is a project officer for GIS Environmental Consultants, and has a Bachelor of Environmental Science from the University of Newcastle and a Bush Regeneration Certificate 2 from Ryde TAFE. Mr Gilson has been with GIS Environmental Consultants for 3 years, and is also an experienced bush regenerator of 4 years and was a landscaper for 6 years. He has extensive field experience and is the co-author of this SIS.

Susan Westcott
Susan Westcott is a project officer for GIS Environmental Consultants, and has Bachelor of Science and Master of Applied Science degrees from the University of Sydney, majoring in terrestrial ecology. Susan's research interests include small mammal ecology. Susan has worked for GIS Environmental Consultants since January 2004.

Cassandra Thompson
Cassandra Thompson is a project officer for GIS Environmental Consultants, and has a Bachelor of Science and a Masters of Applied Science (Environmental Science) both from the University of Sydney, majoring in terrestrial ecology. Cassandra has worked for GIS Environmental Consultants since August 2004.

9.2 Other approvals required for the development or activity

Approval for the proposed construction of a new access road and car-parking area at Seaforth Oval will be required from the RTA and DEC. No other approvals are known to be needed. See accompanying DA documents for further information.

9.3 Licensing matters relating to the survey

Field work for this report was performed under the following licenses:

NSW NPWS Scientific Licence Number: S10749 for Fauna and Flora Survey; and

Animal Care and Ethics Approval: Animal Research Authority Issued by the Director-General of NSW Agriculture for the Fauna Survey for Biodiversity and Impact Assessment, expiry date 3 September 2004.

Both Nicholas Skelton and Tony Gilson are authorised to operate under the above licenses.

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Appendix A. Draft Guidelines for Soil Seedbank Translocation

Soil Seedbank Translocation from remnants of Duffys Forest ecological community

June 2003

The tasks are ordered chronologically and **must** be performed in the order and manner stated using the specified equipment.

Any changes to the order or method of these specifications must be authorised by the NPWS/Council via the Project Manager, appointed by the applicant in accordance with the development consent conditions.

The tasks have been allocated to different positions as described below:

Project Manager: A Person suitably qualified at supervising the variety of works to be undertaken at the donor and recipient sites. The project manager should ensure that the tasks are done to specification, in the appropriate order and in a timely manner. Tasks such as the ecological burn approval and co-ordinating pre-translocation works at both the recipient and donor sites can all happen concurrently, if applicable.

Bush Regeneration contactor: Person(s) suitably qualified to carry out weed control and bush regeneration works at both the recipient and donor sites.

Earthworks Contractor: Experienced operator to undertake soil excavation from the donor site and transportation to the recipient site.

Flora expert: suitably qualified person to undertake pre and post flora surveys, monitoring and evaluation of translocation program.

Recipient site selection

The selection of the recipient site must be made in consultation with Council and assessed for suitability against the following criteria. Council will make the final decision on site selection in consultation with the NPWS, Threatened Species Unit, Central Directorate.

Selection criteria:

- within the same locality and habitat as the donor site;
- has secure tenure for conservation purposes; and
- appropriate approval to translocate to the recipient site can be gained for the site within a timely manner (and approved DA and in accordance with a POM for Public land).

Site preparation works at recipient site:

Task	Responsibility
1. Eradicate all weeds from site and adjacent bushland.	Bush regeneration contractor
2. Prepare site soil in consultation with Warringah Council staff or their representatives. This may involve removal of unsuitable material, levelling, ripping, capping and/or remediation of drainage issues.	Bush regeneration / earthworks contractor
3. Erect fencing to prevent public access as directed by Warringah Council staff or their representatives	Bush regeneration contractor
4. Install silt fence or other erosion control devices where necessary. Silt fences must be installed with 2 strands of strained wire, one at the top of the fence and one 100mm above ground level, to maximise the life of the fence.	Bush regeneration contractor

Site preparation works at donor site:

Task	Responsibility
1. Identify and mark boundary of site for salvage	Flora expert
2. Conduct general vegetation survey within soil excavation area. Vegetation surveys within the excavation area are to be completed to identify the following: - All flora species counted and identified within four 1x1m quadrats, randomly selected. - Establish two 20x20m quadrats. Within each quadrat record each species present and the abundance of each species. The abundance of each species may be recorded via the Braun-Blanquet scale or similar. For example NPWS (2000) used: 1 = rare, few individuals present & cover < 5%; 2 = Uncommon & cover <5%; 3 = common and cover < 5%; 4 = (Very abundant & cover < 5%) OR (5% <= Cover < 20%); 5 = (20% <= Cover < 50%); 6 = (50% <= Cover < 75%); 7 = (75% <= Cover < 100%). NPWS (2000) The native vegetation of the Cumberland Plain, Western Sydney – Technical Report, NSW National Parks and Wildlife Service. – Prepare a complete flora list for the entire site	Flora expert/Bush regeneration contractor
3. Eradicate all weeds from soil excavation area.	Bush regeneration contractor

Removing material from donor site.

Task	Responsibility
1. Collect all seeds stored in woody fruits on plants(including eucalypt trees) with loppers	Bush regeneration Contractors
2. Cut all standing shrubbery with brushcutters.	Bush regeneration Contractors
3. Remove brush material from site and stockpile appropriate quantity for coverage of entire recipient site	Bush regeneration Contractors
4. Scrape top 10cm of soil with excavator*. Care must be taken to avoid contamination with subsoil. Relocate this material immediately to the recipient site.	Bush regeneration / earthworks Contractors

** It is desirable to only take the top 10cm of soil from the site. Research in other areas indicates that seed is present from 0-10cm in the soil.*

Notes:

- *Erosion control at the donor site must be carried out in accordance with Warringah Council's usual specifications for building sites.*
- *It is important to ensure that none of the translocated material is contaminated by weed seed or other propagules, or soil material from other sites. Therefore, all machinery and vehicles must be cleaned prior to arrival at the site.*
- *Hosing down of machinery or vehicles is not permitted in the vicinity of the site.*
- *Machinery with weed seed or other propagules, or soil material from other sites are not permitted to enter the recipient site. This provision will be enforced by Warringah Council officers or their representatives.*
- Brush material from the donor site is required at the recipient site as fine fuel for an ecological burn to stimulate germination. Should insufficient material be collected from the donor site, consideration should be given to obtaining fine material from trees at the donor site. Tree limb trunks and branches may also be placed on the site for habitat. It is estimated that 6-20 tonnes/ha of fine fuel material is required
- *Allow for an additional 10%-20% of material to be moved from the site to allow for bulking.*
- *Disturbance to the topsoil should be minimised prior to its translocation, therefore removal of vegetative material should be done by hand and trees are not to be removed until the topsoil has been excavated.*

4. Translocation and application of material at recipient site.

Task	Responsibility
1. Spread topsoil material to depth of 5-10cm. Topsoil should be spread to this depth and then levelled by hand. No machinery should be allowed to travel over any of the translocated material. To make this easier mark out equal areas at the donor and recipient sites.	Earthworks contractor
2. Apply brush matting to appropriate depth and density. The brush matting is designed to reduce erosion potential and protect the translocated material from exposure to predators. It is also required for an ecological burn to stimulate germination of soil stored seed. It is estimated that 6 –20 tonnes/ha of fine fuel is required (or 0.6 –2.0 kg/m^2).	Bush regeneration contractor
3. Ensure erosion control devices are functioning and adequate.	Bush regeneration contractor
4. Establish permanent monitoring sites as required by stage 6	Bush regeneration contractor

5. Treatment of Translocated Material

1st Treatment

- The recipient site shall be burnt as soon as practical after translocation has occurred to assist the germination of soil stored seed. The site shall be burnt using removed brush and fine material from the donor site.
- The estimated quantity of fuel required to achieve suitable soil heating is estimated at 6-20 tonnes/ha.
- The burn should ideally be in autumn or spring. However, if the fire occurs in spring the site may need to be watered if substantial rain doesn't occur within three months. If there are delays in burning the site and germination on the site has occurred, burning of the site might need reconsideration.

Task	Responsibility
1. Obtain approval for burn at recipient site. Approval from the RFS will need to be obtained to conduct an ecological burn. An application will need to be submitted, approval obtained for the burn and assistance received to conduct the burn. Ideal timing for burn is autumn and to a lesser extent spring. Given that this process may take time approval should be sought as soon as possible.	Project manager
2. Assess quantity of fuel on site add further fuel if necessary. Estimated that 6-20 tones/ha of fine fuel needs to be consumed.	Project manager
3. Conduct burn	RFS /Project manager
4. Reassess quantity of fuel and estimate fuel consumption. Further burning if necessary. To ensure suitable heating of the soil 6-20 tonnes/ha of fine fuel needs to be consumed. It is important that an assessment of the fine fuel density is made immediately before and after burning of the site to ensure suitable fuel consumption is achieved. A brief map/record of the burn, (eg. patchiness & intensity) should be retained to incorporate into the analysis of collected monitoring data.	Project manager/ RFS

- Subsequent treatments

Depending on the outcomes from the burn in terms of fuel consumption and germination, additional treatments of the site may be required including treatment with smoke water, further burning, and/or smoking the site. See comments following in the monitoring and on-going management requirements.

6. *Monitoring and on-going adaptive management*

This stage will be implemented for at least 5 years.

	Task	Responsibility
1.	Duffys Forest ecological community monitoring. At regular intervals the site shall be surveyed for species diversity and abundance using four 1x1m quadrats where by every species is identified and counted. In addition two 20x20m quadrats shall also be surveyed for species and % cover as per guidelines set in Section 3, task 1. Additional plots (20x20m) should be established at 5 additional *G. caleyi* locations (2 plots per site) for benchmark comparison of regrowth. These surveys shall be conducted at 3 months, 6 months, 12 months, then yearly for at least 5 years, following the ecological burn.	Flora expert/NPWS Research
2.	Weed control and bush regeneration At regular intervals the recipient site shall be monitored for weed invasion, control action using appropriate weed control techniques shall be undertaken. The use of herbicides will be kept to an absolute minimum. Supplementary planting at the edges of the site to control the ingress of weeds will only be undertaken if required. Only endemic species to the site will be used, grown from locally sourced seeds. Timing for these actions will be required at 3 months, six months, 12 months, 18 months, then annually for at least five years following the ecological burn. Every care shall be taken at the site to minimise disturbance to seedlings while weeding works are carried out.	Bush regeneration contractor
3.	Evaluation of monitoring and bush regeneration. A review of the results of the monitoring program is required to assess the response of soil stored seed. This will involve the comparison of germination rates of across the various quarats and with other trials. Should germination rates be low then further treatment (burning/smoke water/smoking) may be required. This will also need to take into account ecological burn data and weed germination responses. A brief annual report is to be prepared and submitted the Manager, Threatened Species Unit on the translocation process and from the evaluation of the monitoring program.	Project manager/Flora expert

Further Information:

NPWS
Duffys Forest Recovery Team Co-ordinator
Threatened Species Conservation Unit
Central Directorate
Ph: (02) 9585 6827
Fax: (02) 9585 6642

Warringah Council
Environment Officer
Bushland Management Unit

Ph: (02) 9942 2694
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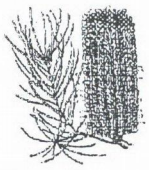
Appendix B. Letter to Council



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Louise Rhodes
Environmental Projects Support Officer
Planning and Strategy Group
Manly Council

May 14th, 2004.

Re: SIS for Proposed new access road and car parking area at Seaforth Oval.

Dear Louise,

Thank you for the Smith & Smith 2002 report.

Could you please confirm the ownership of the land for the access road. We think it is Crown Land under the care and control of DIPNR, or is it RTA land? We understand that the Oval area is under the care and control of Council. In addition, please confirm if there are any other approvals required for this development (see Section 9.2 of the DG's specifications), *e.g.* RTA?

Could you please supply any information in relation to the following;

- New footpaths;
- Changes to drainage;
- Location of traffic lights: infrastructure *e.g.* controlling box, any trenches and their location;
- Any proposed street lighting;
- Fences, bollards, curbing of roads and parking areas;
- Landscaping;
- The area of existing road to be removed and revegetation or rehabilitation is planned;
- Road base material;
- The area of Duffys Forest that is to be lost;
- Any retaining walls;
- Any Works Protection Plan; and
- Any Maintenance and Bushland Management Plan,

that have been produced or are intended to be included with the development application for the proposed construction of the new access road and car parking area.
In addition, please confirm that Jennie Minifie is the person who will be signing the SIS on behalf of the Applicant.
To allow us to complete the SIS could you please reply to this letter ASAP.

Yours sincerely,

Nick Skelton

Appendix C. Fauna Survey Data

No threatened species were found on the site and the site is not likely to be an important habitat for any threatened species or population. Glider sap feed marks were found 20 m from the site, but these are most likely to be from Sugar Gliders, not Squirrel Gliders or Yellow-bellied Gliders. Grey-headed Flying Foxes were observed flying over the site and adjacent field during the nocturnal survey and the Anabat recordings revealed the presence of the Large Bent-wing Bat (*Miniopterus schreibersii*) in the existing carpark adjacent to the study site. The Powerful Owl was not observed during the surveys for this report however is considered Subject Species due to the possibility that they could occasionally use the site for foraging. One rare flora species, *Prostanthera* sp. 'Manly Dam' (Conn 4444), was located 30 m from the proposed construction site. *Prostanthera* sp. 'Manly Dam' (Conn 4444) is not currently listed as a Threatened Species or Endangered Population under the *TSC Act* 1995. However, it is currently being nominated by this author for inclusion and as such is treated as a Threatened Species requiring further assessment. Assessments in the form of 8-part tests are performed for these species.

Fauna Survey Data of Seaforth Oval as appears in "Flora and Fauna of Manly Council's Bushland Reserves Part B: Reserve Profiles", a report prepared for Manly Council by GIS Environmental Consultants 2004. Survey was conducted over a period of 12 months from June 2001 by Marcus Beseler of GIS Environmental Consultants. Included is data from 2004 opportunistic diurnal surveys and nocturnal surveys conducted by GIS Environmental Consultants.

Species	Status	Record	Detected in 2004 Survey
	Avifauna		
Anthochaera carulina Red Wattlebird	Native	o	
Cacatua sanguinea Little Corella	Native	o	
Elanus axillaris Black-shouldered Kite	Native	o	
Gymnorhina tibicen Australian Magpie	Native	o	o, h
Haliastur sphenurus Whistling Kite	Native	h	
Malurus lamberti Variegated Fairy-wren	Native	o	
Manorina melanocephala Noisy Miner	Native	o	
Neochmia temporalis Red-browed Finch	Native	o	
Platycerus elegans Crimson Rosella	Native	o	
Rhipidura fuliginosa Grey Fantail	Native	o	
Sericornis frontalis White-browed Scrubwren	Native	o	

Species	Status	Record	Detected in 2004 Survey
Strepera graculina Pied Currawong	Native	o	o, h
Streptopelia chinensis Spotted Turtle-dove	Introduced	h	
Vanellus miles Masked Lapwing	Native	o	
Mammals			
Canis familiaris Dog	Introduced	o	o
Miniopterus schreibersii Large Bent-wing Bat	Native, Vulnerable		ANABAT
Oryctolagus cuniculus Rabbit	Introduced	t	
Pseudocheirus peregrinus Common Ringtail Possum	Native	t	o
Pteropus poliocephalus Grey-headed Flying Fox	Native		o, h
Trichosurus vulpecula Common Brushtail Possum	Native	t	r
Vespadelus darlingtoni Large Forest Bat	Native		ANABAT
Reptiles and Amphibians			
Lampropholis guichenoti Pale-flecked Garden Sunskink	Native	o	
Lampropholis delicata Dark-flecked Garden Sunskink	Native	o	o
Ctenotus robustus Robust Ctenotus	Native	o	
Saproscincus mustelinus Weasel Skink	Native	o	

Record type: h = Heard, o = observed, t = Tracks, scats, hairs and traces, r = Remains identified on site.

Appendix D. Flora Data

Genus and Species	Family	Habit	Order	Common Name	Status	Q1 Abundance This Study	Q2 Abundance This Study	Q3 Abundance This Study	Incidental This Study *	James (2003) Presence/ Absence	Smith & Smith (2000) Presence/ Absence
Acacia longifolia	FABACEAE	Shrub	DICOTYLEDON	Sydney Golden Wattle		1	2	0		+	+
Acacia parramattenesis	MIMOSACEAE		DICOTYLEDON			0	0	1		+	+
Acacia terminalis	MIMOSACEAE		DICOTYLEDON						*	+	+
Agapanthus orientalis	AMARYLLIDACEAE	Herb	MONOCOTYLEDON		Weed				*	-	-
Ageratina adenophora	ASTERACEAE	Herb	DICOTYLEDON	Crofton Weed	Weed				*	-	-
Allocasuarina littoralis	CASUARINACEAE	Tree	DICOTYLEDON	Black She-oak		5	5	6		+	+
Anagallis arvensis	PRIMULACEAE	Herb	DICOTYLEDON	Scarlet Pimpernel	Weed	1	0	0		-	-
Aristida vagans	POACEAE		MONOCOTYLEDON			0	1	0		+	+
Bidens pilosa	ASTERACEAE	Herb	DICOTYLEDON	Cobbler's Pegs, Pitchforks	Weed	1	2	1		+	-
Billardiera scandens var. *scandens*	PITTOSPORACEAE		DICOTYLEDON			0	3	0		+	+
Briza maxima	POACEAE	Grass	MONOCOTYLEDON	Quaking Grass	Weed	0	1	0		-	-
Bromeliad	BROMELIACEAE	Herb	MONOCOTYLEDON	Bromeliad					*	-	-
Chlorphytum comosum	LILLIACEAE	Herb	MONOCOTYLEDON	Spider Plant	Weed				*	-	-
Clematis aristata	RANUNCULACEAE	Herb	DICOTYLEDON	Old Man's Beard		1	0	0		-	-
Commelina cyanea	COMMELINACEAE	Herb	MONOCOTYLEDON	Creeping Christian		1	0	1		+	+
Conyza sp.	ASTERACEAE	Herb	DICOTYLEDON	Fleabane	Weed	1	0	1		+	-
Cortaderia sp.	POACEAE	Grass	MONOCOTYLEDON	Pampas Grass	Weed				*	-	-
Cotoneaster pannosus	ROSACEAE	Shrub	DICOTYLEDON	Cotoneaster	Weed				*	-	-
Cryptostylis subulata	ORCHIDACEAE		MONOCOTYLEDON	Duck Orchid		0	2	0		-	-
Dianella caerulea var. *caerulea/producta*	PHORMIACEAE	Herb	MONOCOTYLEDON	Blue Flax Lily		2	4	4		+	+
Dichelachne crinita	POACEAE	Grass	MONOCOTYLEDON			0	1	0		+	-
Dodonaea triquetra	SAPINDACEAE	Shrub	DICOTYLEDON	Hop Bush		1	3	2		+	+

Echinopogon caespitosus var. *caespitosus*	POACEAE	Grass	MONOCOTYLEDON	Hedgehog Grass		1	0	0		+	+
Ehrharta erecta	POACEAE	Grass	MONOCOTYLEDON	Veldt Grass	Weed	2	3	4		?	?
Elaeocarpus reticulatus	ELAEOCARPACEAE		DICOTYLEDON	Blueberry Ash		1	2	0		+	+
Entolasia marginata	POACEAE		MONOCOTYLEDON						*	+	+
Entolasia stricta	POACEAE	Grass	MONOCOTYLEDON	Wiry Panic		2	3	4		+	+
Eragrostis curvula	POACEAE		MONOCOTYLEDON	African Lovegrass					*	+	-
Eucalyptus sieberi	MYRTACEAE		DICOTYLEDON	Silver-top Ash		5	5	4		-	-
Euphorbia peblus	EUPHORBIACEAE		DICOTYLEDON	Petty Spurge					*	-	
Foeniculum vulgare	APIACEAE	Herb	DICOTYLEDON	Fennel	Weed	1	0	0		-	-
Gahnia aspera	CYPERACEAE		MONOCOTYLEDON			0	2	0		+	-
Gahnia erythrocarpa	CYPERACEAE		MONOCOTYLEDON						*	+	+
Galium binifolium	RUBIACEAE	Herb	DICOTYLEDON			0	1	0		-	-
Geranium homeanum	GERANIACEAE	Herb	DICOTYLEDON	Northern Cranesbill		1	3	0		+	+
Glochidioon ferdinandi var. *ferdinandi*	EUPHORBIACEAE		DICOTYLEDON			0	2	1		+	+
Glycine tabacina	FABACEAE		DICOTYLEDON			1	0	0		+	?
Grevillea buxifolia var. *buxifolia*	PROTEACEAE		DICOTYLEDON						*	+	+
Hakea dactyloides	PROTEACEAE		DICOTYLEDON			0	0	2		+	+
Hypochaeris radicata	ASTERACEAE	Herb	DICOTYLEDON	Cats Ear	Weed	1	1	2		+	?
Imperata cylindrica var. *major*	POACEAE	Grass	MONOCOTYLEDON	Blady Grass		2	0	3		+	+
Juncus usitatus	JUNCACEAE		MONOCOTYLEDON						*	+	+
Kennedia rubicunda	FABACEAE	Vine	DICOTYLEDON	Dusky Coral-pea		1	0	0		+	+
Kunzea ambigua	MYRTACEAE		DICOTYLEDON			0	0	3		+	+
Lantana camara	VERBENACEAE	Shrub	DICOTYLEDON	Lantana	Nox W2	1	0	2		+	-
Lasiopetalum ferrugineum	STERCULIACEAE		DICOTYLEDON			1	0	0		+	+
Lepidosperma filiforme	CYPERACEAE	Sedge	MONOCOTYLEDON			0	2	0		-	-
Lepidosperma gunnii	CYPERACEAE		MONOCOTYLEDON			0	1	0		+	-
Lepidosperma laterale	CYPERACEAE		MONOCOTYLEDON			0	2	0		+	+
Leptospermum trinervium	MYRTACEAE		DICOTYLEDON						*	+	+
Ligustrum lucidum	OLEACEAE	Shrub	DICOTYLEDON	Privet - broad leaved	Nox W4b	1	0	1		?	-

Ligustrum sinese	OLEACEAE		DICOTYLEDON	Small-leaved privet		0	0	1		+	-
Lilium formosum	LILIACEAE	Herb	MONOCOTYLEDON	Roadside Lilly	Weed				*	-	-
Lomandra glauca	LOMANDRACEAE		MONOCOTYLEDON			0	2	0		+	+
Lomandra longifolia	LOMANDRACEAE		MONOCOTYLEDON			0	2	1		+	+
Melaleuca ?armillaris	MYRTACEAE		DICOTYLEDON			0	0	2		+	-
Microlaena stipoides var. *stipoides*	POACEAE	Grass	MONOCOTYLEDON	Weeping Grass		1	2	1		+	+
Nephrolepsis cordifolia	DAVALLIACEAE		FERN	Fishbone Fern	Weed				*	+	-
Nothoscordum gracile	ALLIACEAE	Herb	MONOCOTYLEDON	Onion Weed	Weed	1	0	0		-	-
Ochna serrulata	OCHNACEAE	Shrub	DICOTYLEDON	Ochna, Mickey Mouse Plant	Weed				*	-	-
Omalanthus populifolius	EUPHORBIACEAE	Shrub	DICOTYLEDON	Bleeding Heart		2	0	2		+	+
Opercularia aspera	RUBIACEAE		DICOTYLEDON			0	1	0		+	+
Oplismenus aemulus	POACEAE	Grass	MONOCOTYLEDON	Basket Grass		1	2	1		+	+
Oxalis rubens	OXALIDACEAE	Herb	DICOTYLEDON			1	0	0		-	-
Ozothamnus diosmifolium	ASTERACEAE		DICOTYLEDON	Everlasting, Paper Daisy		1	0	0		+	+
Paspalum dilatatum	POACEAE	Grass	MONOCOTYLEDON	Water Grass		0	0	1		-	-
Paspalum quadrifarium	POACEAE		MONOCOTYLEDON	Tussock Paspalum		1	0	1		+	-
Passiflora edulis	PASSIFLORACEAE	Vine	DICOTYLEDON	Passionfruit	Weed	1	0	0		-	-
Pennisetum clandestinum	POACEAE	Grass	MONOCOTYLEDON	Kikuyu	Weed	0	0	1		-	-
Persoonia pinifolia	PROTEACEAE		DICOTYLEDON			1	0	0		-	-
Phyllanthus hirtellus	EUPHORBIACEAE	Shrub	DICOTYLEDON	Thyme Spurge		0	2	0		-	-
Phytolacca octandra	PHYTOLACCACEAE	Herb	MONOCOTYLEDON	Ink Weed	Weed				*	-	-
Pittosporum undulatum	PITTOSPORACEAE	Tree	DICOTYLEDON	Sweet Pittosporum		2	3	1		+	+
Plantago lanceolata	PLANTAGINACEAE	Herb	DICOTYLEDON	Lamb's Tongues, Plantain	Weed				*	-	-
Platysace linearifolia	APIACEAE		DICOTYLEDON						*	+	+
Protoasparagus aethiopicus	LILIACEAE	Herb	MONOCOTYLEDON	Asparagus fern	Weed	0	2	3		+	-
Pteridium esculentum	DENNSTAEDIACEAE		FERN	Bracken		0	0	4		+	+
Senna pendula var. *glabrata*	CAESALPINIOIDEAE	Shrub	DICOTYLEDON	Cassia	Weed	1	0	2		+	+
Setaria gracilis	POACEAE	Grass	MONOCOTYLEDON	Pigeon Grass	Weed				*	-	-
Sida rhombifolia	MALVACEAE	Shrub	DICOTYLEDON	Paddy's Lucerne	Weed	1	1	0		+	-

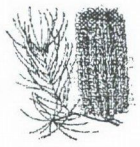
Sisymbrium officinale	CRUCIFERAE		DICOTYLEDON	Hedge Mustard	Weed	1	0	0		-	-
Smilax glyciphylla	SMILACACEAE	Scrambler	MONOCOTYLEDON	Native Sarsaparilla, Sweet Tea		0	2	0		+	+
Solanum mauritianum	SOLANACEAE	Shrub	DICOTYLEDON	Wild Tobacco Tree		0			*	-	-
Solanum nigrum	SOLANACEAE	Herb	DICOTYLEDON	Blackberry Nightshade	Weed	1	1	1		-	-
Sonchus oleraceus	ASTERACEAE	Herb	DICOTYLEDON	Sow Thistle	Weed	1	1	2		-	-
Stenotaphrum secundatum	POACEAE	Grass	MONOCOTYLEDON	Buffalo Grass		0	3	0		-	-
Tetragonia tetragonioides	AIZOACEAE	Herb	DICOTYLEDON	New Zealand Spinach	Weed	2	0	0		+	-
Tradescantia fluminensis	COMMELINACEAE		DICOTYLEDON	Wandering Creeper	Weed				*	-	-
Vicia sativa	FABACEAE	Herb	DICOTYLEDON	Common Vetch	Weed	1	0	0		-	-
Xanthosia tridentata	APIACEAE	Shrub	DICOTYLEDON	Rock Xanthosia		0	2	0		+	+

Abundance key: 0: not detected
1: rare very few, < 5%, < 3 individuals
2: scattered few, < 5%, < 12 individuals
3: widespread but sparse, > 12 individuals
4: frequent, 5 - 20%
5: common, 20 - 50%
6: dominant, 50 - 75%
7: very abundant, 75 - 100%.

Quadrat Physical Characteristics

Character	Quadrat 1	Quadrat 2	Quadrat 3
Topography	Ridgetop	Ridgetop	Ridgetop
Aspect	South	South	South
Slope	Average slope across site is 5 - 10°.		
Rocks	Loose rocks/ introduced construction waste	Loose rocks/ introduced construction waste	Loose rocks/ introduced construction waste
Soil Colour	Grey	Orange	Grey
Soil Texture	100% deeply weathered clay with Ironstone inclusions	100% deeply weathered clay with Ironstone inclusions	100% deeply weathered clay with Ironstone inclusions
Soil Depth	< 2 cm	< 2 cm	< 2 cm
Leaf Litter Depth	4 cm	5 cm	4 cm
Erosion	Not evident	Not evident	Not evident
Hollow bearing trees	0	0	0
Hollow bearing logs	0	0	0
Fallen logs (trunk diameter > 20 cm measured at chest height)	2	0	5
Disturbance History	Highly modified	Highly modified, dumping of garden clippings	Highly modified, dumping of household rubbish
Time since last fire	> 30 years	> 30 years	> 30 years

Appendix E. List of Projects By GIS Environmental Consultants 2003 - 2004



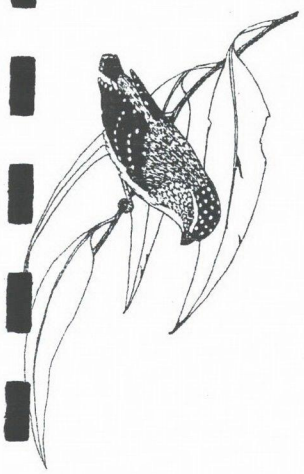
GIS Environmental Consultants

45 Austin Avenue, Dee Why 2099
Mobile Ph: 041 943 8672, Ph: (02) 9939 5129, Email: ecology@ecology.net.au

Reports Completed in the Years 2003 - 2004

Year	Activity/Proposal	Locality	Location	Type of Work	Client
2004	Subdivision	Illawong	Illawong	Court Expert	Jim Kekatos Lawyers
2004	House DA	Ingleside	Ingleside Rd	Ecological Sustainability Plan	Private
2004	Subdivision	Duffy's Forest	Killawarra Rd	Assessment of Dev. Constraints	Dep. Lands and Parnell Partners
2004	Lecture	Seaforth/Manly	Seaforth Walk	Guided community walk	Manly Council
2004	House Replacement	Manly	Wood St	Bandicoot Impact Assessment	Watershed - Architect
2004	House Replacement	Manly	Wood St	Arborist Report	Watershed - Architect
2004	House Replacement	Manly	Bower St	Bandicoot Impact Assessment	Albion Architects - Marc Biancardi
2004	Dwelling Extension	Manly	Le Kiosk	Bandicoot Impact Assessment	Daniel morris - Le kiosk
2004	House Construction	Elanora Heights	Caladenia Close	Ecological Sustainability Plan	Bill MacMahon Architects
2004	House Construction	Elanora Heights	Caladenia Close	8-part tests	Bill MacMahon Architects
2004	House DA	Ingelside	Lane Cove Rd	Statement of Evidence	Mallesons Stephen Jaques
2004	Subdivision	Duffys Forest	Bibbenluke	Court Expert	Simon Maxwell & Mal Corbett
2004	Subdivision	Manly	St Patrick's Estate	Independent assessment	Manly Council
2004	Subdivision	Dee Why	Inman Rd	Tree survey	Roche
2004	Subdivision	Newport	Herbert Ave	Court Expert	Private
2004	Residential Development	Newport	Prince Alfred Parade	Amendment to Report	Dennis Leech & Associates Architects
2004	Unit development	Monavale	Park Street	Flora and Fauna Impact Assessment	Private
2004	Carport	Manly	Bower St	Bandicoot Impact Assessment	Mr M Nolan and assoc and architects.
2004	Carport	Manly	Bower St	Bandicoot Impact Assessment	Private
2004	Earthworks	Belrose	Morgan Rd	Update Building Certificate Application	Mathews contracting
2004	Residential Development	Ingleside	Tumburra St	Ecological Sustainability Plan	Private
2004	Residential Development	Manly	Wood St	Flora & Fauna Impact Assessment	Timothy Moon Architecture
2004	Rediential Development	Manly	Wood St	Flora and Fauna Impact Assessment	Timothy Moon Architecture
2004	House Construction	Avalon	The Knoll	Flora & Fauna Impact Assessment	Susie Watkins and Gerard Coetzee
2004	House Construction	Avalon	The Knoll	Ecological Sustainability Plan	Susie Watkins and Gerard Coetzee
2004	Development Application	Avalon	The Knoll	Flora and Ffauna Assessment	Private
2004	House Construction	Ingleside	Polo	Bushland Management Plan	Chateau Construction (Aust) Pty. Ltd.
2004	House Replacement	Bayview	Pittwater Rd	Flora and Fauna and Tree Assessment	Private
2004	Alterations and additions	Manly	Oyama Ave	Little Penguin Monitoring	Hans Brust Design
2004	Trail upgrade	Ku-ring-gai Chase NP	Ku-ring-gai Chase NP	Flora and Fauna Assessment	National Parks and Wildlife Service
2004	Land Management	North Head	North Head	Flora survey	Sydney Habour Federation Trust
2004	Warehouse and Office Development	Belrose	Narrabang Way	Amendment to Report	Access Communications c/o Giles Tribe Architects
2004	Development Application	Terrey Hills	Mona Vale Rd	Flora and Fauna Impact Assessment	Seahorse Securities - C/o Event Project Management
2004	Road and Carpark	Seaforth	Manly SIS	Species Impact Statement	Manly Council
2004	Land Management	Ingleside	Ingleside GIS	Ingleside Natural Values Survey	Pittwater Council
2004	House Construction	Palm Beach	Florida Rd	Flora and Fauna Survey	Private
2004	Development Application	Manly	Fairy Bower Rd	Assessment of DA and Management Recommedations for Development Consent	Manly Council
2004	Land Management	Dobroyd	Dobroyd	Flora & Fauna Survey	National Parks and Wildlife Service
2004	Residential Development	Manly	Craig Ave	Flora & Fauna Impact Assessment	Kimmo Pitkanen Out of Site Projects
2004	Residential Development	Avalon	Chisholm St	Bushland Management Plan	Alan Lawrence Architecture
2004	Residential Development	Manly	Carey Street	Flora and Fauna Impact Assessment	Manly Council
2004	House Extension	Avalon	Cabarita Rd	Ecological Sustainability Plan	Private
2004	Residential Development	Manly	Bruce Ave	Flora and Fauna Impact Assessment	Tony Messitti & Michael Neale - Michael Robilliard & Associates
2004	Subdivision	Duffys Forest	Bibbenluke Meetings	Meetings and field visit	Simon Maxwell & Mal Corbett
2004	Subdivision	Duffys Forest	Bibbenluke EMP	Works Protection Program	Simon Maxwell & Mal Corbett
2004	Subdivision	Duffys Forest	Bibbenluke Court Case	Court Expert	Simon Maxwell & Mal Corbett
2004	Subdivision	Duffys Forest	Bibbenluke CEMP	Bushland Management Plan	Simon Maxwell & Mal Corbett
2004	Subdivision	Duffys Forest	Bibbenluke CBMP	Concept Bushland Management Plan	Simon Maxwell & Mal Corbett
2004	Land Management	Jervis Bay	Beecroft	Vegetation mapping	Environment Australia

Year	Activity/Proposal	Locality	Location	Type of Work	Client
2004	Management Planning	Manly	Manly	Natural Environment Assessment & Recommendations	Manly Council
2004	Development Proposal	Terrey Hills	Mona Vale Rd	Response Letter	Event Project Management Pty Ltd.
2004	Alterations and additions	Avalon	Cabarita Rd	Ecological Sustainability Plan	Private
2003	Warehouse Development	Belrose	Narabang Way, Austlink Park	Bushland Managem't Plan	Giles Tribe Architects
2003	Warehouse Development	Belrose	Narabang Way, Austlink Park	Works Protection Program	Giles Tribe Architects
2003	Sub-division for Housing	South Turramurra	Chisholm St.	F & F Impact Assessment	Masterton Homes
2003	Sub-division for Housing	St Ives	Rosedale Road	Expert Evidence for Court	Triport Developments
2003	Sub-division for Housing	Frenches Forest	Carnarvon Drive	F & F Survey	Souter and Associates
2003	Sub-division for Housing	Illawong	Old Ferry Rd	F&F Assessment & Managem't Recs	Planning Logic
2003	House Construction	Newport	Prince Alfred Parade	F&F Assessment & Managem't Recs	Dennis Leech & Associates Architects
2003	House Construction	Ingleside	Lanecove Rd	Bushland Management Plan	John and Rita Valentino
2003	Alterations and Additions	Manly	St Patrick's Estate	F&F Assessment & Managem't Recs	Phillip Ayling Design
2003	Alterations and Additions	Manly	Osborne Road	Species Impact Assessment	Muhoba Pty. Ltd.
2001	Building Maintainence	Manly	Oyama Ave	Penguin Impact Assessment	Body Corporate
2003	Bush Fire Hazard Reduction Burn	Garigal	Allworth Dr, Ku-ring-gai NP	Review of Environmental Factors	National Parks and Wildlife Service
2003	Bush Fire Hazard Reduction Burn	Garigal NP	Yiremba Pl, Garigal NP	Review of Environmental Factors	National Parks and Wildlife Service
2003	Bush Fire Hazard Reduction Burn	Ku-ring-gai Chase N	Cicada Glen, Ku-ring-gai NP	Review of Environmental Factors	National Parks and Wildlife Service
2003	Bush Fire Hazard Reduction Burn	Ku-ring-gai Chase N	Coasters Retreat, Ku-ring-gai NP	Review of Environmental Factors	National Parks and Wildlife Service
2003	Bush Fire Hazard Reduction Burn	Ku-ring-gai Chase N	Currawong Beach, Ku-ring-gai NP	Review of Environmental Factors	National Parks and Wildlife Service
2003	Bush Fire Hazard Reduction Burn	Ku-ring-gai Chase N	Elvina Bay, Ku-ring-gai NP	Review of Environmental Factors	National Parks and Wildlife Service
2003	Bush Fire Hazard Reduction Burn	Ku-ring-gai Chase N	Lovett Bay, Ku-ring-gai NP	Review of Environmental Factors	National Parks and Wildlife Service
2003	Bush Fire Hazard Reduction Burn	Ku-ring-gai Chase N	McCarrs Creek Rd, Ku-ring-gai NP	Review of Environmental Factors	National Parks and Wildlife Service
2002	Bush Fire Hazard Reduction Burn	Manly	North Head	F&F Assessment & Managem't Recs	Sydney Harbour Federation Trust
2003	Bush Fire Hazard Reduction Burn	Narrabeen	Montego Cay	F&F Assessment & Managem't Recs	RSL Veterans Retirement Villages
2003	Bush Regeneration	Manly	Manly LGA	Herbarium, plant identification & education	Manly Council
2001	Bushland Management	Manly	Collins Beach	Powerline Maintainence	Australian Police
2001	Bushland Management	North Head	Collins Beach	Bushland Managem't Plan	Australian Police
2001	Construction of Swimming pool	Newport	Herbert Ave	Managem't Plan	Private
2003	Demolishion & Construction of new Residence	Manly	Reddall St	Bandicoot Impact Assessment	J.J. Newlin-Mazaraki Architects
2003	Development Application	Terrey Hills	Mona Vale Rd	F & F Impact Assessment	Seahorse Securities Pty Ltd
2003	Fire Trail Construction	Duffys Forest	Killawara Road	F&F Assessment & Managem't Recs	Mr & Mrs Moyland
2003	Fire Trail Construction	Duffys Forest	Killawara Road	Bandicoot Survey & Weed Managem't	Mr & Mrs Moyland
2003	Garage Extension	Palm Beach	Cynthea Road	F&F Assessment & Managem't Recs	Greg Barret
2003	House Alterations and Additions	Manly	Bower Street	Bandicoot Impact Assessment	Miltura Pty. Ltd
2003	House Replacement	Church Point	Mc Carrs Creek Road	Biodiversity Impact Assessment	Build Air Pty Ltd
2003	House Replacement	Church Point	Mc Carrs Creek Road	Bushland Management Concept Plan	Build Air Pty Ltd
2003	House Replacement	Manly	Addison Road	Species Impact Statement	Payton Holdings Pty Ltd
2003	House Replacement	Palm Beach	Pacific Rd	F&F Assessment & Managem't Recs	SJB Interiors
2003	House Replacement	Terrey Hills	McCarrs Ck Rd	Bushland Management Plan	Dimitri Berezov
2003	House Replacement	Terrey Hills	McCarrs Ck Rd	F & F Impact Assessment	Dimitri Berezov
2003	Intersection and Entrance	Narrabeen	Wakehurst Parkway	Preliminary F&F survey Stage 1	Hyder Consulting for Aust. Academy of Sports
2003	Intersection and Entrance	Narrabeen	Wakehurst Parkway	Preliminary F&F survey Stage 2	Hyder Consulting for Aust. Academy of Sports
2003	Land Management	Balgowlah	Tania Park	F & F Survey	Manly Council
2003	Land Management	Dobroyd	Sydney Harbour NP, Dobroyd Head	F & F Survey	National Parks and Wildlife Service
2003	Land Management	Hunter's Hill	Woolwich Dock and Parklands	F & F Survey	Sydney Habour Federation Trust
2003	Land Management	Manly	Forty Baskets	Natural Assesment	Manly Council
2003	Land Management	Manly	Little Manly Cove	Natural Assesment	Manly Council
2003	Land Management	Manly	Manly Cove	Natural Values Assesment	Manly Council
2003	Land Management	Manly	North Harbour	Natural Values Assesment	Manly Council
2003	Land Management	Manly	Manly Coastal Walk	GIS/GPS Walkway Datacapture & Mapping	Manly Council
2003	Land Management	Manly	Various Reserves	F & F Survey	Manly Council
2003	Land Management	North Head	North Head	Flora survey	Sydney Habour Federation Trust
2003	Land Management	North Head	North Head	Fauna Survey	Sydney Habour Federation Trust
2003	Land Management	North Head	Collins Beach	Tree Survey	Australian Police Institue
2003	Land Management	North Manly	Kierle Park	F & F Survey	Manly Council
2003	Land Management	Seaforth	Seaforth Oval	F & F Survey	Manly Council



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4C25-Q8RM.

MANLY COUNCIL
28 OCT 2003

Jennie Minifie
L Rhodes 4/11

24 October 2003

General Manager
Manly Council
PO Box 82
MANLY NSW 1655

Attention: Jennie Minifie

Subject: Seaforth Oval Duffys Forest Species Impact Statement

Thank you for your letter inviting us to quote for the preparation of a Species Impact Statement for the proposed new access to Seaforth Oval, with particular reference to the impact on the endangered Duffys Forest Ecological Community.

Our quote for the study is:

Dr Peter Smith and Dr Judy Smith, 9.5 person-days @ $600 per day:	$5700.00
Fees for expert identifications and provision of database records:	$500.00
GST:	$620.00
Total:	**$6820.00**

The proposed components of the study are:

Initial briefing meeting (0.5 person-day).

Assessment of available information (1 person-day). This would include obtaining records of threatened flora and fauna species or populations in the locality from the National Parks and Wildlife Service's 'Atlas of NSW Wildlife' database and the Australian Museum and Royal Botanic Gardens databases, as requested in the NPWS Director-General's requirements. Information would also be obtained from the various flora and fauna studies that have been carried out in the surrounding Duffys Forest Ecological Community stands.

Flora survey (2 person-days). Targeted surveys would be undertaken for *Microtis angusii* and *Prostanthera* sp. 'Manly Dam' as requested in the NPWS Director-General's requirements. Another threatened species that is known to occur nearby, *Pimelea curviflora* var. *curviflora*, would also be targeted in these surveys. The surveys would involve three visits to the site at three-week intervals over the October-December period to comply with the NPWS Director-General's specific requirements. As part of the *Microtis* survey, sample material may need to be collected and sent to Dr Rod Peakhall at the Australian National University for identification. In conjunction with the targeted surveys for threatened species,

we would also identify and record the other native plant species encountered at the site, and compile a description of the vegetation structure and composition, and the degree of weed invasion and other disturbance. These data would supplement the existing information on the site from the previous vegetation surveys by ourselves and by Teresa James. The existing mapping of the Duffys Forest Ecological Community at the site from our previous survey would be checked in the field and refined for the Species Impact Statement.

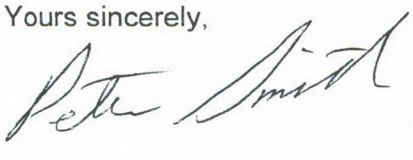
Fauna survey (2 person-days). To our knowledge, there has been no previous fauna survey of the site. To satisfy the NPWS Director-General's requirement for a fauna survey, we propose to set out hair-tubes (baited tubes with adhesive tape around the ends to collect hair samples from mammals) for three weeks (targeting the endangered Southern Brown Bandicoot in particular), and carry out nocturnal surveys with a bat detector on two evenings (targeting threatened bat species, especially the Greater Broad-nosed Bat, which may roost at the site). Spotlighting and frog searches would be carried out in conjunction with the bat detector surveys. Diurnal fauna searches would be carried out in conjunction with the flora surveys, covering frogs, reptiles, birds and mammals, including records from identification of calls (birds and frogs), remains (carcasses, bones, feathers, fur, reptile skins, etc) and characteristic signs (tracks, droppings, diggings, nests, etc). An assessment would be made of any habitat features at the site that are likely to be important to threatened fauna species. Hair samples from the hair-tubes would be identified by Barbara Triggs, who is a leading expert in this field. Bat call recordings may also need to be sent to a bat specialist for confirmation of our identifications.

Preparation of Species Impact Statement (4 person-days). The Species Impact Statement would be prepared to conform with the NPWS Director-General's requirements. A draft would be prepared within 12 weeks of commencement of the study.

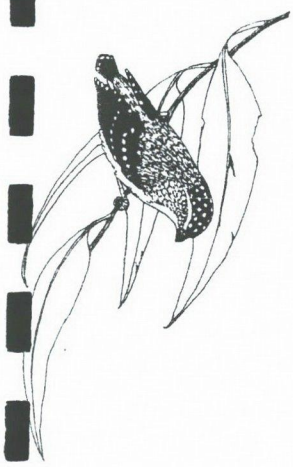
Copies of our curricula vitae are enclosed. Previous studies that we have carried out that are particularly relevant to this project are a vegetation survey for Manly Council of the subject site (November 2002), a Species Impact Statement for NSW Department of Infrastructure, Planning and Natural Resources for a proposed residential development of the land on the other side of Wakehurst Parkway (completed September 2003), and a detailed survey for NSW National Parks and Wildlife Service and Warringah Council of the entire distribution of the Duffys Forest ecological community (completed November 2000).

If you require any further information or clarification of our tender, please do not hesitate to contact us.

Yours sincerely,



Peter Smith



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CURRICULUM VITAE - PETER SMITH

QUALIFICATIONS

- Doctor of Philosophy, Department of Botany, University of Sydney, 1977. Thesis topic: Evolution of the genus *Wahlenbergia* in Australia.
- Bachelor of Science, First Class Honours, University Medal, University of Sydney, 1972. Third year subjects: Botany and Zoology. Honours subject: Botany (plant taxonomy).

AREAS OF EXPERTISE

- Flora and fauna survey (vascular plants, mammals, birds, reptiles and frogs)
- Vegetation classification and mapping (including air photo interpretation)
- Assessment of ecological values and significance
- Wildlife management
- Conservation reserve management
- Wetland management (coastal and inland)
- Flora and fauna impact assessment
- Animal ecology (especially birds and mammals)
- Plant ecology
- Plant taxonomy
- Marine mammals

EMPLOYMENT PROFILE

- Consultant ecologist, P. & J. Smith Ecological Consultants, since May 1985.
- Investigations officer, Natural Resources Section, NSW National Parks and Wildlife Service, January 1984 - May 1985.
- Research officer, Scientific Services Section, NSW National Parks and Wildlife Service, May 1979 - January 1984.
- Technical officer, Department of Vertebrate Ecology, the Australian Museum, August 1977 - May 1979.

SELECTED PROJECTS

- Research at the Botany Department, University of Sydney, on the evolutionary significance of polyploidy in *Dampiera stricta* (Honours thesis) and the genus *Wahlenbergia* (Ph.D. thesis), including a taxonomic revision of the latter (1971-76).
- Research for the Australian Museum and later NSW National Parks and Wildlife Service on the effects of intensive logging on forest birds, including secondary studies of foraging ecology and the effects of fire and drought (1977-84).
- Many flora and/or fauna surveys at various sites in NSW when employed by the Australian Museum and NSW National Parks and Wildlife Service, and as a consultant (1978-2003).
- Co-author of a chapter on plant population ecology for the textbook 'A Natural Legacy: Ecology in Australia' (1984).

- Terrestrial flora and fauna sections of the 1986 environmental impact statement for renewal of the export licence for the Eden woodchip industry (1985-86).
- Flora and fauna survey of the Thredbo Lease Area, Kosciusko National Park, for Kosciusko Thredbo Pty Ltd (1985-87).
- Literature review and development of a proposal for the Royal Australasian Ornithologists Union for a national scheme to monitor the movements and populations of Australian birds - the Australian Bird Count (1986-87).
- Survey for Murray Darling Basin Commission of the floodplain vegetation of the Murray and Edward Rivers, in conjunction with Margules and Partners and the Victorian Department of Conservation, Forests and Lands (1987-89).
- Various projects for NSW National Parks and Wildlife Service in relation to management of an endangered species, the Little Tern, including preparation of a species management report and a draft recovery plan (1987-97). Member of Little Tern Recovery Team (1997-2003).
- Co-author of a book on the fauna of the Blue Mountains (1988-90).
- Mapping of vegetation communities and identification of significant flora and fauna sites for Blue Mountains City Council's Environmental Management Plan Stage 1 (1988) and Stage 2 (1994-95).
- Flora and fauna surveys for Warringah Council of Angophora Reserve, Avalon (1988-89), and McKay Reserve, Palm Beach (1992), and a flora survey of Jamieson Park, Wheeler Heights (1995).
- Flora and fauna surveys of Rookwood Necropolis for the Joint Committee of Necropolis Trustees (1988 and a more detailed survey 1999).
- Expert witness on flora and fauna issues in various court cases for Blue Mountains City Council, Warringah Council, Pittwater Council, Ku-ring-gai Municipal Council, Hornsby Shire Council and the Environmental Defender's Office (1988-2003).
- Study of the history, ecology and management of koalas in Warringah and Pittwater for Warringah Council (1989).
- Mapping of vegetation communities in remnant bushland throughout Hornsby Shire for Hornsby Shire Council (1989-90), plus flora and fauna surveys of Berowra Valley Bushland Park (1990) and Pennant Hills Park (1992-93).
- Review of the conservation and management of waders (shorebirds) in NSW for NSW National Parks and Wildlife Service (1990-91).
- Identification and review of bird species of particular conservation concern in the Western Division of NSW for NSW National Parks and Wildlife Service (1990-95).
- Fauna survey of the Binghi wilderness area for NSW National Parks and Wildlife Service (1991).
- Review of the native flora and fauna of remnant bushland in the City of Penrith for Penrith City Council (1991-92).
- Identification of threatened bird species for listing in the Endangered Fauna (Interim Protection) Act for NSW National Parks and Wildlife Service (1992).
- Mapping of significant floodplain and estuarine wetlands in the Hawkesbury-Nepean valley (1992-93), and mapping of significant upland wetlands in the Hawkesbury-Nepean catchment (1995-96) for NSW Department of Planning.
- Preparation of a management manual on conservation of marine mammal populations and management of strandings and other marine mammal incidents for NSW National Parks and Wildlife Service (1993-96).
- Flora survey of Kedumba Valley for Sydney Water Catchment Services (1996).
- Identification, description and detailed mapping of native vegetation communities in remnant bushland throughout the Warringah Local Government Area (excluding the national parks), including assessment of their conservation status and current condition, compilation of information on the flora and fauna species of the area, estimation of the original extent of native vegetation communities in the area, and identification of existing and potential wildlife corridors, for Warringah Council (1996-2003).
- Koala habitat assessments and other threatened flora and fauna assessments for various park developments for Hornsby Shire Council (1996-97).
- Study of the birds of Careel Bay, their habitats and management requirements, for Pittwater Council (1997, with a follow-up survey in 2001).

- Study of buffer zone requirements for protection of sensitive vegetation units in the Blue Mountains, plus detailed descriptions of the sensitive vegetation units, for Blue Mountains Conservation Society (1997-98).
- Flora and fauna survey of the Woodford Dam catchment area for Sydney Water (1997-98).
- Flora and fauna surveys for NSW Department of Public Works and Services for various works in the Blue Mountains Urban Runoff Control Program (1998).
- Preparation of a management plan for threatened fauna and flora in the Pittwater Local Government Area (excluding the national parks), and preparation of a draft development control plan for biodiversity conservation for Pittwater Council (1998-2000).
- Reviews for Department of Urban Affairs and Planning of flora and fauna assessments prepared for Pacific Highway upgrade projects (1998-99).
- Review of the conservation status of marine mammals in NSW for the NSW Scientific Committee, including preparation of nominations for addition or deletion of species listings in the Threatened Species Conservation Act (1999-2001).
- Waterbird surveys of Dee Why Lagoon, Long Reef and Dee Why Creek for Warringah Council (1999-2000).
- Detailed survey, description, mapping and preparation of management recommendations for an endangered ecological community, the Duffys Forest vegetation community, for NSW National Parks and Wildlife Service and Warringah Council (1999-2000).
- Fauna surveys of 30 sample sites for long-term monitoring of fauna biodiversity in Ku-ring-gai Council bushland reserves (baseline study in 2000-01, resampling of 10 sites in 2003).
- Flora and fauna assessment of Callan Park for NSW Department of Health (2001).
- Flora and fauna assessment of an abandoned road corridor at Belrose for NSW Department of Planning (2001-02).
- Flora and fauna assessment of proposed upper Blue Mountains sewage transfer scheme (2001-03), flora assessment of proposed water supply pipeline from Katoomba to Blackheath (2000-02), and flora and fauna assessment for removal of structures along old sewerline from Leura to Jamison Valley (2002-03) for Sydney Water.
- Review of Environmental Factors for upgrading of the National Pass walking track, Wentworth Falls, for NSW National Parks and Wildlife Service (2002-03).
- Member of Ku-ring-gai and Northern Beaches Threatened Species Working Group convened by NSW National Parks and Wildlife Service (2002-03).
- Species Impact Statement for proposed residential development at Seaforth for NSW Department of Infrastructure, Planning and Natural Resources (2002-03).
- Flora and fauna assessment of proposed rezonings at Mt Kuring-gai and Asquith Industrial Areas for Hornsby Shire Council (2003).

BIBLIOGRAPHY

Theses

Smith, P.J. 1971. Chromosome races in *Dampiera stricta* R.Br. B.Sc. (Hons) thesis, Botany Department, University of Sydney.

Smith, P.J. 1976. Evolution of the genus *Wahlenbergia* in Australia. Ph.D. thesis, Botany Department, University of Sydney.

Publications

Recher, H.F., Rohan-Jones, W. and Smith, P. 1980. *Effects of the Eden Woodchip Industry on Terrestrial Vertebrates, with Recommendations for Management*. Research Note No. 42. Forestry Commission of NSW, Sydney.

Recher, H.F., Lunney, D., Smith, P. and Rohan-Jones, W. 1981. Woodchips or wildlife? *Australian Natural History* 20: 238-244.

Recher, H.F., Milledge, D.R., Smith, P. and Rohan-Jones, W.G. 1983. A transect method to count birds in eucalypt forest. *Corella* 7: 49-54.

Smith, P. 1984. Prey items of the Sooty Owl and the Barn Owl at Bega, New South Wales. *Corella* 8: 71-72.

Smith, P. 1984. The forest avifauna near Bega, New South I. Differences between forest types. *Emu* 84: 200-210.
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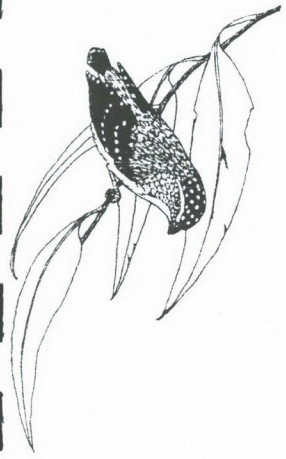

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CURRICULUM VITAE - JUDY SMITH

QUALIFICATIONS

- Doctor of Philosophy, Departments of Zoology and Ecosystem Management, University of New England, 1997. Thesis topic: Ecological patterns in a terrestrial bird community in arid north-western New South Wales. The study was supported in part by grants from the Ecological Society of Australia, Australian Rangeland Society and the Linnean Society of NSW.
- Graduate Diploma of Education, Charles Sturt University, 1989.
- Bachelor of Science in Agriculture, First Class Honours, University of Sydney, 1978. Honours subject: Agricultural Genetics. Awards: Belmore Scholarship, John Arthur Cran Prize, Golden Jubilee Scholarship in Agricultural Science, Professor W.L. Waterhouse Prize.

AREAS OF EXPERTISE

- Flora and fauna survey (vascular plants, mammals, birds, reptiles and frogs)
- Vegetation classification and mapping (including air photo interpretation)
- Assessment of ecological values and significance
- Wildlife management
- Conservation reserve management
- Wetland management (coastal and inland)
- Flora and fauna impact assessment
- Animal ecology (especially birds and mammals)
- Plant ecology
- Agricultural science
- Science education

CONSULTING EXPERIENCE

- Many flora and/or fauna surveys for land-use planning and environmental impact assessment in the Sydney and Blue Mountains regions, and elsewhere (1985-2003).
- Aquatic life section of the 1986 environmental impact statement for renewal of the export licence for the Eden woodchip industry (1985-86).
- Flora and fauna survey of the Thredbo Lease Area, Kosciusko National Park, for Kosciusko Thredbo Pty Ltd (1985-87).
- Survey for Murray Darling Basin Commission of the floodplain vegetation of the Murray and Edward Rivers, in conjunction with Margules and Partners and the Victorian Department of Conservation, Forests and Lands (1987-89).
- Mapping of vegetation communities and identification of significant flora and fauna sites for Blue Mountains City Council's Environmental Management Plan Stage 1 (1988) and Stage 2 (1994-95).
- Flora and fauna surveys for Warringah Council of Angophora Reserve, Avalon (1988-89), and McKay Reserve, Palm Beach (1992), and a flora survey of Jamieson Park, Wheeler Heights (1995).

- Flora and fauna surveys of Rookwood Necropolis for the Joint Committee of Necropolis Trustees (1988 and a more detailed survey 1999).
- Co-author of a book on the fauna of the Blue Mountains (1988-90).
- Study of the history, ecology and management of koalas in Warringah and Pittwater for Warringah Council (1989).
- Mapping of vegetation communities in remnant bushland throughout Hornsby Shire for Hornsby Shire Council (1989-90), plus flora and fauna surveys of Berowra Valley Bushland Park (1990) and Pennant Hills Park (1992-93).
- Revision of a management report on an endangered species, the Yellow-footed Rock-wallaby, for NSW National Parks and Wildlife Service (1990).
- Identification and review of bird species of particular conservation concern in the Western Division of NSW for NSW National Parks and Wildlife Service (1990-95).
- Fauna survey of the Binghi wilderness area for NSW National Parks and Wildlife Service (1991).
- Review of the native flora and fauna of remnant bushland in the City of Penrith for Penrith City Council (1991-92).
- Mapping of significant floodplain and estuarine wetlands in the Hawkesbury-Nepean valley (1992-93), and mapping of significant upland wetlands in the Hawkesbury-Nepean catchment (1995-96) for NSW Department of Planning.
- Flora survey of Kedumba Valley for Sydney Water Catchment Services (1996).
- Identification, description and detailed mapping of native vegetation communities in remnant bushland throughout the Warringah Local Government Area (excluding the national parks), including assessment of their conservation status and current condition, compilation of information on the flora and fauna species of the area, estimation of the original extent of native vegetation communities in the area, and identification of existing and potential wildlife corridors, for Warringah Council (1996-2003).
- Study of the birds of Careel Bay, their habitats and management requirements, for Pittwater Council (1997, with a follow-up survey in 2001).
- Study of buffer zones requirements for protection of sensitive vegetation units in the Blue Mountains, plus detailed descriptions of the sensitive vegetation units, for Blue Mountains Conservation Society (1997-98).
- Flora and fauna survey of the Woodford Dam catchment area for Sydney Water (1997-98).
- Flora and fauna surveys for NSW Department of Public Works and Services for various works in the Blue Mountains Urban Runoff Control Program (1998).
- Preparation of a management plan for threatened fauna and flora in the Pittwater Local Government Area (excluding the national parks), and preparation of a draft development control plan for biodiversity conservation for Pittwater Council (1998-2000).
- Review of Environmental Factors for proposed sealing of Evans Lookout Road, Blue Mountains National Park, Blackheath, for NSW National Parks and Wildlife Service (1999).
- Waterbird surveys of Dee Why Lagoon, Long Reef and Dee Why Creek for Warringah Council (1999-2000).
- Detailed survey, description, mapping and preparation of management recommendations for an endangered ecological community, the Duffys Forest vegetation community, for NSW National Parks and Wildlife Service and Warringah Council (1999-2000).
- Fauna surveys of 30 sample sites for long-term monitoring of fauna biodiversity in Ku-ring-gai Council bushland reserves (baseline study in 2000-01, resampling of 10 sites in 2003).
- Flora and fauna assessment of Callan Park for NSW Department of Health (2001).
- Flora and fauna assessment of an abandoned road corridor at Belrose for NSW Department of Planning (2001-02).
- Flora and fauna assessment of proposed upper Blue Mountains sewage transfer scheme (2001-03), and flora assessment of proposed water supply pipeline from Katoomba to Blackheath (2000-02) for Sydney Water.
- Review of Environmental Factors for upgrading of the National Pass walking track, Wentworth Falls, for NSW National Parks and Wildlife Service (2002-03).
- Species Impact Statement for proposed residential development at Seaforth for NSW Department of Infrastructure, Planning and Natural Resources (2002-03).
- Flora and fauna assessment of proposed rezonings at Mt Kuring-gai and Asquith Industrial Areas for Hornsby Shire Council (2003).

TEACHING EXPERIENCE

- Conducted local courses on the fauna of the Blue Mountains (1985-86).
- Seasonal Ranger, NSW National Parks and Wildlife Service, Blue Mountains District (1988-90).
- Teaching fauna and ecology courses to bush regeneration, outdoor guiding and natural resource management students at Richmond College of TAFE (1995) and Blue Mountains College of TAFE (1997-2003).
- Tutoring in soil science at University of Western Sydney (2000).

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Theses

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Cowan, J. 1977. Breeding to increase protein levels in maize. B.Sc.Agr. (Hons) report, University of Sydney.

Smith, J. 1997. Ecological patterns in a terrestrial bird community in arid north-western New South Wales. Ph.D. thesis, Departments of Zoology and Ecosystem Management, University of New England, Armidale.

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Seaforth Oval – Flora assessment and eight-part test for the Duffys Forest Ecological Community

Teresa James January 2003

Report to Manly Council

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Seaforth Oval - Flora assessment and eight-part test for the Duffys Forest Ecological Community

Teresa James January 2003

Executive summary

Three small patches of the Duffys Forest Ecological Community, an endangered ecological community listed on the *Threatened Species Conservation Act* 1995, will be impacted by proposed works to improve access and facilities at Seaforth Oval. Despite fragmentation, the small size and degraded condition of the remnant, the site still supports a good range of native species and retains the potential to be restored to a better quality remnant with appropriate management. Two further remnants of Duffys Forest vegetation occur in close proximity to the site. With approx. 84% of the original distribution of the Duffys Forest Ecological Community now cleared, all remaining remnants are considered to be significant. This remnant is of particular significance as it is located at the southern limit of its geographical distribution and is one of only a few small remnants remaining within the Manly local government area.

The proposed upgrade of Seaforth Oval will result essentially in the loss or modification of the entire remnant. An eight-part test pursuant to Section 5A of the EP&A Act concludes that a significant impact on the Duffys Forest Ecological Community is likely to occur. The current Development Application will, therefore, require a Species Impact Statement. To avoid a significant impact there would need to be major changes to the proposed intersection and car parking areas to prevent any further fragmentation or significant reduction in size of the remnant. Protection and management of the remnant, irrespective of the outcome of the development proposal, is urgently required to prevent further degradation and loss of the community. Protection, consolidation and management of the two larger patches may be sufficient to negate any significant impacts.

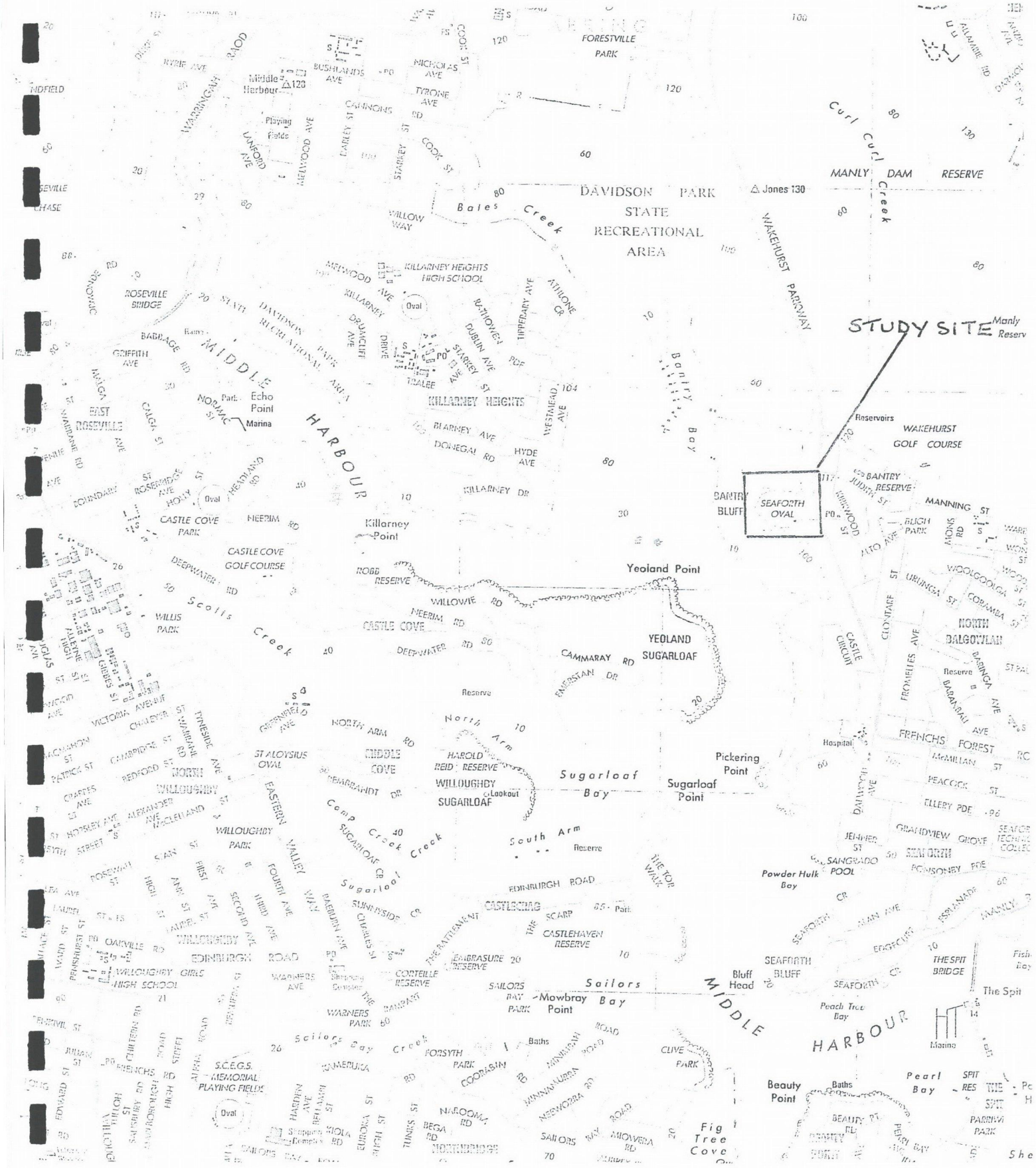
1. Introduction

1.1 Background

Manly Council is currently preparing a Management Plan for Seaforth Oval to improve roads, parking, facilities and access to and from the Wakehurst Parkway. The site is located adjacent to natural bushland within Garigal National Park and in road reserves. Vegetation to the north of the oval and on the eastern side of the Wakehurst Parkway (see Fig 1), has been identified previously as the Duffys Forest Ecological Community by Smith & Smith (2000), an endangered ecological community listed on the *Threatened Species Conservation Act* 1995 (TSC Act). A smaller remnant located within the proposed development area, although not identified as Duffys Forest in the original Smith report, has been recently determined as this community (Smith & Smith 2002). The proposed development will impact on this smaller remnant and consequently assessment, including an eight-part test, is required under Section 5A of the Environmental Planning & Assessment Act (EP&A Act).

1.2 The site

Seaforth Oval is located to the west of the Wakehurst Parkway, opposite Burnt Street at North Seaforth, within the Manly local council area (see Map 1). It occupies part of a north-south ridge-



Map 1: Location of Seaforth Oval

Parramatta River 1:25 000 Topographic Map (second edition)
Central Mapping Authority of NSW

line at approx. 120 metres a.sl.. The oval is surrounded by bushland within Garigal National Park. The land falls steeply to the west of the oval down to Bantry Bay within Middle Harbour. The local geology is Hawkesbury Sandstone with a localized occurrence of lateritic gravels and clay, associated with the Somersby soil landscape, overlying the sandstone in higher parts close to the Wakehurst Parkway.

Currently there is a separate entry and exit for the oval and associated car parking areas. The present roads and parking areas directly adjoin small patches of remnant Duffys Forest located between the Wakehurst Parkway and the oval.

1.3 Literature review

The site occurs within the area covered by the Sydney 1:100 000 map sheet as documented by Benson & Howell (1994). Remnant vegetation located within the proposed development area has been surveyed recently by Smith & Smith (2002). Information on Duffy's Forest is provided in Benson & Howell (1994), Smith & Smith (2000) and NPWS (2001). A full listing of references is provided at the end of the report.

2. Methodology

2.1 Threatened flora assessment

An assessment of threatened flora likely to occur at the site was based on information from the following sources, as well as from previous surveys in the local area:

NPWS Threatened Flora Atlas database;
Survey of Duffys Forest Ecological Community (Smith & Smith (2000);
Threatened Species Information and Environmental Assessment Guidelines for the Manly Council local government area (NSW NPWS 2001);
Garigal National Park - Plan of Management (NPWS 1998).

Plant species with potential habitat at or immediately adjoining the site are summarized in Table 1.

Table 1: Threatened or nationally significant flora with potential habitat at the site

Species	Conservation status	Habitat requirements
Microtis angusii	Endangered -TSC Act & EPBC Act	Forest or woodland on lateritic shale on Wianamatta Shale or associated with shale lenses overlying Hawkesbury Sandstone.
Grevillea caleyi	Endangered -TSC Act & EPBC Act	Open-forest or woodland on Hawkesbury Sandstone in association with shale lenses and lateritic soils.
Persoonia hirsuta	Endangered -TSC Act & EPBC Act	Woodland or scrub/heath on sandstone with a clay influence.
Pimelea curviflora var. *curviflora*	Vulnerable -TSC Act & EPBC Act	Open-forest or woodland on sandstone and laterite soils.

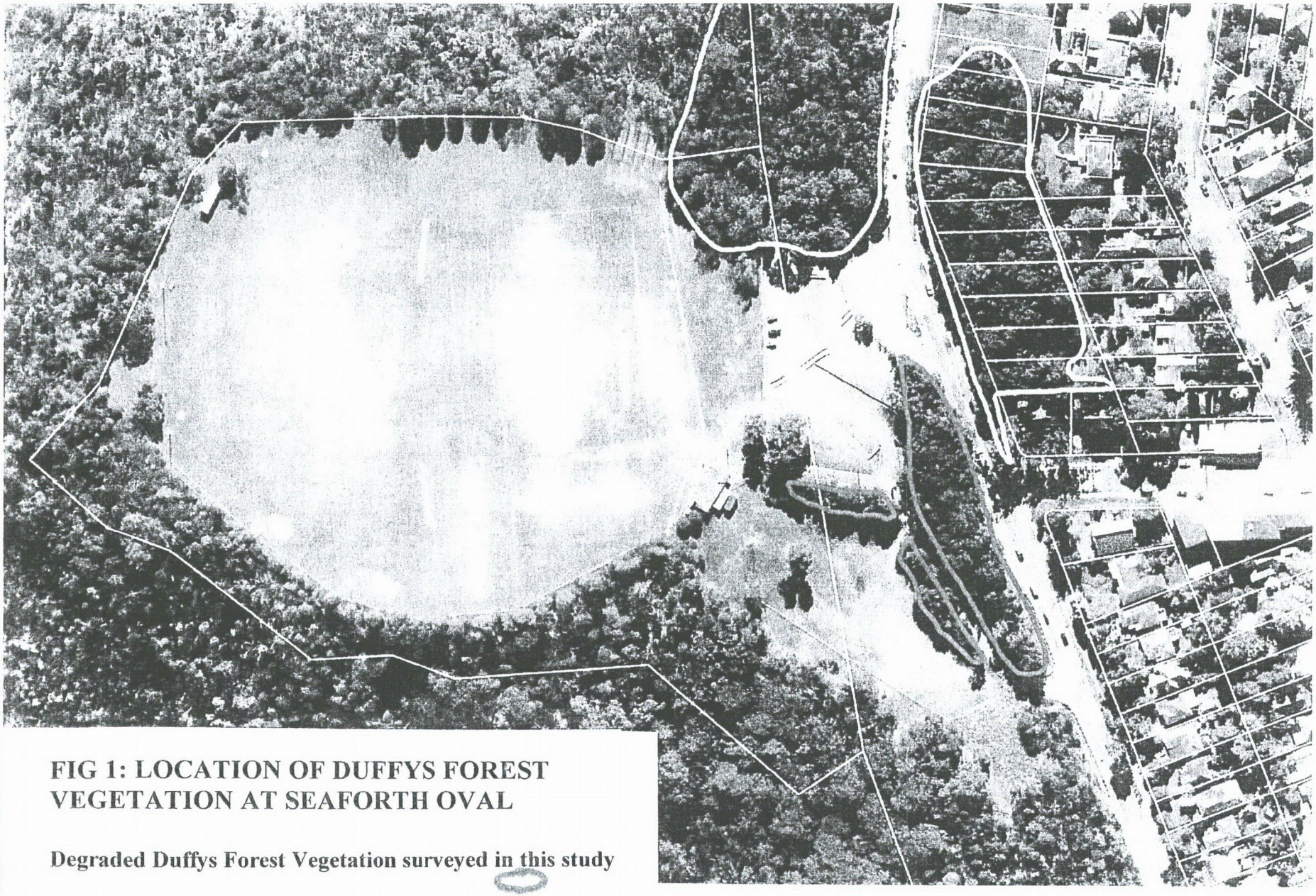


FIG 1: LOCATION OF DUFFYS FOREST VEGETATION AT SEAFORTH OVAL

Degraded Duffys Forest Vegetation surveyed in this study

Local remnants of Duffys Forest Vegetation as identified by Smith & Smith (2000)

From Smith & Smith (2002)

Tetratheca glandulosa	Vulnerable - TSC Act & EPBC Act	Open-forest, woodland or heath on sandstone with a clay influence.
Epacris purpurascens var. *purpurascens*	Vulnerable (TSC Act)	Open-forest, woodland or heath on sandstone with a clay influence. Generally wetter sites.
Lomandra brevis	ROTAP 2RC; rare local endemic.	Open-forest, woodland or heath on sandstone with a clay influence.
Darwinia diminuta	ROTAP 3RCi; rare local endemic.	Heath or open-woodland in sandy loam soils on stony ridge-tops.
Angophora crassifolia	ROTAP 2RCa; rare local endemic.	Low forest and woodland on lateritic soils over Hawkesbury Sandstone.

TSC Act: *Threatened Species Conservation Act* 1995; EPBC Act: *Environment and Protection Biodiversity Conservation Act* 1999.

All of the above species have been recorded previously from the Duffys Forest Ecological Community. A population of *Pimelea curviflora* var. *curviflora* is known from the north east edge of Seaforth Oval, within Garigal National Park (Smith & Smith 2000), and also approx. 300 m north on the eastern side of the Wakehurst Parkway, north of Judith Street (James 2002). A plant of the Onion Orchid *Microtis angusii* has also tentatively been identified at the latter site, as well as *Lomandra brevis* and *Darwinia diminuta*.

2.2 Field survey

Field survey was conducted on 7 January over a period of four hours. Three small patches of vegetation (outlined in red in Figure 1) were surveyed between the Wakehurst Parkway and the oval. The site was carefully walked, searched and the following activities undertaken:

- all native plant species and more common exotic species were recorded;
- plant specimens were collected to confirm identifications as required;
- targeted search for threatened species, particularly *Pimelea curviflora* var. *curviflora;*
- location of remnants and species in relation to proposed development noted.

A brief inspection of remnants of Duffys Forest to the north of the oval and on the eastern side of the Wakehurst Parkway was also made.

2.3 Taxonomy & conservation status

The naming of plant species follows Harden (1990-1993) with updates from the Royal Botanic Gardens, Sydney. Plant community identification and conservation status (including species) is based on Benson & Howell (1994), Smith & Smith (2000) and the TSC Act.

2.4 Limitations of survey

The number of plant species recorded in any brief survey will be an underestimate of the actual species present and a more accurate and comprehensive survey would need to be undertaken at different times of the year to account for seasonal variation. Both this survey and a previous survey (Smith & Smith 2002) were undertaken in late spring-early summer. Although this is generally a good period for surveys, the drought conditions of recent months are likely to have affected plant growth and vigor.

3. Results

3.1 Plant communities

Vegetation at the site comprises three patches of low open-forest separated by a road and access tracks. The longer strip located parallel to the Parkway is approx. 125 m long and 10-25 m wide but is dissected by a walking track opposite Burnt Road. The two smaller remnants are located west of the access road and are approx. 60 m and 35 m long and are 5-10 m wide (see Fig 1). The main tree species are Silvertop Ash *Eucalyptus sieberi* and Black She-oak *Allocasuarina littoralis* with occasional trees of Red Bloodwood *Corymbia gummifera*. The trees are approx. 6-10 m high above a sparse understorey. Common smaller tree and shrub species include *Pittosporum undulatum, Hakea dactyloides, Dodonaea triquetra, Kunzea ambigua, Acacia myrtifolia, A. suaveolens, A. longifolia, Lasiopetalum* species and *Grevillea buxifolia*. The dominance of *Allocasuarina* in the canopy has resulted in a thick layer of needles over the ground surface. Grasses and ground cover plants are consequently relatively sparse but include *Dianella caerulea, Lomandra longifolia, L. glauca, Entolasia* species and *Pteridium esculentum*. A full listing of species is provided in Appendix 1.

Photo 1: Northern end of larger patch of Duffys Forest

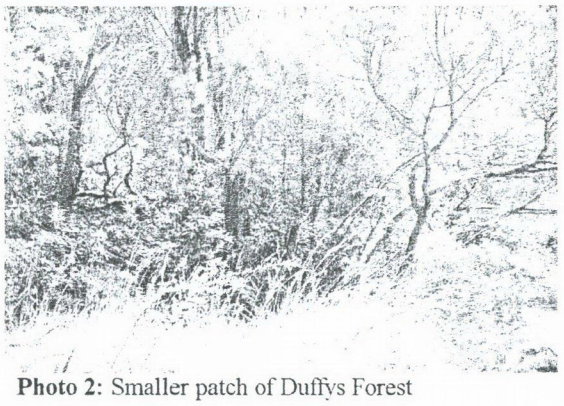


Photo 2: Smaller patch of Duffys Forest

Vegetation at the site has been identified previously as representative of the Duffys Forest Ecological Community (Smith & Smith 2002). Duffys Forest is floristically similar to Sydney Sandstone Ridgetop Woodland and Sydney Sandstone Gully Forest with all three communities occurring on Hawkesbury Sandstone. Duffys Forest, however, is associated with shale lenses and lateritic soils overlying the sandstone unlike the other two communities. A characteristic assemblage of plant species is associated with Duffys Forest that reflects the deeper profile (absence of rocky outcrops) and higher clay content of the soil. In small fragmented and disturbed remnants, however, this assemblage is likely to be less typical due to the greater likelihood of introduced species (native or exotic) and the loss of more sensitive species. This is evident at the site. Although most of the native species recorded from the site have been recorded previously from Duffys Forest, only 26 species or 37% are listed as characteristic of the community in the Final Determination. Vegetation at the site is also low in positive diagnostic species for Duffys Forest for similar reasons. The diagnostic species index for Sydney Sandstone Gully Forest is slightly higher, however, the location and vegetation is clearly not consistent with this community. Although in a relatively poor condition, vegetation within the surveyed area is still considered to be representative of Duffy's Forest as described in the Final Determination under the TSC Act (see Table 2).

Table 2 –Summary of identification of the Duffys Forest Ecological Community at the Site based on criteria listed in the Final Determination (TSC Act)

Criteria from Final Determination	Application to Site
2. Occurs on ridgetops, plateaus, upper slopes on Hawkesbury Sandstone geology typically in association with laterite soils and soils derived from shale and laminate lenses	Yes along ridge-top
2. Structural form of open-forest to woodland	Yes, open-forest
2. Reported from the Warringah, Pittwater, Ku-ring-gai, Hornsby and Manly local government areas	Yes, Manly LGA
3. Characterised by a basic assemblage of 73 named species which are listed in Final Determination.	26 or 36% of these species have been recorded from the site
4. The total species list of the community is considerably larger than in criteria 3	Yes, a total of 71 native species are recorded from the site and most of these have been recorded previously from the community (Smith & Smith 2000)
5. A list of diagnostic species can be used to distinguish the community from similar surrounding communities	Duffys Forest index = 50; Sydney Ridgetop Woodland = 50; Sydney Gully Forest index = 52.5
7. The community is highly fragmented by urban development and some remnants have not been mapped on larger scale maps. Some disturbed or degraded remnant patches may not be mapped in Smith & Smith (2000).	This small and disturbed remnant has not been mapped in Smith & Smith (2000)

3.2 Plant species

3.2.1 General

A total of 71 native plant species have been recorded from the site during this survey and the Smith & Smith survey (November 2002) (see Appendix 1). In comparison, 120 species have been recorded from the larger and more intact Duffys Forest remnant on the eastern side of the Wakehurst Parkway (Smith & Smith 2002). A slightly larger (approx. 0.5 ha) but highly modified remnant east of the Parkway and north of Judith Street (c. 300 m north) supports over 100 native species (James 2002). Some considerably larger remnants, however, contain a similar level of species e.g. Forest Way, Garigal NP with 86 species from 17 ha. Proportionate to the size of the remnant, therefore, species richness appears to be moderate despite the disturbed state. Smith & Smith (2002) comment that many of the species present may not have been present in the original vegetation but are recent colonizers. There is likely to be some element of this as indicated by the low proportion of "characteristic" species recorded, however, most of the species mentioned by Smith & Smith (2002) have also been recorded from several other remnants of Duffys Forest.

3.2.2 Significant species

No threatened species were recorded from the site in this survey or the Smith & Smith (2002) survey. The small size of the remnant patches, the highly disturbed conditions and the thick layer of *Allocasuarina* needles covering the ground surface are not likely to be conducive to their germination and growth. It is possible, however, that if once present at the site there may still be viable rootstock or seed present in the soil seed bank that could regenerate with appropriate management. The most likely species to occur is *Pimelea curviflora* var. *curviflora* with a known population less than 100 metres distance from the surveyed remnant. This taxon is known to regenerate from both rootstock and seed.

Three species recorded from the site are considered to be biogeographically significant (Smith & Smith 2000). *Gahnia erythrocarpa*, *Grevillea speciosa* and *Lasiopetalum rufum* are local endemic species confined to the Central Coast botanical region. Port Jackson is the southern geographical limit for *Grevillea speciosa*.

3.3 Condition of vegetation and threatening processes

The vegetation has been isolated and fragmented by roads and pathways. Existing car parking areas with sealed surfaces have also encroached on vegetation in the northern part of the remnant. There is considerable evidence of rubbish and green waste dumping within the remnant patches. A large pile of rocks has been deposited within the larger patch adjacent to the access pathway. There is evidence of dead plants and physical damage to the vegetation.

Weedy exotic species commonly occurring at the site include Tussock Paspalum *Paspalum quadrifarium*, Kikuyu *Pennisetum clandestinum*, African Lovegrass *Eragrostis curvula*, Panic Veldt *Ehrarta erecta*, *Briza subaristata*, Paddys Lucerne *Sida rhombifolia*, Fleabane *Conyza* species, Cobblers Pegs *Bidens pilosa* and Asparagus Fern *Protasparagus aethiopicus*. Several noxious weeds were recorded from the site but pose no great threat at the present time. Noxious weeds included Lantana *Lantana camara*, Small-leaved Privet *Ligustrum sinense*, Fishbone Fern *Nephrolepis cordifolia* and Senna *Senna pendula*.

Photo 3: Dumping of rubbish and garden refuse

Photo 4: Damage to plants

The long narrow shape of the fragmented patches with extensive boundaries, easy access to the site, high visitation and use of roads and facilities in the vicinity and adjoining disturbed areas, all contribute significantly to the vulnerability of the site and the extent of disturbance. Disturbance zones along boundaries are known to experience an increase in soil temperatures, increased desiccation and physical damage, increased transfer of dust, seeds, insects and disease from adjoining areas, changed soil moisture levels and surface runoff rates with increased rates of erosion and transport of soil and nutrients and increased invasion by diseases and exotic species (Saunders *et. al.* 1991, Hobbs 1993). Such changes or "edge effects" clearly have a degrading

impact on native vegetation. A study on urban remnants in Sydney by Dostal (2000) has indicated that such "edge effects" may dominate within the first 20 m and often extend to at least 40 m.

Despite the degree of disturbance the vegetation appears to be quite resilient (often associated with lateritic soils) and has potential for regeneration to a more natural remnant of Duffys Forest. A good range of native species survive, however, many are observed to be uncommon at the site. Some species may also be present underground in the form of woody rootstock and in the soil seed-bank. The close proximity of Duffys Forest to the north and east may provide an important source of propagules. Under the present conditions, however, the vegetation is unlikely to remain representative of Duffys Forest in the short to medium-term unless managed appropriately and ongoing threatening processes are controlled. The dominance of Black She-oak *Alloasuarina littoralis*, which inhibits the growth of many other native species, needs to be addressed to promote diversification of the remnant. The general degradation of habitat, fragmentation, weed invasion, physical damage from inappropriate access and disturbance, and nutrient enrichment are recognized threats to Duffys Forest.

4. Conservation significance and ecological constraints to development

The presence of Duffys Forest vegetation, an endangered community, may pose a significant ecological constraint to proposed development of the site. Only approx. 240 ha of the Duffys Forest Ecological Community remains (less than 16% of the original extent) and remnants are typically small, fragmented and disturbed. Although the site is degraded some 70 native species survive and there is potential for restoration to a better quality remnant with appropriate management. Furthermore the remnant is within 25-50 metres of two larger remnants of Duffys Forest. Potential habitat for threatened or nationally significant species is also present (see Table 1). Table 3 compares a range of remnants of Duffys Forest in relation to size, species richness, condition and the presence of significant species. Although no threatened species have been recorded from the site a good level of species richness relative to size is evident. It is also apparent that most of the smaller remnants of Duffys Forest vegetation are in poor condition. Areas at Manly Dam Reserve and Ku-ring-gai, however, indicate that smaller remnants can be managed effectively.

Table 3: Comparison of remnant size, species richness and presence of significant species in Duffys Forest (information from Smith & Smith 2000)

Site name	Size (ha)	Number of native species	Condition	Species of national & state significance
Oval N. of Weardon Rd. Belrose	0.2	-	Poor	None recorded
Seaforth Oval - study site	**0.25**	**71**	**Poor**	**None recorded**
Seaforth Oval eastern side of Parkway	0.3	120	Poor	None known to be recorded
Seaforth Oval – Garigal NP section	0.4	Not available	Poor	*Pimelea curviflora var. curviflora;*
Precint A1	0.4	103	Poor but early stage of regeneration	*Pimelea curviflora var. curviflora; Darwinia diminuta; Lomandra brevis; ?Microtis angusii*
Oates Place, Belrose	0.6	81	Poor	*Pimelea curviflora var. curviflora; Grevillea caleyi*
Frank Beckman	1.0	113	Poor	*Pimelea curviflora var. curviflora;*

Reserve, Terry Hills				*Lomandra brevis;*
Ku-ring-gai Wildflower Garden	1.7	79	Average	None
Park Circuit, Manly Dam Res.	2.3 in 2 parts	62	Good	None
Manning Street, Manly Dam Res.	2.6	77	Average	*Pimelea curviflora var. curviflora; Angophora crassifolia*
Eurabba road, Duffys Forest	4.5	139	Average & poor	*Pimelea curviflora var. curviflora; Epacris purpurascens var. purpurascens; Lomandra brevis*
Warringah Road, Frenchs Forest	5.4	112	Poor	None
Aquatic Drive, Frenchs Forest	7.6	137	Average to poor	*Pimelea curviflora var. curviflora; Lomandra brevis*
Forest Way, Garigal NP	17.3	86	Good	*Grevillea caleyi; Lomandra brevis*

5. Proposed development

Manly Council is currently preparing a Management Plan for Seaforth Oval. The proposed works include a new access point and 4-way intersection (with traffic lights) at Burnt Street, new parking areas and additional sporting and recreational facilities. See Draft Landscape Concept Plan (Plan 1).

5.1 Impacts of the proposed development on Duffys Forest

The creation of a new intersection at Burnt Road, new car parking areas, construction of a half basketball court and landscaped areas will directly impact on the three patches of Duffys Forest. The two smaller patches will be completely cleared. The larger and most diverse remnant parallel to the Wakehurst Pathway will be fragmented and reduced in size by approx. fifty percent. Although currently fragmented to a small degree by a pathway, the construction of a road will effectively create two separate patches with significantly reduced dispersal and genetic exchange likely between them. The maximum width of the remaining patches of vegetation will be 10-15 m. Edge effects around these two small patches are likely to affect the entire remnant.

6. Eight-part test of significance

The 8 Part Test is a statutory mechanism under the Environmental Planning & Assessment Act 1979 that helps to determine whether a proposed activity is likely to have a significant effect on threatened species, populations or communities. The following test will consider the impact of the proposed development on the Duffys Forest Ecological Community. The relevant parts of the test in relation to threatened communities are c, d, f, g & h.

Duffys Forest

c) In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

The affected area comprises three small patches of vegetation of approx. 1875 sq m, 600 sq. m, and 175 sq. m. with a total area of approx. 2650 sq. m. or 0.26 ha. The proposed development will result in the direct loss of the two smaller patches and increased fragmentation and a reduction in size of the larger patch. Approx. 900 sq. m of Duffys Forest will remain in two separate patches

DRAFT

LEGEND

- EXISTING CONTOURS
- PROPOSED CONTOURS
- MODIFIED PERIMETER FENCE
- 2.0m WIDE PEDESTRIAN PATH
- 3.5m WIDE SHARED PEDESTRIAN/CYCLE PATH
- PEDESTRIAN STAIR
- SEATING NODE/REST STOP
- PATH JUNCTION NODE
- BBQ FACILITIES
- EXISTING TREES
- PROPOSED TREES
- EXISTING BUSHLAND
- BUSH REGENERATION AREAS
- PROPOSED MASS PLANTING TO PATH EDGE
- TURF AREAS

Existing drainage pits to collect overland flow and to be piped to proposed water storage tank (under future basketball court) for the re-use of water.

Existing Silt fans to be removed as per Environmental Consultant's recommendations.

Small concrete water collection tanks to be installed at exit pipes of existing sub-soil drainage system as recommended by Environmental Consultant. Subject to feasibility study.

Edge Treatment Planting to a Bushland Management Plan as per Environmental Consultant's recommendations.

Raised mound to prevent overland flow into Garaigal National Park

Public Shelter & seating

Orbital Path(crushed sandstone with timber edge)becomes an edge to segregate turf areas from surrounding bushland

Future Sports Club with Changeroom & Toilets below .

Emergency access and service lane with turn-a-round area

Children's playground

Half Basketball Court with water collection storage tank below as per Environmental Consultant's recommendations.

BBQ & Picnic area

Bus Parking & Drop-off

osed ramp for led access

bled Parking

ossible future king tracks

Proposed Shelter/Lookout Tower with walking tracks information, bike racks, seating & bins.

Reconstruct soil around Cricket nets as recommended by Environmental Consultant

To existing Engravings, Timber-getters, & Old Bullock Tracks

Proposed new carpark with kerb, gutter & drainage pits. Carpark run-off either to be collected & piped to proposed collection tank (under future basketball court) or piped to the council stormwater system (Wakehurst Parkway & urban areas) as per Environmental Consultant's recommendations.

Secondary Carpark

Bus Stop

Future controlled intersection with slip-way to prevent traffic congestion

WAKEHURST PARKWAY

BURNT ST

Sports Oval | *Edge Treatment* | *Garigal National Park*

SECTION AA

SECTION BB

Entry from Carpark level

Shared Sports Club

Change-rooms/Toilets & sports equipment storage

Pedestrian stairs

SECTION CC

DRAFT

0 5 10 20 50 100 m

Plan 1: Seaforth Oval - Draft Landscape Concept Plan

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PLAN OF MANAGEMENT LANDSCAPE MASTERPLAN

less than 10-15 m wide. It is unlikely that these small patches can survive as an example of the Duffys Forest Ecological Community in view of their small size, increased isolation and indirect impacts i.e. "edge effects". The assessment is based, therefore, on complete loss of the present remnant.

The total area to be lost (0.26 ha) is small and represents only 0.1% of the 240 ha of Duffys Forest known to remain (NPWS 2001). In view of the highly fragmented distribution of the community and small size of most remaining remnants (most < 5 ha), however, this size area may be significant. Assessment of significance of an area of habitat is also related to condition and regeneration potential of the vegetation, diversity, habitat for threatened species, proximity to other remnants of the community and security of a remnant. A summary of these factors is presented below:

Condition (including diversity) and regeneration potential
The remnant is highly disturbed due to fragmentation by roads and pathways, "edge effects" along extensive boundaries and illegal dumping. Lack of fire has resulted in a dominance of Black She-oak that inhibits the growth of many other native species. The shrub and ground layers are generally sparse. According to the rating system used by Smith & Smith (2000) the condition of this remnant must be considered to be poor, however, a significant proportion of known remnants are similarly rated. At least 70 native species, most of which are commonly recorded from Duffys Forest, still survive at the site. It is likely that the vegetation could regenerate well following an appropriate controlled burn, weed control and protection from physical disturbance.

Habitat for threatened species
The site contains potential habitat for a range of threatened and significant species that typically grow in Duffys Forest. A known population of *Pimelea curviflora* var. *curviflora* occurs within 50-100 metres. These species potentially could still occur at the site as rootstock or in the soil seed bank. Appropriate management of the remnant may provide suitable conditions for germination/re-sprouting of these species. Seedlings of *Pimelea curviflora* var. *curviflora* have been observed after fire in an area where it had not previously been seen (Benson & McDougall 2001).

Proximity to other remnants
Two larger, better quality remnants of the Duffys Forest Ecological Community (although still rated as poor by Smith & Smith 2000) occur 50-100 metres north and east of the surveyed remnant. Although now separated by sealed roads some limited dispersal and genetic exchange may still occur.

Security of remnant
The remnant occurs on Crown land providing potential opportunities for conservation, however, recreational use of Seaforth Oval is the primary land use of the area.

Although the remnant (comprising three small patches) is small and in poor condition it is concluded that a significant area of habitat may be removed and modified in view of the species richness, regeneration potential, close proximity of refuge areas, potential habitat for threatened species, general lack of good quality remnants elsewhere and its occurrence on Crown land.

d) whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community.

The development will result in increased fragmentation and isolation of known habitat of the Duffys Forest Ecological Community. The construction of a road through the one remaining patch of vegetation is likely to reduce dispersal and genetic exchange between the separate parts. In view of the highly fragmented nature of remaining areas of the community NPWS recommend that further fragmentation should be avoided.

f) whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or similar protected areas) in the region;
Less than 8% (117 ha) of the original extent of Duffys Forest is represented within NPWS reserves. A further 2.7% (39 ha) is afforded some protection in reserves managed by Council or Trusts. The Duffys Forest Ecological Community is not adequately represented in the conservation reserve system (NPWS 2001).

g) whether the development or activity proposed is of a class of development or activity which is recognised as a threatening process;
The proposed activity will result in the clearing, modification and degradation of Duffys Forest vegetation. "*Loss of biodiversity as a result of loss and/or degradation of habitat following clearing and fragmentation of native vegetation*" is listed as a key threatening process in the *TSC Act (1995)*. This is directly relevant to the Duffys Forest Ecological Community and the proposed development.

h) whether any threatened species, population or ecological community is at the limit of its known distribution;
This remnant is at the southern limit of the known geographical distribution of the community. It is one of few remaining remnants within the Manly local government area.

Conclusion
The eight part test indicates that the proposed development is likely to have a significant impact on the Duffys Forest Ecological Community based on the following:

c) a significant area of habitat may be affected;
d) the development will result in some increased fragmentation and isolation;
f) Duffys Forest Ecological Community is inadequately conserved;
g) the proposed development is recognized as a key threatening process;
h) the remnant to be affected is at the southern limit of the geographical distribution.

7. Conclusion & recommendations

Remnant vegetation at Seaforth Oval is representative of the Duffys Forest Ecological Community, an endangered ecological community listed under the TSC Act. With approx. 84% of the original distribution of Duffys Forest now cleared, all remaining remnants are considered significant (NPWS 2001). This remnant, although small and degraded, is of particular significance as it is located at the southern limit of its geographical distribution and is one of only a few small remnants within the Manly local government area. The proposed upgrade of Seaforth Oval will result in the loss or modification of the entire remnant. An eight-part test pursuant to Section 5A of the EP&A Act concludes that a significant impact on Duffys Forest Ecological Community is likely to occur. The Development Application will, therefore, require a Species Impact Statement.

To avoid a significant impact there would need to be major changes to the development in relation to the proposed intersection and car parking areas. Any further fragmentation of the remnant or any significant reduction in size, particularly of the larger patch, cannot be sustained by the Duffys Forest vegetation. Protection and management of the remnant, irrespective of the outcome of the development proposal, is urgently required to prevent further degradation and loss of the community. Protection, consolidation and management of the two larger patches may be sufficient to negate any significant impacts of future development. The following recommendations are provided to protect and enhance Duffys Forest vegetation at the site:

- Access in and out of the oval to be located away from the remnant to the north or south.
- The current entry road that runs between two larger patches of Duffys Forest Ecological Community to be removed and consolidation of the remnant effected.
- Removal of pathway opposite Burnt Street through the larger patch, or replacement with a natural surface and limited access.
- Consider linking this remnant to the remnant of Duffys Forest within Garigal National Park to the north (if adequate access at southern end of site).
- Fencing of the remnant to protect from disturbance, dumping etc.
- Creation of buffer zones between the Duffys Forest vegetation and adjoining areas. Such zones should be planted with species representative of the community and of local genetic stock.
- A detailed management plan to be prepared for the remnant. Key requirements include protection from physical damage, weed control, thinning of the *Allocasuarina* trees, appropriate fire management to promote regeneration and diversification and consolidation of patches.

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Appendix 1: Plant species recorded from Duffys Forest at Seaforth Oval

Compiled from Smith & Smith (2002) with additions by T.A. James (Jan 2003)

Key

DF = Duffys Forest Ecological Community; SSGF = Sydney Sandstone Gully Forest, SSRW = Sydney Sandstone Ridge-top Woodland
Occurrence in Duffys Forest, conservation significance & diagnostic species based on Smith & Smith 2000; Benson & Howell 1994
* = Exotic species
Noxious weed categories (Manly Council 2002)
W2 = The weed must be fully and continuously supressed and destroyed.
W3 = The weed must be prevented from spreading and its numbers and distribution reduced.
W4b = Any existing weed must be prevented from flowering or fruiting.
W4c = The weed must be prevented from spreading to an adjoining property.

Plant groups & families	Plant species	Listed in Final Det. for DF(2002)	Diagnostic species - + or -	Recorded from DF (Smith 2000)	Notes, conservation status
Ferns					
DAVALLIACEAE	*Nephrolepis cordifolia				Fishbone Fern; noxious weed W4c
DENNSTAEDIACEAE	Hypolepis muelleri			+	Uncommon
	Pteridium esculentum	+		+	Common
GLEICHENIACEAE	Gleichenia dicarpa		SSGF +	+	Uncommon
Dicotyledons					
AIZOACEAE	Tetragonia tegragonioides				Not recorded previously from Duffys Forest, probably introduced to site
APIACEAE	Centella asiatica			+	Uncommon
	Platysace linearifolia	+		+	Uncommon
	Xanthosia tridentata	+		+	Uncommon
ASTERACEAE	*Bidens pilosa				Cobblers Pegs; common weed
	*Conyza sp.				Fleabane; common weed
	*Hypochaeris radicata				Flatweed; common weed

	Ozothamnus diosmifolius			+	Uncommon
CASUARINACEAE	Allocasuarina littoralis	+		+	Dominant tree
	A. distyla			+	Uncommon
ELAEOCARPACEAE	Elaeocarpus reticulatus			+	Uncommon
EPACRIDACEAE	Epacris pulchella	+		+	Uncommon
	Leucopogon lanceolatus			+	Uncommon
EUPHORBIACEAE	Glochidion ferdinandi var. ferdinandi			+	Uncommon; probably introduced to site
	Micrantheum ericoides	+		+	Uncommon
	Omalanthus populifolius			+	Several small plants
FABACEAE - Faboideae	Desmodium varians			+	Uncommon
	Glycine microphylla			+	Uncommon
	Kennedia rubicunda			+	Uncommon
Mimosoideae	Acacia floribunda			+	Uncommon, introduced to site
	A. longifolia			+	Moderately common
	A. myrtifolia	+		+	Uncommon
	A. parramattenesis		SSRW -	+	Uncommon
	A. suaveolens	+		+	Uncommon
	A. terminalis subsp.angustifolia			+	Uncommon
Caesalpinoideae	*Senna pendula var. glabrata				Senna; noxious weed W4b
GERANIACEAE	Geranium homeanum			+	Uncommon
LORANTHACEAE	Amyema congener subsp. congener				Uncommon. Not recorded prev. from Duffys Forest
MALVACEAE	*Sida rhombifolia				Paddys Lucerne, common weed

MELIACEAE	Melia azedarach				Not recorded prev. from Duffys Forest
MYRTACEAE	Angophora hispida		DF - SSRW +	+	Uncommon
	Corymbia gummifera	+		+	Uncommon
	Eucalyptus sieberi	+		+	Common
	Kunzea ambigua			+	Common
	Leptospermum trinervium	+		+	Uncommon
	Melaleuca ?armillaris				Not native to site
OLEACEAE	*Ligustrum sinense				Small-leaved Privet, noxious weed W4b
PITTOSPORACEAE	Billardiera scandens var. scandens	+		+	Uncommon
	Pittosporum undulatum			+	Common
PROTEACEAE	Banksia ericifolia	+		+	Uncommon; one large tree
	Grevillea buxifolia var. buxifolia	+		+	Moderately common
	G. linearifolia	+		+	Uncommon
	G. speciosa				Biogeographically significant; restricted to Central Coast botanical division; S. limit at Port Jackson. Recorded from smallest patch.
	Hakea dactyloides	+		+	Moderately common
	H. teretifolia			+	Uncommon
	Persoonia pinifolia	+		+	Uncommon
RUBIACEAE	Opercularia aspera			+	Uncommon
SAPINDACEAE	Dodonaea triquetra	+		+	Moderately common
SOLANACEAE	*Solanum americanum				Occasional weed
STERCULIACEAE	Lasiopetalum ferrugineum	+		+	Uncommon

	L. rufum				Biogeographically significant; restricted to Central Coast botanical division. Recorded from northern end of larger patch. Not recorded prev. for DF
URTICACEAE	*Parietaria judaica				Pellitory; noxious weed W3
VERBENACEAE	*Lanatana camara				Lantana; noxious weed W2
Monocotyledons					
ALLIACEAE	*Nothoscordum borbonicum				Onion Weed; occasional weed
ASPARAGACEAE	*Protasparagus aethiopicus				Asparagus Fern; common weed
COMMELINACEAE	Commelina cyanea			+	Uncommon
CYPERACEAE	Cyathochaeta diandra	+		+	Uncommon
	*Cyperus spp.				Damp, grassy sites
	Gahnia aspera				Uncommon; not recorded prev. from DF
	G. erythrocarpa		DF - SSGF +	+	Biogeographically significant; restricted to Central Coast botanical division. Recorded from s. end of larger patch.
	Lepidosperma gunnii				Uncommon
	Lepidopserma laterale	+		+	Uncommon
JUNCACEAE	Juncus continuus			*	Uncommon
	J. usitatus			+	Uncommon
LOMANDRACEAE	Lomandra glauca	+		+	Moderately common
	L. longifolia	+		+	Uncommon
PHORMIACEAE	Dianella caerulea var. producta	+		+	Common
	D. revoluta var. revoluta		DF +	+	Uncommon

POACEAE	Aristida vagans		DF + SSGF -	+	Uncommon
	Austrodanthonia tenuior			+	Moderately common
	*Avena barbata				Bearded Oats; occasional weed
	*Briza subaristata				Common weed
	Cynodon dactylon				Common
	Deyeuxia parviseta or decipiens			+	Potentially regionally significant species. Identification to check further.
	Dichelachne crinita				Uncommon; not recorded prev. from DF
	Echinopogon caespitosus			+	Uncommon
	*Ehrarta erecta				Panic Veldt. Common weed
	Entolasia stricta var. stricta	+		+	Common
	E. stricta var. hirsuta				Uncommon
	E. marginata			+	Common
	*Eragrostis curvula				African Lovegrass; common weed along tracks and roads
	Imperata cylindrica var. major			+	Moderately common
	Microlaena stipoides			+	Uncommon
	Oplismenus aemulus			+	Uncommon
	*Paspalum quadrifarium				Tussock Paspalum; aggressive, common weed
SMILACACEAE	Smilax glyciphylla			+	Uncommon