6 ASSESSMENT OF SIGNIFICANCE

6.1 Key Thresholds Assessment (Part 3A)

As required by the Draft Guidelines for Threatened Species Assessment for Part 3A applications (DEC / DPI 2005), the following assessment of Key Thresholds (four in total) is provided for the proposed Trinity Point Marina.

Whether or not the proposal, including actions to avoid or mitigate impacts or compensate to prevent unavoidable impacts will maintain or improve biodiversity values.

The proposal would remove a very small amount of remnant eucalypt woodland vegetation and a small area of riparian vegetation consisting predominantly of Swamp Oak and representing disturbed SOFF EEC. The majority of riparian vegetation present within the subject site would be retained post-development. Providing the recommended mitigation measures are adopted, remnant Forest Red Gums (*Eucalyptus tereticornis*) would be retained and enhancement of riparian vegetation would be undertaken to rehabilitate degraded riparian areas. Since only a very small amount of vegetation removal would be required and riparian areas would be rehabilitated/landscaped, the proposal is considered likely to improve biodiversity values within the subject site.

Whether or not the proposal is likely to reduce the long-term viability of a local population of the species, population or ecological community.

No threatened flora species were recorded or considered likely to occur within the subject site.

A small portion of disturbed SOFF EEC would be removed as a result of the proposal. However, the remaining foreshore area including degraded areas of SOFF would be rehabilitated/landscaped as part of the proposal. Rehabilitation of SOFF would occur along the shore of Lake Macquarie within the subject site.

One threatened fauna species was recorded within the subject site and a further seven threatened fauna species were considered likely to occur at least on an occasional basis. Threatened fauna species discussed here include:

- Eastern Freetail Bat (*Mormopterus norfolkensis*), recorded;
- Osprey (*Pandion haliaetus*), suitable habitat present;
- Swift Parrot (*Lathamus discolor*), suitable habitat present;
- Grey-headed Flying Fox (*Pteropus poliocephalus*), suitable habitat present;
- Eastern Bentwing Bat (*Miniopterus schreibersii*), suitable habitat present;
- Little Bentwing Bat (*Miniopterus australis*), suitable habitat present;
- Large-footed Myotis (*Myotis adversus*), suitable habitat present; and
- Greater Broad-nosed Bat (*Scoteanax ruepelli*), suitable habitat present.

The removal of a negligible area of vegetation as a result of the proposal is considered to be a small portion of the foraging habitat available to these threatened fauna species within the local area. Furthermore, all threatened fauna species that were considered likely to occur or were recorded within the subject site are highly mobile species capable of traversing or utilising open spaces.

Suitable nesting/breeding sites for the Osprey do exist within large trees within the eucalypt woodland and riparian vegetation. However, the species or potential nests were not recorded during the recent site inspection (2007) or previous investigations (HSO, 2001; 2003b). Therefore, it is considered highly unlikely that the subject site is currently used for breeding by the Osprey. Providing recommended mitigation measures discussed in Section 5 are adopted, most mature eucalypts offering potential nesting sites for Osprey would be retained. The Osprey is known to nest within highly modified environments frequented by people (ie South West Rocks Country Club - nesting in satellite dish and artificial nesting pole). As such it is considered unlikely that the proposal would interrupt the breeding cycle of the Osprey such that it would reduce the long-term viability of a local population

No suitable breeding/roosting habitat was found to occur within the subject site for the remaining threatened fauna species considered likely to occur or recorded within the subject site (ie other than Osprey).

In conclusion, it is considered unlikely that the proposal would reduce the long-term viability of threatened flora species since none are considered likely to occur; EECs since only a small portion of SOFF would be removed and rehabilitation would occur; and threatened fauna species since the area of vegetation to be removed as a result of the proposal is a negligible proportion of the foraging habitat available to these highly mobile species in the local area and since no breeding/roosting/nesting habitat would be removed as a result of the proposal.

Whether or not the proposal is likely to accelerate the extinction of the species, population or ecological community or place it at risk of extinction.

It is considered unlikely that the proposal would place threatened flora or fauna species or EECs at risk of extinction, or accelerate this process, since no threatened flora species are considered likely to occur within the site; since only a small portion of SOFF EEC would be removed and rehabilitation would occur; and since the area of vegetation to be removed as a result of the proposal is a negligible proportion of the foraging habitat available to these highly mobile fauna species in the local area and since no breeding/roosting/nesting habitat for threatened fauna species would be removed as a result of the proposal.

No threatened flora species were considered likely to occur within the subject site.

Whether or not the proposal will adversely affect critical habitat.

There is no declared “Critical Habitat” within the study area, and as such the proposal will not adversely affect any such habitat.

6.2 Considerations under SEPP 44 - Koala habitat protection

First Consideration – Is the Land ‘Potential Koala Habitat’?

Schedule 2 of State Environmental Planning Policy (SEPP) No. 44 – ‘Koala Habitat Protection’ lists 10 tree species that are considered indicators of ‘Potential Koala Habitat’. The presence of any of the species listed on a site proposed for development triggers the

requirement for an assessment for 'Potential Koala Habitat'. SEPP 44 defines potential Koala Habitat as:

"areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component".

Harper Somers O'Sullivan (2001) found that the study area represented 'Potential Koala Habitat' as defined by SEPP 44. Within the subject site, Forest Red Gum (*Eucalyptus tereticornis*) is the only Schedule 2 Koala feed tree.

Second Consideration – Is the Land 'Core Koala Habitat'

SEPP 44 defines core Koala habitat as:

"an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population."

Direct searches of Koala within the study area included spotlighting and diurnal searches. Indirect searches for evidence of Koala included searches for scats and scratches on tree trunks, particularly targeting primary browse species. No evidence of Koala was found within the study area and no individuals were observed (HSO, 2001; 2003b).

The most recent local Koala records is from 1997 near Morisset and from 1996 at Mannering Park (Atlas of NSW Wildlife data). Historical records that exist within 10 km of the study area including:

- 1950's on Pulbah Island in Lake Macquarie
- 1986 from Wangi Point

A lack of recent Koala records from the local area indicate that the local Koala population, should it exist, it is likely to be at very low density.

Whilst the subject site offers potential Koala habitat, the lack of recent records combined with no evidence of Koala within the study area indicates that a resident Koala population is unlikely to occur. As a result the subject site was not considered to constitute core Koala habitat under SEPP 44 and no further provisions of the SEPP 44 apply to the subject site.

6.3 Considerations under the EPBC Act 1999

Considerations have been made under the Commonwealth *EPBC Act (1999*). Searches of the Department of Environment and Water Resources On-line Database were undertaken to gather baseline data on the study area and general locality. This data, combined with other local knowledge and records, was utilised to assess whether the type of activity proposed on the subject site will have, or is likely to have a significant impact upon a matter of National Environmental Significance (NES), or on the environment of Commonwealth land*.

* The subject site is not land owned by the Commonwealth, and hence this portion of the Act is not applicable. The matters of NES and site-specific responses are listed below.

- *World Heritage areas:*

The subject site is not a World Heritage area, and is not in close proximity to any such area.

- *Wetlands protected by international treaty (the RAMSAR convention):*

The subject site is not part of any RAMSAR Wetland area, and is not in proximity to any such area.

- *Nationally listed threatened species and ecological communities:*

A total of 25 nationally listed threatened species under the *EPBC Act 1999* were listed as being relevant within the proximate region of the subject site as follows:

• *Acacia bynoeana*	Bynoe's Wattle
• *Angophora inopina*	Charmhaven Apple
• *Caladenia tessellata*	Tessellated Spider Orchid
• *Cryptostylis hunteriana*	Leafless Tongue Orchid
• *Diuris praecox*	Newcastle Doubletail
• *Grevillea parviflora* subsp*. parviflora*	
• *Microtis angusii*	Angus's Onion Orchid
• *Syzygium paniculatum*	Magenta Lilly Pilly
• *Tetratheca juncea*	Black-eyed Susan
• *Heleioporus australiacus*	Giant Burrowing Frog
• *Litoria aurea*	Green and Golden Bell Frog
• *Litoria littlejohni*	Littlejohn's Tree Frog
• *Mixophyes balbus*	Southern Barred Frog
• *Mixophyes iteratus*	Giant Barred Frog
• *Hoplocephalus bungaroides*	Broad-headed Snake
• *Lathamus discolor*	Swift Parrot
• *Rostratula australis*	Australian Painted Snipe
• *Xanthomyza phrygia*	Regent Honeyeater
• *Chalinolobus dwyeri*	Large-eared Pied Bat
• *Dasyurus maculatus*	Spotted-tailed Quoll
• *Petrogale penicillata*	Brush-tailed Rock-Wallaby
• *Potorous tridactylus tridactylus*	Long-nosed Potoroo
• *Pteropus poliocephalus*	Grey-headed Flying-fox

The potential for the proposal to significantly impact on individuals or local populations for the above species is negligible given the small amount of disturbed habitat to be affected. This assessment concluded that it is considered unlikely the current proposal will have a significant impact upon a local population such that local extinctions would occur. Likewise, it is considered that no significant impacts are likely to occur on a Commonwealth level. As such, the proposal is not likely to be a controlled action in relation to any of these matters of National Environmental Significance. Thus referral to the Department of Environment and Water Resources (DEW) is not necessary.

- *Nationally listed migratory species:*

Five nationally listed migratory species have been listed as being relevant within the proximate region of the subject site:

• *Haliaeetus leucogaster*	White-bellied Sea Eagle
• *Hirundapus caudacutus*	White-throated Needletail
• *Merops ornatus*	Rainbow Bee-eater
• *Monarcha melanopsis*	Black-faced Monarch

- *Myiagra cyanoleuca* Satin Flycatcher
- *Rhipidura ruffifrons* Rufous Fantail
- *Xanthomyza phrygia* Regent Honeyeater
- *Ardea alba* Great Egret
- *Ardea ibis* Cattle Egret
- *Calidris acuminata* Sharp-tailed Sandpiper
- *Charadrius mongolus* Lesser Sand Plover
- *Galinago hardwickii* Latham's Snipe
- *Numenius madagascariensis* Eastern Curlew
- *Pluvialis fulva* Pacific Golden Plover
- *Rostratula australis* Australian Painted Snipe

It is considered unlikely the current proposal would have a significant impact upon a local population of nationally listed migratory species such that local extinctions would occur. Thus referral to the DEW is not necessary.

- *All nuclear actions:*

No type of nuclear activity is proposed for the subject site.

- *The environment of commonwealth marine areas:*

The proposed activity on the subject site will not have a significantly adverse effect on any Commonwealth marine area.

Summary Statement:
Based on the above, it is considered the current proposal will not have a significant impact on any matters of National Environmental Significance under the *EPBC Act (1999)*; hence referral to the DEW is not necessary.

7 CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

RPS Harper Somers O'Sullivan (RPS HSO) was commissioned by Johnson Property Group to undertake a Terrestrial Ecological Assessment for the development of land at Trinity Point, Morisset Park, Lake Macquarie, NSW. Methods undertaken included a review of previous ecological reports undertaken for the site (HSO, 2001; 2002; 2003a; 2003b; and 2005) and a recent site inspection to verify and update previous findings. The subject site was found to consist largely of cleared grassland with scattered remnant or ornamental trees. Disturbed riparian vegetation remained on the fringes of Lake Macquarie, largely outside of the proposed development footprint.

One threatened fauna species was recorded within the study area (Eastern Freetail Bat - *Mormopterus norfolkensis*) and a further seven threatened fauna species were considered likely to occur within the subject site on at least an occasional basis. No threatened flora species were recorded or considered likely to occur within the subject site.

Since the threatened fauna species recorded or considered likely to occur within the subject site are all highly mobile, potential impacts are largely restricted to the removal or modification of a negligible proportion of the foraging habitat available to the species' in the local area. Potential breeding/nesting/roosting habitat was found for Osprey within mature trees within the subject site; however, no evidence of nesting was observed during site investigations (current; HSO, 2001; 2003b).

It was found that the potential impacts arising from the proposed Trinity Point Marina on threatened fauna species recorded or considered likely to occur within the subject site are of a small scale and magnitude. As such the proposal is considered unlikely to adversely impact on threatened fauna species recorded or considered likely to occur within the subject site.

7.2 Recommendations

The potential impacts arising from the proposed Trinity Point Marina on threatened species, populations and/or endangered ecological communities listed under TSC Act and/or EPBC Act are considered to be minimal. However, a number of mitigation measures could be implemented to further reduce potential impacts. Recommended mitigation measures are:

- Retain Forest Red Gums (*Eucalyptus tereticornis*) within the proposal footprint where possible (with regard for feasibility and public safety). Selective lopping of limbs to stabilise trees should be considered in consultation with a qualified arborist.

- Minimise potential impacts associated with erosion and sedimentation on adjacent sensitive communities (ie Saltmarsh and riparian vegetation) and Lake Macquarie during construction through the inclusion of appropriate erosion and sediment controls.

- Adopt recommendations made by The Ecology Lab to minimise impacts on the aquatic environment and associated communities (ie mangroves and saltmarsh).

- Minimise potential impacts arising from stormwater runoff into adjacent riparian areas (Saltmarsh and Swamp Oak Floodplain Forest EECs) and Lake Macquarie by designing and installing appropriate stormwater detention and/or filtering devices.

- Undertake riparian enhancement utilising native species from local seed stock and minimising soil disturbance.

- Remove Camphor Laurel (Class 4 Noxious Weed) in the east of the subject site.

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APPENDIX A: TRINITY POINT MARINA DIRECTOR-GENERAL'S REQUIREMENTS

JOHNSON PROPERTY GROUP
Creating living communities

Trinity Point Marina & Mixed Use Resort Director General Requirements

22 August 2007

Summary: The following summarises the Director General Requirements for this project.

Our Vision –
To create a premier tourist destination, a successful, viable and vibrant place and a destination – one that forms part of an experience with and interaction with the areas greatest quality – the lake itself. With public access to be facilitated around and through the site, its success as a 'place' is paramount.

Johnson Property Group have submitted a Part 3A application with the Department of Planning in order to obtain combined Concept Plan and Project Application approvals for a world class Marina facility at Trinity Point, on the shores of Lake Macquarie. The following diagrams describe the main components that we seek approvals for – at both Concept stage and Project Application stage. Once approved, the Trinity Point Marina and Mixed Use Resort will be an international destination that will attract people from all corners of the world.

The Department of Planning have issued Director General Requirements outlining assessment criteria for both Concept Plan and Project Application approvals. Being regarded as a specialist consultant in your field, we invite your firm to participate in this exciting project. We have reviewed the attached Director General Requirements and have notionally assigned a discipline to each task. However, we require you to review all tasks within the Director General Requirements to ensure that all tasks relating to your discipline are covered.

We seek a return brief from your firm outlining scope of works, fees, and experience to address the requirements of the Director General in the form of an environmental assessment report. As part of this return brief, you will also need to nominate staff to be involved in this project and a responsible Project Manager.

Prior to returning your brief to JPG, we strongly recommend that you visit the site in order to familarise yourself with the site / area / proposal. Contact Bryan Garland to arrange access to the site.

In your return brief, you should make provisional allowance for 5 project team meetings (assume these will be conducted in Sydney), 3 presentation meetings to Department of Planning or other Government Agencies and 1 community consultation day (likely to be conducted on a Sunday at the Trinity Point site).

Please note that, as part of the above meetings, we will be conducting a project team meeting 4 weeks after engagement of each consultant so that each consultant can present their environmental assessment findings to the project team. Should the findings be satisfactory to the team, then we would expect to receive a draft environmental assessment report 2 weeks after the conclusion of this presentation meeting.

You should be aware that other consultants will be appointed to this project that may influence the work that you will be conducting and vice versa. We recommend that you make appropriate allowances to converse with other team members.

Your return brief should be emailed to bryan.garland@jpg.net.au no later than **10.00am Monday, 3 September 2007.**

Should you have any questions, please do not hesitate to contact **Bryan Garland** via email or phone (0438 800 092).

We have a strict policy at JPG to ensure that any dealing with a Government Department is only conducted in the presence of a representative of JPG. This applies to phone / email and meetings. Should you need to liaise with a Government Department, please first contact the JPG Development Manager.

Attachments:

Attachment 1: Director General Requirements List

Attachment 2: Concept Plan of Trinity Point Marina and Mixed Use Resort

Attachment 3: Plan illustrating what we seek Project Approval for

Attachment 4: Plan illustrating what we seek Concept Plan Approval for

Director General's Environmental Assessment Requirement
Trinity Point Marina

Project	**(1) Concept Plan Application:** A concept plan approval is sought for the construction of a staged marina for up to 300 wet berths, restaurant and café, club, recreational and conference facilities, 85 permanent residential and 85 tourist accommodation units, a helipad and boardwalk. The application will involve approval of the following conceptual key design parameters: land use, built form, indicative building heights and residential unit types, site coverage, FSR, setbacks, roads and vehicle access, pedestrian through site linkages, public domain works and infrastructure requirements, stormwater management and landscaping. **(2) Project Application:** A Project approval is sought for: • Staged 300 wet marina berths • marina/tourist village comprising: - marina club - function centre with meeting rooms - restaurant and café - marina store - gym/fitness area - day spa/beauty salon - tourist offices/administration space; and - workshop and dry boat storage - residential flat building • helipad • car parking and • associated road and infrastructure construction	NOTE
General Requirements	The Environmental Assessment must include: **PART A: Concept Plan Application** • An executive summary • An outline of the scope of the project including:- (i) any development options (ii) justification of the project taking into consideration any environmental impacts of the project, the suitability of the site and whether the project is in the public interest (iii) outline of the stage implementation of the project • A thorough site analysis and description of existing environment; • Consideration of all relevant statutory and non-statutory provisions, in particular relevant provisions arising from environmental planning instruments, Regional Strategies and Development Control Plans (including justification of any non-compliances) as well as impacts, if any, on matters of national environmental significance under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 • An environmental risk analysis of the project including consideration of the issues raised during consultation • The plans and documents outlined in Attachment 3 • A signed statement from the author of the Environmental Assessment certifying that the information contained in the report is neither false not misleading; and • An assessment of the key issues specified below and a table outlining how these key issues have been addressed	ALL

Director General's Environmental Assessment Requirement
Trinity Point Marina

	PART B: Project Application • The matters listed above in **Part A,** • A detailed description, including plan details, of the project application component (comprising Stage 1 of the development); and • Where relevant; demonstrate compliance with BCA and relevant Australian Standards for proposed building, traffic, road and parking; utilities; noise and flooding	ALL ALL ALL
Key Issues	**PART A: Key Issues to be Addressed in the Concept Plan Application Environmental Assessment:** **1. Rezoning of the Site** 1.1 The Environmental Assessment will only be exhibited after a Section 65 Certificate has been issued for a draft Local Environmental Plan to amend the zoning of the land to permit residential development **2. Owners Consent** 2.1 Provide evidence of land owner's consent to make application for all components of the proposal on Crown land, including the marina and helipad. **3. Compliance with Development Standards and Planning Policies** 3.1 Demonstrate compliance with all relevant standards, objectives and provisions of the Lake Macquarie Local Environmental Plan 2004, Lifestyle 2020 Strategy, DCP No. 1 – Principles of Development, and Kendall Grange, Morisset Master Plan 2005. Justify any inconsistencies with the provisions of these documents. **4. Design & Visual Amenity and Impacts** 4.1 Demonstrate the achievement of design excellence having regard to the significance of the site in relation to Lake Macquarie and its environs. Address design quality and visual impact in respect of setting, height, built form and building mass as viewed from the public domain including the Lake Macquarie, foreshore and waterways and relevant mitigation measures 4.2 Demonstrate suitability of the proposal with the surrounding area in relation to potential character, height, bulk, scale, built form, amenity (including noise) and visual amenity having regard to SEPP 71, NSW Coastal Policy 1997, Coastal Design Guidelines of NSW (2003), objectives of the 6(2) Tourism and Recreation zone and all relevant development control plans including Lifestyle 2020 Strategy, DCP No. 1 – Principles of Development and Kendall Grange, Morisset Master Plan 2005. 4.3 Justify any significant departure in relation to proposed land use mix, density, height, bulk and scale with regard to the guidelines of the adopted Kendall Grange, Morisset Master Plan 2005. 4.4 A visual assessment is required to demonstrate that the proposal will not have unacceptable visual impact. 4.5 Address the landscape setting and retention of existing significant vegetation on the site. Demonstrate that any removal of vegetation on the site will have minimal visual impacts.	NOTE JOHNSON PROPERTY GROUP ALL ARCHITECT/VISUAL CONSULTANT ARCHITECT/VISUAL CONSULTANT/PLANNER ARCHITECT/VISUAL CONSULTANT/PLANNER VISUAL CONSULTANT VISUAL CONSTULANT/LANDSCAPE CONSULTANT

Director General's Environmental Assessment Requirement
Trinity Point Marina

	5. Public Access	
	5.1 Address Existing and future opportunities for public access to and along the foreshore.	ARCHITECT/PLANNER/ TRAFFIC CONSULTANT
	6. Water Cycle Management	
	6.1 Address potential impacts on the water quality including stormwater management systems, surface water controls, management of slipways, hardstands and vessels, management of sewage waste from vessels, fuel and chemical storage and management of spill management having regard to State Groundwater, Rivers, Wetlands and Estuary Policies, Lake Macquarie Estuary Management Plan, Lake Macquarie Mooring Management Plan and Lake Macquarie Foreshore Stabilisation and Rehabilitation Guidelines.	STORMWATER MANAGEMENT
	6.2 Address pollutant runoff loads from the site, treatment of waste, effluent disposal and sediment and erosion control. Demonstrate an acceptable level of water quality protection with respect to downstream receiving waters during and after construction.	STORMWATER MANAGEMENT
	6.3 Address changes in the hydrological regime of the catchment as a result of the project	STORMWATER MANAGEMENT
	6.4 Demonstrate the development is compatible with Council's relevant Flood Policy in accordance with the guidelines contained in the NSW Floodplain Development Manual (2005). Address the impact of flooding on the proposed development, the impact of the development on flood behaviour and the impact of the flooding on the safety of people/users of the development. Implications of climate change on flooding should be considered.	FLOOD CONSULTANT
	7. Groundwater Protection	
	7.1 Address the NSW Groundwater Policy Framework Document – General, NSW Groundwater Quality Protection Policy and NSW Groundwater Dependent Ecosystem Policy	FLOOD/GEOTECHNICAL
	8. Establishment of Helipad and Helicopter Noise Impacts	
	8.1 Address CASA's Guideline for Establishment and Use of Helicopter Landing Sites (HLS), in particular the "Recommended Criteria for a Basic and Standard HLS"	NOISE/HLS CONSULTANT
	9. Marina Development and Potential Impacts	
	9.1 Address the potential impacts of the marine structure and operations on the seabed, in particular on seagrass and benthic organisms including the shading effects of the structures proposed measures to prevent/mitigate impact. Design should minimise shading on the seagrass beds.	MARINA/ECOLOGIST
	9.2 Address the potential impacts of any structure located on the foreshore to interfere with the free movement of seagrass wrack along the foreshore, and on wave energy and the risk of deflection or refraction to other locations and proposed measures to prevent/mitigate impacts.	MARINA
	9.3 Address the potential impacts stormwater run-off on water quality and seagrass beds and proposed measure to prevent/mitigate impacts	STORMWATER/MARINA/ ECOLOGIST
	9.4 Address the potential impacts on navigation and on existing swing moorings on or in the immediate area of Bardens Bay.	MARINA
	9.5 Address provision of day berthing facilities for general public.	MARINA

Director General's Environmental Assessment Requirement
Trinity Point Marina

	10. Infrastructure and Utilities Provision	
	10.1 Address existing capacity and requirements of the proposal for effluent disposal, water supply, electricity, waste disposal and telecommunications services and social services such as schools and health services in consultation with relevant agencies. Address existing and proposed capacity exists within Council's sewerage infrastructure to support the development must be provided.	SERVICING/SOCIAL
	11. Flora and Fauna	
	11.1 Address measures for the conservation of flora and fauna and their habitats within the meaning of the Threatened Species Conservation Act 1995 and the Fisheries Management Act, having regard to the Draft Guidelines for Threatened Species Assessment (DEC & DPI July 2005)	ECOLOGIST
	12. Traffic and Access	
	12.1 Prepare a Traffic Impact Study in accordance with the RTA's Guide to Traffic Generating Developments. Traffic analysis shall use SIDRA or similar traffic model and take into account relevant intersections including current and traffic growth projects for the life of the project, 95th percentile back of queue lengths and delays and level of service on all legs.	TRAFFIC
	12.2 Address Draft SEPP 66 – Integration of Land Use and Transport and DIPNR's EIS Guidelines on Roads and Related Facilities.	TRAFFIC
	12.3 Identify needs (if any) to upgrade roads/junctions and improvement works to ameliorate any traffic inefficiency and safety impacts associated with the development where relevant. This should include identification of pedestrian movements and appropriate treatments.	TRAFFIC
	13. Geotechnical Assessment	
	13.1 Prepare a geotechnical assessment of the property to address potential impact of subsidence and future mining of coal resources in the area.	GEOTECH
	14. Heritage	
	14.1 Address the draft Guidelines for Aboriginal Cultural Heritage Impact Assessment and Community Consultation (DEC, July 2005)	HERITAGE
	14.2 Identify whether the site has significance in relation to Aboriginal cultural heritage and identify appropriate measures to preserve any significance.	HERITAGE
	14.3 Identify any other items of heritage significance and provide measures for conservation of such items.	HERITAGE
	15. Natural Hazards	
	15.1 Identify the presence and extent of acid sulphate soils on the site and recommend appropriate mitigation measures. The level of assessment shall be consistent with the Acid Sulphate Soil Manual (ASSMAC). Address any site contamination and recommend appropriate mitigation measures.	GEOTECH
	15.2 Address the impact on and from coastal processes and provide mitigation/preventative measures.	MARINA

Director General's Environmental Assessment Requirement
Trinity Point Marina

	PART B: Key Issues to be addressed in the Project Application Environmental Assessment	
	1. Compliance with the Concept Plan	
	1.1 The EA must demonstrate consistency with EA requirements as detailed above in **Part A** and the following additional matters.	ALL
	2. Design and Building Plans	
	2.1 The Design and building plans shall be consistent with the conceptual key design parameters including land use, built form, heights, site coverage, FSR and setbacks.	ARCHITECT
	2.2 Detailed architectural drawings are to be drawn to scale and show floor and section plans; communal facilities and servicing points; height of the proposed development in relation to the land; significant level changes; parking and vehicular access arrangements; location of lifts; stairs and corridors; fenestrastions and balconies and pedestrian access.	ARCHITECT/CIVIL DESIGNER
	2.3 Demonstrate that the design provides for personal safety and crime prevention for future residents and visitors	?
	3. Water Cycle Management	
	3.1 Provide a detailed plan for Integrated Water Cycle Management (including stormwater plans) in accordance with Council's adopted code of practice for water sensitive urban design (WSUD). Include considerations of impacts on the surrounding environment, use of treated grey water, and ongoing monitoring and maintenance.	STORMWATER
	4. Groundwater Protection	
	4.1 Should the proposed development/works intercept groundwater, provide details of predicted highest groundwater table at the development site, proposed works, groundwater extraction and proposed preventive/protective measures to address groundwater pollution and groundwater dependent ecosystems; and the disposal of waste water.	GEOTECH/ECOLOGIST
	5. Establishment of Helipad and Helicopter Noise Impacts	
	5.1 Prepare and noise assessment report by a qualified acoustic consultant to investigate potential noise impacts associated with the taking off, approaching and en route of helicopters to the helipad. The report shall address potential impacts on residential amenities; fauna and their habitats in particular threatened species, populations or ecological communities of fish or marine vegetation and their critical habitat. The report shall include hours and frequency of operation, noise contours/levels, route, noise mitigation measures and/or acoustic treatments. Best practice in the measurement and prevention/mitigation of noise impacts shall be adopted.	NOISE CONSULTANT/HLS/ ECOLOGIST

Director General's Environmental Assessment Requirement
Trinity Point Marina

6. Other Noise Impacts		
6.1	Address legislative requirements on air quality and noise impacts under the Protection of the Environment Operations Act 1997 and EPA's Environmental Criteria for Road Traffic Noise.	NOISE
6.2	Identify all potential sources of air pollution associated with the proposal during construction and operation, and proposed measures to prevent or mitigate the pollution.	NOISE/ODOUR
6.3	Prepare a noise assessment report by a qualified acoustic consultant to investigate potential noise impacts on residential amenities arising from construction and operation activities; traffic (vehicles and boat). The report shall address the nature of movements, hours and frequency, noise mitigation measures and/or acoustic treatments.	NOISE/MARINA/HLS/ TRAFFIC
7. Marina Development and Potential Impacts		
7.1	Full description of the construction and operation of the marina including any dredging, excavation, demolition, piling activity, use of machinery/plant, the size and number of vessels that are likely to be accommodated, likely boat repair and maintenance activities to be carried out, hours of operation, licensing arrangements, access to the moorings.	MARINA
7.2	Address the potential for contamination from disturbance of the seabed from piling activities, quantum of any dredged and excavated materials proposed measures to prevent/mitigate impact.	MARINA/ECOLOGIST
8. Waste Management		
8.1	Identify potential sources of waste associated with the proposal (such as litter, solid waste, sewage, grey water). Address how this waste will be managed and proposed measures to prevent or mitigate any adverse impacts.	PLANNER
9. Acid Sulfate Soils		
9.1	Provide an Acid Sulfate Soils Management Plan in Accordance with the Acid Sulfate Soil Manual (ASSMAC).	GEOTECH
10. Earthworks and Filling		
10.1	Address impacts of earthworks and filling on the existing hydrology and water quality, the conversion of flora, fauna and habitat and the management of acid sulphate soils and any contamination of the site.	CIVIL DESIGNER/ STORMWATER/ FLOODING/ ECOLOGIST/ GEOTECH
10.2	Provide details of the source of fill including types of material and soils, and details of suitable revegetation planting.	ARCHITECT/ CIVIL DESIGNER/ LANDSCAPE ARCHITECT
11. Landscaping		
11.1	Provide a detailed landscape plan showing ramps, stairs and retaining wall levels, lines of fencing, security and access points, built elements such as pergolas, walls, planters and water features, details of public, communal open space and private open space; trees to be removed to be shown dotted; trees to remain and proposed trees/planting including species height and maturity; deep soil	LANDSCAPE ARCHITECT

Director General's Environmental Assessment Requirement
Trinity Point Marina

		zones and/or adequate soil depth for planting on structures; and site lighting.	
	12. Shadow Diagrams		
	12.1	Provide shadow diagrams to show solar access to the site and adjacent properties and the foreshores at summer solstice, winter solstice and the equinox.	ARCHITECT
	13. Waste Management Plan		
	13.1	Provide a waste management plan indicating disposal of waste from the site including demolition material.	PLANNER
	14. Noise		
	14.1	Demonstrate that the proposal will be designed, constructed, operated and maintained so that there is no unacceptable level of noise impacts (including air and traffic noise) on amenity in the locality	NOISE/TRAFFIC

APPENDIX B: HSO (2001) FLORA AND FAUNA SURVEY AND ASSESSMENT REPORT

APPENDIX C: HSO (2003B) SUPPLEMENTARY SURVEY REPORT

APPENDIX D: THREATENED SPECIES LIKELIHOOD OF OCCURRENCE ASSESSMENT

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Plants			
Acacia bynoeana Bynoe's Wattle (E, V*)	Small, prostrate shrub found in low heath and open woodland, generally on loamy clays and sand. Occurs from the Lower Hunter south to Southern Highlands.	**Low –** This species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b) and any habitat is considered marginal due to past clearing and grazing practices.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Angophora inopina Charmhaven Apple (V, V*)	Small to medium tree found in shallow sandy soils in open woodland, swamp woodland and wet heath. The main occurrences of this species are in the Wyong and Lake Macquarie LGA's (from Charmhaven to Wyee and Morisset, and north to near Toronto), with disjunct populations also in Port Stephens LGA (south of Karuah).	**Low –** This species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b) and any habitat is considered marginal due to past clearing and grazing practices.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Caladenia tessellata Tessellated Spider Orchid (E, V*)	A small terrestrial orchid, which regrows its single leaf on an annual basis. It is known to occur in grassy woodland and locally it has potential to occur within Coastal Plains Scribbly Gum Woodland. Flowers from September to October and is known to flower particularly after fire.	**Low –** The remnant vegetation within the site contains marginal potential habitat for *C. tessellata*. However, past clearing and grazing practices are likely to preclude the species from occurring. Additionally, little evidence of recent fire activity was present.	**Low –** Whilst some potentially suitable habitat may have been present within remnant vegetation, ongoing clearing, grazing and mowing of the subject site is likely to have precluded the species from occurring. Since this species is unlikely to occur it is also unlikely to be affected by the proposal.
Callistemon linearifolius (V)	Shrub that grows in dry sclerophyll forest on the coast and adjacent ranges. Re-sprouting / juvenile specimens difficult to distinguish from other *Callistemon* species such as *C. rigidus* or *C. linearis* without the aid of flowering parts.	**Low –** This species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b) and any habitat is considered marginal due to past clearing and grazing practices.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Cryptostylis hunteriana Leafless-tongue Orchid (V, V*)	Saprophytic orchid. Grows in swamp heath on sandy soils. Distribution limits N-Gibraltar Range S-south of Eden. Flowers December - February.	**Low –** The remnant vegetation within the site contains marginal potential habitat for *C. hunteriana*. However, past clearing and grazing practices are likely to preclude the species from occurring.	**Low –** Whilst some potentially suitable habitat may have been present within remnant vegetation, ongoing clearing, grazing and mowing of the subject site is likely to have precluded the species from occurring. Since this species is unlikely to occur it is also unlikely to be affected by the proposal.
Diuris praecox Newcastle Doubletail (V, V*)	Found predominantly in coastal Eucalypt forests on hilltops or slopes. This species has been recorded at a number of dry woodland locations to the south east of Lake Macquarie. Flowers July to August	**Low –** The remnant vegetation within the site contains marginal potential habitat for *D. praecox*. However, past clearing and grazing practices is likely to preclude the species. Additionally, it was not located within the site, despite surveys undertaken by HSO (2001) during the flowering period.	**Low –** Whilst some potentially suitable habitat may be present, this species was not recorded within the subject site. Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Eucalyptus camfieldii Camfield's Stringybark (V, V*)	Tree or mallee to 10m high, but often less. Rare and localised, in coastal shrub heath on sandy soils on sandstone, often restricted drainage.	**Low –** This species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b) and any habitat is considered marginal due to past clearing and grazing practices.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Grevillea parviflora ssp. *parviflora* (V, V*)	Occurs in light, clayey soils in woodlands. Most plants appear capable of suckering from a rootstock. Much confusion surrounds the taxonomy of this species and other similar *Grevillea* taxa (S. Bell *pers. comm.*), and a NPWS-funded study of the species is currently in progress.	**Low –** This species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b; and present) and any habitat is considered marginal due to past clearing and grazing practices.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Melaleuca biconvexa Biconvex Paperbark (V, V*)	A shrub to small tree, which grows in poorly drained areas from Jervis Bay to Port Macquarie.	**Low –** This species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b) and any habitat is considered marginal due to past clearing and grazing practices.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Microtis angusii Angus's Onion Orchid (E, E*)	Record from the Terry Hill's district of Sydney. Occurs upon disturbed soil horizons that were originally ridgetop lateritic soils supporting a distinctive open to low open forest community, Duffy's Forest Vegetation Community, which is listed as an EEC. Suspected occurrences in the southern Lake Macquarie hinterland are derived from a tentative record by Bell (1998) in the Lake Macquarie State Recreation area, which occurs to the south of Gwandalan. Flowers from May to October.	**Low –** The vegetation within the site contains marginal potential habitat for *M. angusii*. However, this species is extremely rare in the Hunter region and past clearing and grazing practices is likely to preclude the species. Additionally the species was not located within the site, despite surveys undertaken by HSO (2001) during the flowering period.	**Low –** Whilst some potentially suitable habitat may be present, this species was not recorded within the subject site. Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Pultenaea maritima Coastal Headland Pea (V)	The species occurs in grasslands, shrublands and heath on exposed coastal headlands from Newcastle to Byron Bay in NSW.	**Low –** This species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b) and any habitat is considered marginal due to lack of exposed coastal headland habitat and past clearing and grazing practices.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Syzygium paniculatum Magenta Lilly Pilly (V, V*)	A shrub to small tree, found in sub-tropical and littoral rainforest on sandy soils or sheltered gullies mostly near water courses. Distribution between Bulahdelah and Jervis Bay. Hunter Region records confined to the Lake Macquarie hinterland (DEC 2005).	**Low –** No suitable habitat present (rainforest) and the species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b).	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Tetratheca juncea Black-eyed Susan (V, V*)	Occurs in a variety of forested and heathy habitats. Locally found in Open Forests and Woodlands with dense, undisturbed understorey, often in association with *Angophora costata* / *Corymbia gummifera* on slopes with south-easterly aspects.	**Low –** This species was not observed during the recent site inspection (2007) or previous field surveys (HSO, 2001; 2003b) and any habitat considered marginal due to past clearing and grazing practices.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Herpetofauna			
Hoplocephalus bungaroides Broad-headed Snake (E, V*)	Largely confined to Triassic sandstones, including the Hawkesbury, Narellan and Shoalhaven formations, within the coast and ranges. Nocturnal, sheltering in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in hollows in large trees within 200 m of escarpments in summer.	**Low** – Whilst there are some rock outcrops on the south-east bluff, it is not considered to provide suitable habitat for this species. Furthermore, there are no records of the species within 10 km of the site.	**Low** – Due to the lack of preferred habitat resources and local records, it is considered unlikely this species would occur within the subject site and as such it is unlikely that it would be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Crinia tinnula Wallum Froglet (V)	Occurs in coastal, low-lying acid Paperbark forest, within the 'wallum country' (often on sandy soils). Known to occur within wet forest habitats in the Lower Hunter and western Lake Macquarie. The closest *C. tinnula* record is less than 2 km to the north of the subject site (NPWS Atlas of NSW Wildlife data).	**Low** - Riparian vegetation within the subject site is not representative of 'wallum' vegetation assemblages, consisting largely of Swamp Oak rather than *Melaleuca* and sedge fields. As such the habitat within the subject site is considered unsuitable for this species.	**Low** – Due to the lack of individuals and preferred habitat observed on the subject site, this species is unlikely to be affected by the proposal.
Heleioporus australiacus Giant Burrowing Frog (V, V)	This species is mostly restricted to Hawkesbury Sandstone. Usually found around sandy creek banks, with crayfish burrows in this area (Robinson, M. 1996).	**Low** – This species is unlikely to occur within the subject site due to the lack of appropriate habitat (Hawkesbury Sandstone) and records within 10 km (NPWS Atlas of NSW Wildlife).	**Low** – Due to the lack of habitat resources, hence preferred habitat on subject site, it is considered unlikely this species will be affected by the proposal.
Litoria littlejohni Little John's Tree Frog (V, V*)	A pale brown frog with dark speckles which occurs along permanent rocky creeks with thick fringing vegetation associated with eucalypt woodlands and heaths among sandstone outcrops. Occurs on the plateaus and eastern plains of the Great Dividing Range.	**Low** – This species is unlikely to occur within the subject site due to the lack of appropriate habitat (rocky creeks within sandstone outcrops) and records within 10 km (NPWS Atlas of NSW Wildlife).	**Low** – Due to the lack of habitat resources, hence preferred habitat on subject site, it is considered unlikely this species will be affected by the proposal.
Litoria aurea Green and Golden Bell Frog (E, V*)	Inhabits swamps, lagoons, streams and ponds as well as dams, drains and storm water basins. Thought to be displaced from more established sites by other frog species, thus explaining its existence on disturbed sites.	**Low** – This species is unlikely to occur within the subject site due to the lack of appropriate habitat (freshwater wetland, ephemeral ponds or drains with fringing vegetation).	**Low** – Due to the lack of habitat resources, hence preferred habitat on subject site, it is considered unlikely this species will be affected by the proposal.
Mixophyes balbus Southern Barred Frog (E, V*)	Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Breeds in streams during summer after heavy rain, outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Eggs are laid on rock shelves or shallow riffles in small, flowing streams.	**Low** – This species is unlikely to occur within the subject site due to the lack of appropriate habitat (undisturbed creeks in wet sclerophyll forest and rainforest) and lack of records within 10 km (NPWS Atlas of NSW Wildlife).	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.
Mixophyes iteratus Giant Barred Frog (V)	Mostly restricted to wet sclerophyll forest and rainforest, including Antarctic Beech forest. Usually found within close proximity to permanent running water (Robinson, M, 1996).	**Low** – This species is unlikely to occur within the subject site due to the lack of appropriate habitat (undisturbed creeks in wet sclerophyll forest and rainforest) and lack of records within 10 km (NPWS Atlas of NSW Wildlife).	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.
Pseudophryne australis Red-crowned Toadlet (V)	Generally restricted to Hawkesbury Sandstone where it may be found beside temporary creeks, gutters and soaks and under rocks and logs. Breeds in deep leaf litter inundated with heavy rain (Robinson, M, 1996).	**Low** – This species is unlikely to occur within the subject site due to the lack of appropriate habitat (Hawkesbury Sandstone) and lack of records within 10 km (NPWS Atlas of NSW Wildlife).	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Avifauna			
Rostratula australis Australian Painted Snipe (E)	A small freshwater and estuarine wader, which prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber.	**Low - Moderate** – The lake fringes may provide some small areas of marginal habitat for the Painted Snipe at low tide; however, there are no records within 10 km of the subject site and the presence of this species is not expected.	**Low** – The vegetation within the riparian zone would be retained. Additionally, the species was not recorded during recent site inspection (2007) or previous investigations (HSO, 2001). Furthermore, the habitat present is not considered to be of any significance to this species in a local or regional context.
Ixobrychus flavicollis Black Bittern (V)	Solitary species, living near water (estuarine to brackish) in mangroves and other trees which need to form only a narrow fringe of cover. A riparian species that occasionally ventures into the open within estuarine habitats. Recorded approximately 2 km to the south in 1993 (NPWS Atlas of NSW Wildlife).	**Low - Moderate** – Marginal habitat exists within riparian vegetation (quite exposed). However, the species was not recorded during the recent site inspection (2007) or previous investigations (HSO, 2001).	**Low** – The vegetation within the riparian zone would be retained. Additionally, the species was not recorded during the recent site inspection (2007) or during previous investigations (HSO, 2001) and habitat is not as preferred by this species.
Pandion haliaetus Osprey (V, M*)	Requires water bodies for fishing in close proximity (usually <1km) to suitably tall nesting site such as dead tree, power pole etc. Essentially and estuarine species, but an accidental species to inland / freshwater wetland habitats. Known to nest near Morisset hospital.	**Moderate -** The species is known to forage within Lake Macquarie and potential nesting sites exist within the subject site. The species may occasionally use the subject site and adjacent areas. However, the species or potential nests were not recorded during the recent site inspection (2007) or previous investigations (HSO, 2001; 2003b).	**Low** – Since the species was not recorded and no Osprey nests were observed within the subject site the proposal is considered unlikely to adversely impact the species.
Haematopus fuliginosus Sooty Oystercatcher (V)	Marine, usually rock shoreline, high rocky islets, boulders below cliffs, wave-cut platforms and reefs. Also inhabits sandy beaches and coves between rocky headlands (Morcombe, 2000). Also occurs within closed estuarine habitats where rocky substrates are present.	**Low - Moderate** – The lake fringes may provide some small areas of habitat for the Sooty Oystercatcher at low tide; however, larger areas of more preferable habitat occur elsewhere within Lake Macquarie. Additionally, it was not recorded during the recent site inspection (2007) or previous investigations (HSO, 2001; 2003b).	**Low** – The majority of the marginal habitat present would not be affected by the proposal; hence, retaining ongoing potential opportunity for this species. .
Charadrius mongolus Lesser Sand Plover (V, M*)	When in Australia, this migratory species inhabits sheltered bays, harbours and estuaries with large intertidal sandflats or mudflats. Prey includes molluscs, worms, crustaceans and insects.	**Low - Moderate** – The lake fringes may provide some small areas of marginal habitat for the Lesser Sand Plover at low tide; however, there are no records within 10 km of the subject site and the presence of this species is not expected.	**Low** – The vegetation within the riparian zone would be retained. Additionally, the species was not recorded during recent site inspection (2007) or previous investigations (HSO, 2001). Furthermore, the habitat present is not considered to be of any significance to this species in a local or regional context.
Ephippiorhynchus asiaticus Black-necked Stork (E)	Inhabits swamps associated with river systems and large permanent pools but sometimes appears on the coast or in estuaries. It has also been recorded on farm dams and sewage treatment ponds.	**Low - Moderate** – The lake fringes may provide some small areas of marginal habitat for the Black-necked Stork at low tide; however, there are no records within 10 km of the subject site and the presence of this species is not expected.	**Low** – The vegetation within the riparian zone would be retained. Additionally, the species was not recorded during recent site inspection (2007) or previous investigations (HSO, 2001). Furthermore, the habitat present is not considered to be of any significance to this species in a local or regional context.
Ptilinopus regina Rose-crowned Fruit-Dove (V)	Generally lives in rainforest, though it also frequents brushes of coastal districts as well as forests and mangroves.	**Low** – Preferred rainforest habitat absent. Marginal mangrove habitat present on lake fringe (below high tide mark) adjacent to subject site. Furthermore, the species was not recorded during the recent site inspection (2007) or previous surveys (HSO, 2001, 2003b).	**Low** – Marginal habitat present adjacent to the subject site; however, the proposal would not disturb this habitat.
Ptilinopus superbus Superb Fruit-dove (V)	Occurs in rainforest and similar closed forests including, monsoon forest, regrowth, lantana thickets and woodland adjoining rainforest at all altitudes.	**Low** – Preferred rainforest habitat absent from the subject site and species is unlikely to occur within the subject site. Furthermore, the species was not recorded during the recent site inspection (2007) or previous surveys (HSO, 2001, 2003b).	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Calyptorhynchus lathami Glossy Black-Cockatoo (V)	Occurs in forests and woodlands where it forages predominantly on *Allocasuarina* cones. Requires large Eucalypt tree hollows for nesting.	**Low – Moderate** - The subject site contains *Casuarina glauca* that may provide foraging habitat for the Glossy Black-Cockatoo; however, this is likely to be marginal.	**Low** – Whilst some potentially suitable foraging habitat may be present within the site; the riparian *C. glauca* would be retained subsequent to the proposal. Additionally no hollow-bearing trees were recorded within the site. The proposal would result in little disturbance to Glossy Black Cockatoo foraging habitat and is considered unlikely to adversely affect the species.
Lathamus discolor Swift Parrot (E, E*)	On the mainland this species frequents Eucalypt forests and woodlands with large trees having high nectar production during winter. Mainland winter foraging sites often vary from year to year as a consequence of varying eucalypt blossoming cycles. Nests only in Tasmania.	**Moderate** – The species was not recorded within the subject site; however, *Eucalyptus tereticornis* would provide some winter flowering foraging resources for the species.	**Low** – The amount of foraging habitat to be removed as a result of the proposal is considered to be a small portion of the habitat available to the species in the local area. Additionally, no breeding habitat is present within the subject site. As such the proposal is considered unlikely to adversely affect the species.
Ninox connivens Barking Owl (V)	Occurs mainly in dry sclerophyll woodland. Nests in large Eucalypt hollows, and roosts in hollows or thick vegetation. Hunts a range of prey species including birds and both terrestrial and arboreal mammals.	**Low** – This species is rare on the coast and was not detected during targeted field surveys and evidence of large forest owl activity was not observed within the subject site during the recent site inspection (2007) or previous surveys (HSO, 2001; 2003b). Marginal foraging habitat due to a mainly open understorey exists within the subject site as part of a larger home range. No hollow-bearing trees were recorded within the subject site and as such no breeding habitat exists.	**Low -** the amount of foraging habitat to be removed as a result of the proposal is considered to be a small portion of the habitat available to the species in the local area. Additionally, no breeding habitat is present within the subject site. As such the proposal is considered unlikely to adversely affect the species.
Ninox strenua Powerful Owl (V)	Occurs in sclerophyll forests and woodlands where suitable prey species occur (being predominantly arboreal mammals). Requires large hollows, usually in Eucalypt trees, for nesting. Roosts in dense vegetation within such areas.	**Low - Moderate** – This species was not detected during targeted field surveys and evidence of large forest owl activity was not observed within the subject site during the recent site inspection (2007) or previous surveys (HSO, 2001; 2003b). Suitable foraging habitat exists within the subject site, albeit not preferred intact forest habitat. No hollow-bearing trees were recorded within the subject site and as such no breeding habitat exists.	**Low -** the amount of foraging habitat to be removed as a result of the proposal is considered to be a small portion of the habitat available to the species in the local area. Additionally, no breeding habitat is present within the subject site. As such the proposal is considered unlikely to adversely affect the species.
Tyto novaehollandiae Masked Owl (V)	Found in a range of habitats, locally within sclerophyll forests and woodlands where appropriate / preferred prey species occur (being predominantly terrestrial mammals). Requires large Eucalypt hollows for nesting and these hollows are also preferred for roosting sites.	**Low - Moderate** – This species was not detected during targeted field surveys and evidence of large forest owl activity was not observed within the subject site during the recent site inspection (2007) or previous surveys (HSO, 2001; 2003b). Suitable foraging habitat exists within the subject site, albeit not preferred intact forest habitat. No hollow-bearing trees were recorded within the subject site and as such no breeding habitat exists.	**Low -** the amount of foraging habitat to be removed as a result of the proposal is considered to be a small portion of the habitat available to the species in the local area. Additionally, no breeding habitat is present within the subject site. As such the proposal is considered unlikely to adversely affect the species.
Climacteris picumnus Brown Treecreeper (V)	Frequents drier forests and woodlands, particularly open woodland lacking a dense understorey. Also found in grasslands in proximity to wooded areas where there are sufficient logs, stumps and dead trees nearby. Feeds on invertebrate larvae and small insects, particularly ants. Utilises hollows for roosting/nesting. Appears not to persist in remnants less than 200ha.	**Low** – The subject site contains highly marginal habitat for the Brown Treecreeper due to the fragmented nature of the vegetation and lack of hollow-bearing trees. Additionally, this species was not recorded within the subject site during site inspection or previous surveys (HSO, 2001; 2003b). As such the species is considered unlikely to occur within the subject site.	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Xanthomyza phrygia Regent Honeyeater (E, E*)	Nomadic Honeyeater that disperses to non-breeding areas, including the coast, in winter, where flowering trees are sought. Within its range it is mostly recorded in Box-Ironbark Eucalypt associations along creek flats, river valleys and foothills. Coastal swamp forests are used when more western resources fail and may be critical refuges during these times. Nests mainly west of the divide, although breeding attempts have occurred at Quorrobolong.	**Low** - **Moderate** – The species was not recorded within the subject site; however, *Eucalyptus tereticornis* would provide some winter flowering foraging resources for the species.	**Low** – the amount of foraging habitat to be removed as a result of the proposal is considered to be a small portion of the habitat available to the species in the local area. Additionally, no breeding habitat is present within the subject site. As such the proposal is considered unlikely to adversely affect the species.
Lophoictinia isura Square-tailed Kite (V)	Inhabits open forests and woodlands, particularly those on fertile soils with abundant passerines. They may also range in nearby open habitats but not into extensive treeless regions. This species is notably absent from alpine regions and small isolated remnant woodlands in large open areas.	**Low – Moderate** - Marginal foraging habitat is present within the subject site. However, this species was not recorded within the subject site during fieldwork and the nearest record is almost 10 km to the west. Potential nesting habitat does exist within the subject site; however, no evidence of nesting was observed during the recent site inspection (2007) or previous surveys (HSO, 2001; 2003b).	**Low** – The subject site contains marginal foraging habitat for the species; however, only a small portion would be removed as a result of the proposal. Additionally, no evidence of the species was recorded within the subject site. As such the proposal is considered unlikely to adversely affect the species.
Mammals			
Dasyurus maculatus Spotted-tailed Quoll (V, V*)	Found in a variety of forested habitats. This species creates a den in fallen hollow logs or among rocky outcrops. Generally does not occur in otherwise suitable habitats that are in close proximity to urban development.	**Low** – The subject site is sparsely forested and is located adjacent to residential development at Morisset Park. As such the subject site offers limited habitat value to the Spotted-tailed Quoll.	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.
Petaurus australis Yellow-bellied Glider (V)	Usually associated with tall, mature wet Eucalypt forest. Also known from tall dry open forest and mature woodland. The diverse diet of this species is primarily made up of Eucalypt nectar, sap, honey dew, manna and invertebrates found under decorticating bark and pollen. Tree hollows for nest sites are essential, as are suitable food trees in close proximity.	**Low** – The subject site does not offer suitable habitat for the species (tall mature wet eucalypt forest) or suitable hollows for denning.	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.
Petaurus norfolcensis Squirrel Glider (V)	Occurs In Eucalypt Forests And Woodlands Where It Feeds On Sap Exudates And Blossoms. In These Areas Tree Hollows Are Utilised For Nesting Sites. Also Requires Winter Foraging Resources When The Availability Of Normal Food Resources May Be Limited, Such As Winter-Flowering Shrub And Small Tree Species.	**Low - Moderate -** Suitable habitat for the Squirrel Glider was found to exist within the north-west portion of the study area, adjacent to the Lake Macquarie SCA further to the west (HSO, 2001). However, the species was not recorded despite targeted surveys (HSO, 2001), the subject site does not contain suitable nesting/denning habitat and offers limited forage diversity with little to no understorey. The main resource potentially used by Squirrel Glider would be the winter-flowering *Eucalyptus tereticornis*. The Squirrel Glider is not considered likely to occur within the subject site on more than an occasional basis (ie dispersing young).	**Low** – No potential denning habitat and only a small portion of marginal foraging habitat would be removed as a result of the proposal. As such the proposal is considered unlikely to adversely impact the species.
Petrogale penicillata Brush-tailed Rock Wallaby (E, V*)	Occurs in forests and woodlands along the Great Divide and on the western slopes in escarpment country with suitable caves and rocky overhangs for shelter.	**Low** – No suitable habitat within the subject site (no escarpments, rocky overhangs or caves) and no records exist within 10 km (NPWS Atlas of NSW Wildlife data).	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Phascogale tapoatafa Brush-tailed Phascogale (V)	Inhabits dry open forest and woodlands, often in areas with sparse groundcover. It is one of the most arboreal Dasyurids and mainly hunts invertebrates, although some vertebrate prey is taken on occasion. Utilises small tree hollows for nesting and refuge sites.	**Low** – Marginal foraging habitat exists within the subject site; however, no hollow-bearing trees that may be used for denning were recorded within the subject site. Furthermore, no records exist within 10 km of the subject site (NPWS Atlas of NSW Wildlife data) and the species was not detected during targeted survey (HSO, 2001; 2003b).	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.
Phascolarctos cinereus Koala (V)	Occurs in forests and woodlands where it requires suitable feed trees (particular *Eucalyptus* spp.) and habitat linkages. Will occasionally cross open areas, although it becomes more vulnerable to predator attack and road mortality during these excursions.	**Low - Moderate** – Potential Koala habitat exists within the study area, which includes the subject site (HSO, 2001). However, no evidence of Koala was recorded during targeted surveys including spotlighting and scat searches (HSO, 2001; 2003b) and a lack of recent local records (NPWS Atlas of NSW Wildlife data) indicates that Koala is likely to be a very occasional visitor to the subject site, at most.	**Low** – The small amount of potential foraging habitat to be removed as a result of the proposal is not considered likely to adversely affect the species.
Potorous tridactylus Long-nosed Potoroo (V)	Prefers cool rainforest, wet sclerophyll forest and heathland. Sleeps by day in a nest on the ground, and digs for succulent roots, tubers, fungi and subterranean insects. Some diggings seemingly attributable to this species may belong to *Isoodon macrourus* (Northern Brown Bandicoot).	**Low** – No suitable habitat within the subject site (no rainforest or wet sclerophyll forest with groundcover) and no records within 10 km (NPWS Atlas of NSW Wildlife data).	**Low** – Due to the lack of habitat resources, hence preferred habitat within the subject site, it is considered unlikely this species will be affected by the proposal.
Pteropus poliocephalus Grey-headed Flying-fox (V, V*)	Forages over a large area for nectar / fruits etc. Seasonally roosts in communal base camps situated within wet sclerophyll forests or rainforest. Frequently observed to forage in flowering Eucalypts.	**Moderate - High** – Foraging habitat exists within *Eucalyptus tereticornis* and *Ficus* sp. (Figs) recorded within the subject site. However, no camps or camp habitat (gullies) were recorded from the subject site.	**Low** – The small amount of potential foraging habitat to be removed as a result of the proposal is not considered likely to adversely affect the species, given the abundance of foraging habitat within the local range for this species.
Miniopterus schreibersii Eastern Bentwing-Bat (V)	This species utilises a range of habitats for foraging, including rainforest, wet and dry sclerophyll forests, woodlands and open grasslands. Requires caves or similar structures for roosting habitat.	**Moderate** – Suitable foraging habitat exists within the subject site. No suitable cave roosting habitat present within the subject site.	**Low** – No roosting habitat (caves and similar) exists within the subject site and the small amount of foraging habitat that would be modified as a result of the proposal is considered to be a small amount of the foraging habitat available to the species in the local area. As such the proposal is considered to be unlikely to adversely affect the species.
Miniopterus australis Little Bentwing-bat (V)	Prefers to forage in well-vegetated areas, such as within wet and dry sclerophyll forests and rainforests. Requires caves or similar structures for roosting habitat. Largely confined to more coastal areas.	**Moderate** – Suitable foraging habitat exists within the subject site. No suitable cave roosting habitat present within the subject site.	**Low** – No roosting habitat (caves and similar) exists within the subject site and the small amount of foraging habitat that would be modified as a result of the proposal is considered to be a small amount of the foraging habitat available to the species in the local area. As such the proposal is considered to be unlikely to adversely affect the species.
Mormopterus norfolkensis Eastern Freetail-bat (V)	This species forages predominantly in dry forests and woodlands east of the divide. It roosts in tree hollows, under bark and within man-made structures.	**High** – This species was recorded within the study area during fieldwork (HSO, 2001). No suitable roosting habitat (hollow-bearing trees) was recorded within the subject site.	**Low** – No roosting habitat (hollow-bearing trees) exists within the subject site and the small amount of foraging habitat that would be modified as a result of the proposal is considered to be a small amount of the foraging habitat available to the species in the local area. As such the proposal is considered to be unlikely to adversely affect the species.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Falsistrellus tasmaniensis Eastern False Pipistrelle (V)	This species is found in a variety of forest types such as open forests, woodlands and wetter sclerophyll forests (usually with trees >20m). This species roosts in tree hollows.	**Low - Moderate** – Marginal foraging habitat exists within the subject site. No suitable hollow roosting habitat was recorded within the subject site.	**Low** – No roosting habitat (hollow-bearing trees) exists within the subject site and the small amount of foraging habitat that would be modified as a result of the proposal is considered to be a small amount of the foraging habitat available to the species in the local area. As such the proposal is considered to be unlikely to adversely affect the species.
Chalinolobus dwyeri Large-eared Pied Bat (V, V*)	This species forages in tall open forests and the edges of rainforest. It roosts in mine shafts and similar structures.	**Low - Moderate** – Marginal foraging habitat exists within the subject site. No suitable cave roosting habitat present within the subject site and no records exist within 10km of the subject site (NPWS Atlas of NSW Wildlife data).	**Low** – No roosting habitat (caves and similar) exists within the subject site and the small amount of foraging habitat that would be modified as a result of the proposal is considered to be a small amount of the foraging habitat available to the species in the local area. As such the proposal is considered to be unlikely to adversely affect the species.
Myotis adversus Large-footed Myotis (V)	Usually found near bodies of water, including estuaries, lakes, reservoirs, rivers and large streams, often in close proximity to their roost site. Although usually recorded foraging over wet areas, it also utilises a variety of wooded habitats adjacent to such areas including rainforest, wet and dry sclerophyll forest, woodland, and swamp forest. Roosts in small colonies of between 15 and several hundred individuals in caves, mines and disused railway tunnels.	**Moderate** – The close proximity of suitable foraging habitat on Lake Macquarie would increase the likelihood that the species would also utilise the subject site. However, no suitable roost habitat (caves, bridges or tree hollows) was recorded within the subject site.	**Low** – No roosting habitat (caves and similar) exists within the subject site and the small amount of marginal foraging habitat (preferred habitat would be over open water in Lake Macquarie) that would be modified as a result of the proposal is considered to be a small amount of the foraging habitat available to the species in the local area. As such the proposal is considered to be unlikely to adversely affect the species.
Scoteanax rueppellii Greater Broad-nosed Bat (V)	Forages in moister gullies and wet sclerophyll forests as well as in lightly wooded areas and open spaces / ecotones. This species roosts in tree hollows.	**Moderate** – Suitable foraging habitat exists within the subject site. No suitable hollow roosting habitat was recorded within the subject site.	**Low** – No roosting habitat (hollow-bearing trees) exists within the subject site and the small amount of foraging habitat that would be modified as a result of the proposal is considered to be a small amount of the foraging habitat available to the species in the local area. As such the proposal is considered to be unlikely to adversely affect the species.
Vespadelus troughtoni Eastern Cave Bat (V)	A cave dweller, known from wet sclerophyll forest and tropical woodlands from the coast and Dividing Range to the drier forests of the semi-arid zone. It has been found roosting in small groups in sandstone overhangs, in mine tunnels and occasionally in buildings. In all situations, the roost sites are frequently in reasonably well-lit areas.	**Low - Moderate** – Local records exist for the species and suitable foraging habitat exists within the subject site. However, the species is commonly found on the north coast of NSW and local records are considered to represent the occasional presence of the species.	**Low** – Unlikely that the species occurs within the local area on more than an occasional basis. No roosting habitat (caves and similar) exists within the subject site and the small amount of foraging habitat that would be modified as a result of the proposal is considered to be a small amount of the foraging habitat available to the species in the local area. As such the proposal is considered to be unlikely to adversely affect the species.
Endangered Ecological Communities			
Coastal Saltmarsh in the North Coast Bioregion	Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner occurs in the intertidal zone on the shores of estuaries and lagoons, including when they are intermittently closed along the NSW coast. Classified by the Lower Hunter Central Coast Regional Biodiversity Conservation Strategy (LHCCREMS) as Map Unit (MU) 47a.	**High** – This vegetation community was recorded in a small area in close proximity to the subject site (HSO, 2001). However, this community would occur below the mean high tide mark and as such would be assessed within the aquatic ecological assessment undertaken for the proposal by The Ecology Lab.	***See aquatic ecological assessment undertaken by The Ecology Lab***

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bio-regions	Associated with periodic or semi-permanent inundation by freshwater, although there may be minor saline influence in some wetlands. They typically occur on silts, muds or humic loams in depressions, flats, drainage lines, backswamps, lagoons and lakes associated with coastal floodplains. Wetlands or parts of wetlands that lack standing water most of the time are usually dominated by dense grassland or sedgeland vegetation, often forming a turf less than 0.5 metre tall and dominated by amphibious plants including *Paspalum distichum*, *Leersia hexandra* and *Carex appressa*. Wetlands or parts of wetlands subject to regular inundation and drying may include large emergent sedges over 1 metre tall, such as *Baumea articulata, Eleocharis equisetina* and *Lepironia articulata*.	**Low** – No plant species representative of freshwater wetland vegetation was detected within the subject site. The subject site is not subjected to regular inundation.	**Low** – Unlikely to occur based on the lack of suitable habitat within the subject site; therefore no significant impact is expected.
Hunter Lowland Redgum Forest (HLRF)	Found on gentle slopes arising from depressions and drainage flats on permian sediments of the Hunter Valley floor in the Sydney Basin and NSW North Coast Bioregions. Dominant canopy species include *Eucalyptus tereticornis, E. amplifolia* and *E. moluccana* with scattered other Eucalypt species also present. Classified by the Lower Hunter Central Coast Regional Biodiversity Conservation Strategy (LHCCREMS) as Map Unit (MU) 19.	**Low**– The subject site contains remnant *Eucalyptus tereticornis* trees that are a dominant canopy species representative of HLRF EEC. However, the presence of *Angophora floribunda* within the subject site indicates that the remnant Eucalypt Woodland is more likely to be have once supported River Flat Eucalypt Forest EEC than HLRF.	**Low** – Since the subject site is considered unlikely to contain remnant representatives of HLRF, no impact from the proposal is expected.
River-flat Eucalypt forest (RFEF) on coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bio-regions	Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include *Eucalyptus tereticornis* (Forest Red Gum), *E. amplifolia* (Cabbage Gum), *Angophora floribunda* (Rough-barked Apple) and *A. subvelutina* (Broad-leaved Apple). Correlates with LHCCREMS communities - 'Central Hunter Riparian Forest' Map Unit (MU) 13, 'Wollombi Redgum-River Oak Woodland' MU14 and 'Redgum Roughbarked Apple Swamp Forest' MU38.	**Low - Moderate** – remnant *Eucalyptus tereticornis* and *Angophora floribunda* trees within the subject site suggest that parts of the subject site may have once supported this community or a close affiliate. However, clearing for the St. John of God training centre and grazing has eradicated all but a few scattered remnant trees.	**Low** – The subject site contains remnant trees that may have represented RFEF EEC. However, the regeneration potential of this vegetation community is considered to be quite low due to the high level of soil disturbance and understorey maintenance (mowing) due to the close proximity of the training centre facilities. Therefore, the removal of a very small number of remnant trees is considered to be a small, highly disturbed portion of this EEC with limited regeneration potential and is unlikely to adversely affect other remnants of this EEC.
Swamp Oak Floodplain Forest (SOFF) of the NSW North Coast, Sydney Basin and South East Corner bio-regions	This community is associated with periodically inundated flats, drainage lines, lake margins and estuarine fringes associated with coastal floodplains, typically occurring on grey-black clay-loams and sandy loams. Usually occurring below 20 m altitude.	**High** – some riparian vegetation on the fringes of Lake Macquarie is considered to be representative of SOFF EEC due to the dominance of Swamp Oak (*Casuarina glauca*).	**Low –** Riparian vegetation is not to be removed as a result of the proposal and as such it is not considered likely to adversely affect SOFF EEC. Additionally, beneficial riparian vegetation enhancement works are proposed.

Species / Community	Habitat Description	Chance of Occurrence On Site	Likely Level of Impact
Swamp Sclerophyll Forest (SSF) on Coastal Floodplains	The community is associated with humic clay or sandy loams on waterlogged or episodically flooded alluvial flats and drainage lines within coastal floodplains. It is generally characterised by an open to dense canopy of eucalypts and / or paperbarks. Canopy heights generally vary from 8m to 25m depending on species composition. In the Hunter Region the canopy often contains *Eucalyptus robusta* and / or *Melaleuca quinquinervia* although other plant species, such as *Callistemon salignus*, *Casuarina glauca*, *Eucalyptus resinifera* subsp. *hemilampra*, *Livistona australis* may be present. Small trees and shrubs, including *Melaleuca* sp., *Glochidian ferdinandi*, *Acacia* sp. *Leptospermum polygalifolium* subsp. *polygalifolium* and *Dodanaea triquetra*, are often present in the lower strata. Correlates with LHCCREMS Map Unit (MU) 42 'Riparian Melaleuca Swamp Woodland', MU42a – 'Melaleuca Scrub', MU43 – 'Wyong Paperbark Swamp Forest' and MU43a – 'Melaleuca Scrub'.	**Low** – Riparian vegetation within the subject site does not contain representative species such as *Melaleuca quinquenervia* or *Eucalyptus robusta* within the canopy. As such no SSF is considered likely to occur within the subject site.	**Low** – Unlikely to occur based on the lack of significant vegetation components within the subject site; therefore, no significant impact is expected.
Endangered Populations			
Eucalyptus parramattensis subsp. *parramattensis* Endangered Population in Wyong and Lake Macquarie LGA's	The current population within Lake Macquarie LGA is 10 individuals and a record exists for this population near Moonee to the east of the study area (Atlas of NSW Wildlife data).	**Low** – No *Eucalyptus parramattensis* was recorded within the subject site during the recent site investigation (2007) or previous surveys (HSO, 2001; 2003b) and the Lake Macquarie LGA population is not known to extend to the subject site.	**Low** – Unlikely to occur based on the lack of suitable habitat within the subject site, therefore no significant impact is expected.

APPENDIX E Flora Species List

FLORA SPECIES LIST

The following list includes all species of vascular plants observed on site during fieldwork. It should be noted that such a list couldn't be considered comprehensive, but rather indicative of the flora present on the site. It can take many years of flora surveys to record all of the plant species occurring within any area, especially plant species that are only apparent in some seasons such as Orchids.

A number of species cannot always be accurately identified during a brief survey, generally due to a lack of suitable flowering and/or fruiting material. Any such species are identified as accurately as possible, and are indicated in the list as indicated:

- specimens that could only be identified to genus level are indicated by the generic name followed by the abbreviation "sp.", indicating an unidentified species of that genus;
- specimens for which identification of the genus was uncertain are indicated by a question mark ("?") placed in front of the generic, which is followed by the abbreviation "sp." and;
- specimens that could be accurately identified to genus level, but could be identified to species level with only a degree of certainty are indicated by a ("?") placed in front of the epithet.

Authorities for the scientific names are not provided in the list. These follow the references outlined below.

> Harden, G. (ed) (2000). *Flora of New South Wales, Volume 1*. Revised edition. UNSW, Kensington, NSW.
>
> Harden, G. (ed) (2002). *Flora of New South Wales, Volume 2*. Revised edition. UNSW, Kensington, NSW.
>
> Harden, G. (ed) (1992). *Flora of New South Wales, Volume 3.* UNSW, Kensington, NSW.
>
> Harden, G. (ed) (1993). *Flora of New South Wales, Volume 4*. UNSW, Kensington, NSW. Names of families and higher taxa follow a modified Cronquist System (1981).

Introduced species are indicated by an asterisk "*".

Threatened species listed under the Threatened Species Conservation Act 1995 (TSC Act 1995) or the Environmental Protection of Biodiversity and Conservation (EPBC Act 1999) and / or Rare or Threatened Australian Plant (ROTAP) listed species are indicated in bold font and marked as:

(V) = *Vulnerable Species listed under the TSC Act*
(E) = *Endangered Species listed under the TSC Act*
(EE) = Species listed under the Commonwealth EPBC Act 1999 as Endangered
(EV) = *Species listed under the Commonwealth EPBC Act 1999 as Vulnerable*
(R) = *ROTAP as per Briggs and Leigh (1996)*

The following standard abbreviations are used to indicate subspecific taxa:

ssp. - subspecies
var.- variety
agg. aggregate
× - hybrid between the two indicated species

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Coniferopsida	Araucariaceae	*Araucaria heterophylla**	Norfolk Island Pine	x	x
Coniferopsida	Cupressaceae	*Chamaecyparis sp. (*cultivar*)*	Cypress	x	x
Coniferopsida	Pinaceae	*Pinus elliotti**	Slash Pine		x
Coniferopsida	Pinaceae	*Pinus sp.**	-	x	
Cycadopsida	Zamiaceae	*Macrozamia communis*	Burrawang	x	
Filicopsida	Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair	x	x
Filicopsida	Davalliaceae	*Nephrolepis cordifolia**	Fish-bone Fern	x	x
Filicopsida	Dennstaedtiaceae	*Histiopteris incisa*	Bat's Wing Fern	x	
Filicopsida	Dennstaedtiaceae	*Pteridium esculentum*	Bracken	x	x
Filicopsida	Dicksoniaceae	*Calochlaena dubia*	False Bracken	x	
Magnoliidae	Acanthaceae	*Pseuderanthemum variabile*	Pastel Flower	x	
Magnoliidae	Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach	x	x
Magnoliidae	Apiaceae	*Apium prostratum* var. *filiforme*	Sea Celery	x	x
Magnoliidae	Apiaceae	*Centella asiatica*	Swamp Pennywort	x	x
Magnoliidae	Apiaceae	*Hydrocotyle bonariensis**	Kurnell Curse / Pennywort	x	x

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Magnoliidae	Apiaceae	*Hydrocotyle geraniifolia*	Forest Pennywort	x	
Magnoliidae	Apocynaceae	*Nerium oleander**	Oleander Bush	x	
Magnoliidae	Apocynaceae	*Parsonsia straminea*	Common Silkpod	x	
Magnoliidae	Araliaceae	*Hedera helix**	English Ivy	x	
Magnoliidae	Araliaceae	*Schefflera actinophylla*	Umbrella Tree	x	x
Magnoliidae	Asteraceae	*Ageratina adenophorum**	Crofton Weed	x	
Magnoliidae	Asteraceae	*Bidens pilosa**	Cobbler's Pegs	x	
Magnoliidae	Asteraceae	*Chrysanthemoides monilifera* subsp. *rotundata**	Boneseed	x	
Magnoliidae	Asteraceae	*Cirsium vulgare**	Spear Thistle	x	x
Magnoliidae	Asteraceae	*Conyza albida**	Fleabane		x
Magnoliidae	Asteraceae	*Facelis retusa**	Waterbuttons		x
Magnoliidae	Asteraceae	*Gamochaeta americana**	Cudweed		x
Magnoliidae	Asteraceae	*Hypochaeris radicata**	Flatweed	x	x
Magnoliidae	Asteraceae	*Senecio lautus ssp. dissectifolius*	Fireweed	x	
Magnoliidae	Asteraceae	*Senecio madagascariensis**	Fireweed	x	x

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Magnoliidae	Asteraceae	*Sonchus asper**	Prickly Sow-thistle		
Magnoliidae	Asteraceae	*Sonchus oleraceus**	Common Sow-thistle	x	x
Magnoliidae	Asteraceae	*Taraxacum officinale**	Dandelion	x	x
Magnoliidae	Avicenniaceae	*Avicennia marina* var. *australasica*	Grey Mangrove	x	x
Magnoliidae	Balsaminaceae	*Impatiens walleriana**	Busy Lizzie	x	x
Magnoliidae	Bignoniaceae	*Jacaranda mimosifolia**	Jacaranda	x	
Magnoliidae	Carophyllaceae	*Cerastium glomeratum**	Mouse-ear Chickweed		
Magnoliidae	Casuarinaceae	*Casuarina glauca*	Swamp Oak	x	x
Magnoliidae	Chenopodiaceae	*Atriplex prostrata**	-	x	x
Magnoliidae	Chenopodiaceae	*Sarcocornia quinqueflora*	Glasswort	x	x
Magnoliidae	Chenopodiaceae	*Suadea australis*	Austral Seablite	x	x
Magnoliidae	Commelinaceae	*Commelina cyanea*	Scurvy Weed	x	x
Magnoliidae	Commelinaceae	*Tradescantia fluminensis**	Wandering Jew	x	x
Magnoliidae	Convolvulaceae	*Dichondra repens*	Kidney Weed		
Magnoliidae	Convolvulaceae	*Ipomoea indica**	Coastal Morning Glory	x	

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Magnoliidae	Crassulaceae	*Bryophyllum pinnatum**	Resurrection Plant	x	
Magnoliidae	Dilleniaceae	*Hibbertia scandens*	Climbing Guinea-flower	x	
Magnoliidae	Ericaceae	*Rhododendron* sp. (cultivar)*	Azalea	x	
Magnoliidae	Euphorbiaceae	*Breynia oblongifolia*	Coffee Bush	x	
Magnoliidae	Euphorbiaceae	*Euphorbia peplus**	Spurge	x	x
Magnoliidae	Euphorbiaceae	*Glochidion ferdinandii*	Cheese Tree	x	
Magnoliidae	Fabaceae	*Erythrina X sykesii**	Coral Tree	x	x
Magnoliidae	Fabaceae	*Hardenbergia violacea*	False Sarsparilla	x	
Magnoliidae	Fabaceae	*Pultenaea paleacea* var. *paleacea*	-	x	
Magnoliidae	Fabaceae	*Trifolium dubium**	Yellow Suckling Clover		x
Magnoliidae	Fabaceae	*Trifolium repens**	White Clover	x	x
Magnoliidae	Fabaceae	*Vicia sativa* subsp. *sativa**	Common Vetch		x
Magnoliidae	Geraniaceae	*Pelargonium* sp. (cultivar)	-	x	x
Magnoliidae	Haloragaceae	*Gonocarpus tetragynus*	Poverty Raspwort	x	
Magnoliidae	Haloragaceae	*Gonocarpus teucroides*	Raspwort	x	

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Magnoliidae	Lamiaceae	*Westringia fruiticosa*	Coast Westringia	x	x
Magnoliidae	Lauraceae	*Cinnamomum camphora**	Camphor Laurel	x	x
Magnoliidae	Lobeliaceae	*Pratia purpurascens*	Whiteroot	x	
Magnoliidae	Malaceae	*Cotoneaster pannosus**	Cotoneaster (cultivar)		x
Magnoliidae	Malvaceae	*Hibiscus sp.* (Cultivar)	Hibiscus	x	
Magnoliidae	Malvaceae	*Modiola caroliniana**	Red-flowered Mallow		x
Magnoliidae	Malvaceae	*Sida rhombifolia**	Paddy's Lucerne	x	x
Magnoliidae	Mimosaceae	*Acacia implexa*	Hickory	x	
Magnoliidae	Mimosaceae	*Acacia longifolia* var. *longifolia*	Sydney Golden Wattle	x	
Magnoliidae	Mimosaceae	*Acacia ulicifolia*	Prickly Moses	x	
Magnoliidae	Moraceae	*Ficus macrophylla*	Moreton Bay Fig	x	x
Magnoliidae	Moraceae	*Ficus rubiginosa*	Port Jackson Fig	x	x
Magnoliidae	Musaceae	*Musa acuminata**	Banana	x	
Magnoliidae	Myrsinaceae	*Rapanea howittiana*	Brush Muttonwood	x	
Magnoliidae	Myrtaceae	*Angophora costata*	Smooth-barked Apple	x	

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Magnoliidae	Myrtaceae	*Angophora floribunda*	Rough-barked Apple	x	x
Magnoliidae	Myrtaceae	*Callistemon salignus*	Willow Bottlebrush	x	
Magnoliidae	Myrtaceae	*Callistemon* sp. (cultivar)	-	x	x
Magnoliidae	Myrtaceae	*Eucalyptus haemastoma*	Scribbly Gum	x	
Magnoliidae	Myrtaceae	*Eucalyptus microcorys*	Tallowwood	x	
Magnoliidae	Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany	x	
Magnoliidae	Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum	x	x
Magnoliidae	Myrtaceae	*Eucalyptus umbra* subsp. *umbra*	Broad-leaved White Mahogany	x	
Magnoliidae	Myrtaceae	*Leptospermum polygalifolium*	Lemon Scented Tea-tree	x	x
Magnoliidae	Myrtaceae	*Lophostemon confertus*	Brush Box	x	
Magnoliidae	Myrtaceae	*Melaleuca sieberi*	-	x	
Magnoliidae	Myrtaceae	*Syzygium* sp.*		x	
Magnoliidae	Oleaceae	*Ligustrum lucidum**	Large-leaved Privet	x	x
Magnoliidae	Oleaceae	*Ligustrum sinense**	Small-leaved Privet	x	
Magnoliidae	Oleaceae	*Olea europa* subsp. *africana**	Common Olive	x	x

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Magnoliidae	Oxalidaceae	*Oxalis corniculata**	Yellow Wood Sorrel	x	x
Magnoliidae	Pittosporaceae	*Pittosporum undulatum*	Sweet Pittosporum	x	x
Magnoliidae	Plantaginaceae	*Plantago lanceolata**	Ribwort	x	x
Magnoliidae	Primulaceae	*Anagallis arvensis**	Scarlet Pimpernel	x	x
Magnoliidae	Primulaceae	*Samolus repens*	Creeping Brookweed	x	x
Magnoliidae	Proteaceae	*Grevillea robusta*	Silky Oak	x	x
Magnoliidae	Proteaceae	*Lambertia formosa*	Mountain Devil	x	
Magnoliidae	Rhamnaceae	*Pomaderris sp.*	-	x	
Magnoliidae	Rosaceae	*Rubus parvifolius*	Native Raspberry	x	
Magnoliidae	Rosaceae	*Rubus ulmifolius**	Blackberry	x	
Magnoliidae	Santalaceae	*Exocarpos cupressiformis*	Native Cherry	x	
Magnoliidae	Sapindaceae	*Dodonaea triquetra*	Hop Bush	x	
Magnoliidae	Scrophulariaceae	*Veronica plebia*	Creeping Speedwell	x	x
Magnoliidae	Solanaceae	*Lycopersicon esculentum**	Tomato	x	
Magnoliidae	Solanaceae	*Solanum mauritianum**	Wild Tobacco	x	

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Magnoliidae	Solanaceae	*Solanum nigrum**	Black Nightshade	x	x
Magnoliidae	Solanaceae	*Solanum prinophyllum*	Forest Nightshade	x	x
Magnoliidae	Sterculiaceae	*Lasiopetalum ferrugineum* var. *ferrugineum*	Rusty Velvet-bush	x	
Magnoliidae	Verbenaceae	*Lantana camara**	Lantana	x	x
Magnoliidae	Verbenaceae	*Verbena bonariensis**	Purpletop	x	x
Magnoliidae	Violaceae	*Viola hederacea*	Ivy-leaved Violet	x	x
Liliidae	Alliaceae	*Nothoscordum borbonicum**	Onion Weed	x	x
Liliidae	Araeceae	*Zantedeschia aethiopica**	White Arum Lily	x	x
Liliidae	Arecaceae	*Archontophoenix alexandrae*	Alexandra Palm		x
Liliidae	Arecaceae	*Livistona australis*	Cabbage Tree Palm	x	x
Liliidae	Arecaceae	*Syagrus romanzoffiana**	Cocos Palm	x	
Liliidae	Asparagaceae	*Protasparagus aethiopicus**	Asparagus Fern	x	x
Liliidae	Cyperaceae	*Cyperus eragrostis**	Umbrella Sedge	x	x
Liliidae	Cyperaceae	*Cyperus involucratus**	-	x	
Liliidae	Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge	x	

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
Liliidae	Juncaceae	*Juncus krausii*	Sea Rush	x	x
Liliidae	Juncaceae	*Juncus subsecundus*	Finger Rush	x	x
Liliidae	Juncaceae	*Juncus usitatus*	Common Rush	x	x
Liliidae	Juncaginaceae	*Triglochin striata*	Streaked Arrow-grass	x	x
Liliidae	Liliaceae	*Agapanthus sp.**	Agapanthus	x	
Liliidae	Lomandraceae	*Lomandra longifolia*	Spiky-headed Mat-rush	x	x
Liliidae	Phormiaceae	*Dianella caerulea* var. *producta*	Blue Flax Lily	x	
Liliidae	Poaceae	*Andropogon virginicus**	Whisky Grass	x	x
Liliidae	Poaceae	*Anisopogon avenaceus*	Oat Speargrass	x	x
Liliidae	Poaceae	*Aristida vagans*	Three-awn Speargrass	x	
Liliidae	Poaceae	*Avena fatua**	Wild Oats		
Liliidae	Poaceae	*Axonopus affinis**	Narrow-leaved Carpet Grass	x	x
Liliidae	Poaceae	*Briza minor**	Shivery Grass		
Liliidae	Poaceae	*Cynodon dactylon*	Common Couch	x	x
Liliidae	Poaceae	*Echinopogon caespitosus* var.	Tufted Hedgehog Grass	x	x

Class/Subclass	Family	Scientific Name	Common Name	HSO 2001	RPS HSO 2008
		caespitosus			
Liliidae	Poaceae	*Imperata cylindrica* var. *major*	Blady Grass	x	x
Liliidae	Poaceae	*Lolium rigidum**	Stiff Ryegrass		x
Liliidae	Poaceae	*Melinus repens**	Red Natal Grass		x
Liliidae	Poaceae	*Oplismenus aemulus*	Basket Grass	x	x
Liliidae	Poaceae	*Paspalum dilatatum**	Paspalum		x
Liliidae	Poaceae	*Pennisetum clandestinum**	Kikuyu	x	x
Liliidae	Poaceae	*Poa seiberiana*	Tussock Grass	x	
Liliidae	Poaceae	*Sporobolus virginicus*	Sand Couch	x	x
Liliidae	Poaceae	*Zoysia macrantha*	Coast Couch	x	x
Liliidae	Xyridaceae	*Xyris sp.*		x	

APPENDIX F Seven-Part Test of Significance

7-PART TEST OF SIGNIFICANCE OF IMPACTS TO THREATENED SPECIES AND EEC'S

For the purposes of the Environmental Planning and Assessment Act 1979 and, in particular, in the administration of Sections 78A, 79B, 79C, 111 and 112, the following factors have been taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats:

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Pandion haliaetus **Osprey**

Osprey nest and roost in tall eucalypt trees which adjoin foraging habitat such as open water. Within the subject site three individual *Eucalyptus tereticornis* trees will be removed as part of the proposal and would represent a small cumulative loss of nesting/roosting habitat. However, the species or evidence of Osprey nesting was not recorded during the various previous surveys (HSO, 2001; 2003b; 2007, 2008). The majority of the Lake Macquarie foreshore vegetation will be retained as part of the proposal. Therefore, the proposal is not considered likely to result in an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Pteropus poliocephalus **Grey-headed Flying Fox**

No individuals of this species were recorded during the current or previous fauna surveys. Suitable foraging habitat exists within flowering canopy tree species such as *Eucalyptus tereticornis* (Forest Redgum) and within the *Ficus sp.* trees within the subject site. However, no roosting habitat (camps in gullies) exists within the site and the portion of foraging habitat to be removed as a result of the proposed development will represent a relatively small cumulative loss of foraging habitat available to the species in the local area. Therefore, the proposal is not considered likely to result in an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Miniopterus australis **Little Bentwing-bat**

No individuals of this species were recorded during the current or previous fauna surveys. Little Bentwing Bats roost in caves and rock crevices and similar structures, of which there are none on subject site. These bats are highly mobile and the subject site is likely to be part of a much larger foraging habitat. A preference for open land adjacent to wooded habitat has been noted for this species. Due to the small amount of habitat to be altered / modified due to the proposal (0.04) with the removal of vegetation unlikely to impact this species, it is unlikely that the proposal will have any impact on this species that will cause a local extinction.

Miniopterus schreibersii **Eastern Bentwing-bat**

No individuals of this species were recorded during the current or previous fauna surveys. Eastern Bentwing Bats roost in caves and similar man-made structures, of which there are none on site. These bats are highly mobile and the site is likely to be part of a much larger foraging habitat. A preference for wooded habitat has been noted for this species. Due to the small amount of habitat to be removed as a result of the proposal (0.04ha) and the greater amount of similar vegetation in the areas adjacent to the subject site, it is unlikely that the proposal will have any impact on this species that will cause a local extinction.

Mormopterus norfolkensis **Eastern Freetail Bat**

This species was positively identified from field survey investigations and is utilising the site for foraging. Foraging habitat in the form of open forest vegetation is present within the subject site. This species may utilise tree-hollows and no hollow-bearing trees are to be removed as part of the proposal. The removal of the a small area of Swamp Oak Floodplain Forest (0.04ha) on the subject site is likely to have minimal impact as these bats utilise still water for foraging purposes. It is therefore unlikely that the proposal will significantly impact upon the local population to cause local extinction.

Myotis adversus **Large-footed Myotis**

This species was positively identified from field survey investigations and is utilising the subject site for foraging. The Myotis is a cave-roosting bat also known to roost in mines, railway tunnels and dense rainforest, of which there are none on subject site. This species may utilise tree-hollows and no hollow-bearing trees are to be removed as part of the proposal. The removal of the a small area of Swamp Oak Floodplain Forest (0.04ha) on the subject site is likely to have minimal impact as these bats utilise still water for foraging purposes. Lake Macquarie would represent a large area of still water providing habitat for this species. It is therefore unlikely that the proposal will significantly impact upon the local population to cause local extinction.

Scoteanax rueppellii **Greater Broad-nosed Bat**

Greater Broad-nosed Bats were not identified during field surveys however, the subject site contains potential foraging habitat in the form of open forested areas on the foreshore of Lake Macquarie. The loss of a small area (0.04) of open forest for foraging is unlikely to impact significantly on this species. No hollow-bearing trees will be removed as part of the proposal. It is therefore unlikely that the proposal will significantly impact upon the local population to cause local extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act 1995*.

c) In the case of a critically endangered or endangered ecological community, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Swamp Oak Floodplain Forest on Coastal Floodplains

The current proposal will involve the removal of approximately 0.04 ha (subject site) of SOFF. With over 0.35 ha to be retained within the study area and over this will represent only 10% of the extant of the vegetation within the study area. In addition LHCCREMS have mapped over 2600 ha Swamp Oak Rushland Forest within the region. Therefore the removal of 10% in the study area and 0.001% within the region it is highly unlikely that the proposal will have an adverse effect on the extent of the SOFF such that the local occurrence is likely to be placed at risk of extinction.

The extent of SOFF that will be retained within the study area will undergo rehabilitation and weed removal under the guidelines which will be set out within a proposed vegetation management plan. This will enhance and improve the biodiversity of the existing vegetation within the study area. Therefore the proposal is unlikely to substantially and adversely modify the composition of SOFF such that its local occurrence is likely to be placed at the risk of extinction.

River Flat Eucalypt Forest on Coastal Floodplains

The current proposal may involve the removal of three *Eucalyptus tereticornis* trees within the subject site. With over 0.39 ha to be retained within the study area this will represent a small incremental loss within the subject site. In addition LHCCREMS have mapped over 360 ha of this vegetation community within the region. Therefore the removal of three trees representative of this community within the study area it is highly unlikely that the proposal will have an adverse effect on the extent of the RFEF such that the local occurrence is likely to be placed at risk of extinction.

The extent of RFEF that will be retained within the study area will undergo rehabilitation and weed removal under the guidelines which will be set out within a proposed vegetation management plan. This will enhance and improve the biodiversity of the existing vegetation within the study area. Therefore the proposal is unlikely to substantially and adversely modify the composition of RFEF such that its local occurrence is likely to be placed at the risk of extinction.

d) In relation to the habitat of a threatened species, population or ecological community:

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

The proposal will involve the removal of less 0.04ha of open forest habitat. The open forest habitat to be removed represents potential forging habitat for the Grey-headed Flying-fox and Microchiropteran bat species (*Myotis adversus, Mormopterus norfolkensis, Miniopterus australis, Miniopterus schreibersii and Scoteanax*

rueppellii). The removal of three *Eucalyptus tereticornis* trees that will be removed provide foraging habitat for Swift Parrot and potential nesting/breeding habitat for the Osprey.

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

No areas of habitat are likely to be isolated as a result of the proposal. The study area is currently fringed by urban development with fragments of the original native vegetation remaining on the foreshore of Lake Macquarie.

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

Pandion haliaetus **Osprey**

Osprey nest and roost in tall eucalypt trees which adjoin foraging habitat such as open water. Within the subject site three individual *Eucalyptus tereticornis* trees will be removed as part of the proposal and would represent a small cumulative loss of nesting/roosting habitat. However, the species or evidence of Osprey nesting was not recorded during the various previous surveys (HSO, 2001; 2003b; 2007, 2008). The majority of the Lake Macquarie foreshore vegetation will be retained as part of the proposal. Therefore, the proposal is not considered likely to result in an adverse effect on the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

Pteropus poliocephalus **Grey-headed Flying Fox**

Suitable foraging habitat exists within flowering canopy tree species such as *Eucalyptus tereticornis* (Forest Redgum) and the *Ficus sp.* within the subject site. However, no roosting habitat (camps in gullies) exists within the site and the portion of foraging habitat to be removed as a result of the proposed development will represent a relatively small cumulative loss of foraging habitat available to the species in the local area. Therefore, the portion of foraging habitat to be removed or modified as a result of the proposal is not considered to be of high importance to the long-term survival of the species within the locality.

Miniopterus australis **Little Bentwing-bat**

Little Bentwing Bats roost in caves and rock crevices and similar structures, of which there are none on site. These bats are highly mobile and the subject site is likely to be part of a much larger foraging habitat. A preference for open land adjacent to wooded habitat has been noted for this species. Due to the small amount of habitat to be altered / modified due to the proposal (0.04ha) and the greater amount of similar vegetation in the areas adjacent to the subject site, it is unlikely that the proposal will have any impact on this species or that it will effect the long-term survival of the species within the locality

Miniopterus schreibersii **Eastern Bentwing-bat**

No individuals of this species were recorded during the current or previous fauna surveys. Eastern Bentwing Bats roost in caves and similar man-made structures, of which there are none on site. These bats are highly mobile and the site is likely to be part of a much larger foraging habitat. A preference for wooded habitat has been noted for this species. Due to the small amount of habitat to be removed as a result of the proposal (0.04ha) and the greater amount of similar vegetation in the areas adjacent to the subject site, it is unlikely that the proposal will have any impact on this species or that it will effect the long-term survival of the species within the locality.

Mormopterus norfolkensis **Eastern Freetail Bat**

This species was positively identified from field survey investigations and is utilising the site for foraging. Foraging habitat in the form of open forest vegetation is present within the subject site. This species may utilise tree-hollows and no hollow-bearing trees are to be removed as part of the proposal. The removal of the a small area of Swamp Oak Floodplain Forest (0.04ha) on the subject site is likely to have minimal impact as these bats utilise still water for foraging purposes. It is therefore unlikely that the proposal will have any impact on this species or that it will effect the long-term survival of the species within the locality.

Myotis adversus **Large-footed Myotis**

This species was positively identified from field survey investigations and is utilising the subject site for foraging. The Myotis is a cave-roosting bat also known to roost in mines, railway tunnels and dense rainforest, of which there are none on subject site. This species may utilise tree-hollows and no hollow-bearing trees are to be removed as part of the proposal. The removal of the a small area of Swamp Oak Floodplain Forest (0.04ha) on the subject site is likely to have minimal impact as these bats utilise still water for foraging purposes. Lake Macquarie would represent a large area of still water providing habitat for this species, it is therefore unlikely that the proposal will have any impact on this species or that it will effect the long-term survival of the species within the locality.

Scoteanax rueppellii **Greater Broad-nosed Bat**

Greater Broad-nosed Bats were not identified during field surveys however, the subject site contains potential foraging habitat in the form of open forested areas on the foreshore of Lake Macquarie. The loss of a small area (0.04) of open forest for foraging is unlikely to impact significantly on this species. No hollow-bearing trees will be removed as part of the proposal. It is therefore unlikely that the proposal will significantly impact upon the local population to cause local extinction.

Swamp Oak Floodplain Forest on Coastal Floodplains

The development proposal will require the removal of 0.04ha of SOFF for the installation of a boat lift. This area of SOFF comprises of canopy only trees with an exotic understory of grasses and herbs. The condition of the SOFF vegetation community is considered to be degraded due to past anthropogenic factors. It is therefore considered that the importance of the SOFF to be removed to be of low. Therefore it is unlikely that the proposal will significantly impact upon the survival of the EEC in the locality.

River Flat Eucalypt Forest on Coastal Floodplains

The development proposal will require the removal of three isolated *Eucalyptus tereticornis* trees and possibly the removal of 0.018ha. The three individual trees are isolated and consist of a lawn understorey with no shrub layer present. The area of this RFEF vegetation community to be removed may not occur as the development proposal is currently at the concept plan stage. However removal of individual trees may occur and this area is a worse case scenario. The vegetation is currently in poor condition due to weed infestation from pasture weeds and *Lantana camara.* The condition of the RFEF vegetation community is considered to be degraded due to past anthropogenic factors. It is therefore considered that the importance of the RFEF to be removed to be of low. Therefore it is unlikely that the proposal will significantly impact upon the survival of the EEC in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the TSC Act 1995.

f) Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan are available from DECC or DPI for the above species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed development will require the removal of native vegetation and as such could contribute to the Key Threatening Process "Clearing of Native Vegetation". Clearing of vegetation at this scale represents a small cumulative impact due to the small size of the area to be cleared (0.04ha). As such it is unlikely to significantly contribute to this process on a regional scale.

The proposal is likely to contribute to the Key Threatening Process "Invasion, establishment and spread of *Lantana*" as a result of the proposal. The clearance of native vegetation to construct the marina will create bare soil which is vulnerable to weed invasion. Provided clearing is undertaken in close temporal association with the construction of the marina, the opportunities for weed invasion will be minimised as a result of the proposal. Furthermore, the existing remnant vegetation within and subject site has current invasions of *Lantana camara,* however the proponent is

currently undertaking removal of this species which is enhancing the native biodiversity of the existing vegetation.

The proposal is likely to contribute to the Key Threatening Process "Invasion of Native Plant Communities by Exotic Perennial Grasses" Many of the perennial exotic grasses establish following disturbances such as construction works. This may result in local and regional declines of many native species and communities including threatened species that have potential habitat within the site. The subject site has severe incursions of exotic perennial grasses particularly within the cleared areas of the subject site. Whilst the future development has the potential to increase the number of exotic grasses, an extensive weed control program is planned for the future which will involve removal of these exotic grasses and other weeds.

The proposal is likely to contribute to the Key Threatening Process "Human Caused Climate Change" as a result of clearing vegetation and modification of the environment. It is considered that clearing and modification of the landscape could constitute a minor incremental change. Thus the extent to which the proposal would contribute to this process is considered unlikely to be significant.

No other KTP's are believed to be relevant to the current proposal.