



MOLINO STEWART

ENVIRONMENT & NATURAL HAZARDS



HOLDMARK

Holdmark Property Group

**157 Church Street, Ryde
Biodiversity Assessment**

Final Report





157 Church Street, Ryde Biodiversity Assessment

FINAL REPORT

for

Holdmark Property Group

by

Molino Stewart Pty Ltd

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1 INTRODUCTION

1.1 INTRODUCTION

This Biodiversity Assessment is submitted to City of Ryde Council (CRC) as supporting documentation for an Environmental Assessment prepared for a Concept Approval modification application for Stage A of the commercial development of 157 Church Street, Ryde.

1.2 LOCATION

The subject property is located next to Church Street on the north bank of Parramatta River, entirely bound by major and local roads (Figure 2). The property is within 100m of the foreshore, cycleway and public reserves along the Parramatta River in an area of previous shipping activity (Ryde Wharves). It is within a developing residential precinct overlooking Shepherd's Bay.

This subject property is presently developed as a showroom, maintenance and storage facility for golf carts with the majority of the site cleared on vegetation. Limited planting of landscape vegetation occurs along the boundary with Church Street including five palm trees and a hedgerow of bottlebrush. Photographs of the existing building are provided in Figure 2.

The subject property is zoned B4 Mixed Use in the Ryde Local Environmental Plan (LEP) adjacent to the RE1 Open Space 'public recreation' zoned foreshore reserves. The area of land immediately to the south of the subject property, between the property and the Loop Road is also included within the RE1 land use zone.

1.3 THE PROPOSAL

It is proposed to demolish the existing structures and build a 15 storey multi-level commercial/retail and residential complex.

Car parking will be provided with access from Parsonage Street. Service access will be from the service lane off Church Street exiting onto Well Street. Limited clearing of vegetation is required for the new complex (Figure 3). In compensation, landscaping proposed at the perimeter of the shopping complex will incorporate native species recorded within the foreshore reserves in the local area.

Due to the proximity of the proposed development to Parramatta River and the potential for impact on the riparian community and public reserves; CRC have requested a flora and fauna survey of the remnant vegetation as part of the development application to assess the ecological implications of the proposed development on the local biodiversity.



Figure 1 Location of subject property next to Church Street / Ryde Bridge, surrounded by local roads and separated from the foreshore along Parramatta River



Figure 2 Photographs of the existing building showing planted vegetation as part of the landscaping



Figure 3 Proposed commercial / retail development will replace existing structures without any need for additional clearing of surrounding vegetation

2 METHODOLOGY

The Biodiversity Assessment was conducted in accordance with the following legislation:

- Part 4 of the NSW Environmental Planning & Assessment (EP&A) Act (1979);
- NSW Threatened Species Conservation (TSC) Act (1995);
- Commonwealth Environmental Protection and Biodiversity Conservation (EPBC) Act (1999);
- NSW Rural Fires Act (1997);

The Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities (DEC, 2004) facilitate informed decision making at the local scale for individual development activities with particular regard to: preliminary flora and fauna determination; and Assessment of Significance. The Guidelines were applied with the following objectives:

- Determining the threatened flora species recorded from the locality;
- Assessing the vascular flora species capable of being identified, searching for threatened flora species and the description of vegetation associations on site;
- Determining the threatened fauna species occurring in the locality;
- Searching for threatened fauna species;
- Assessing the habitat value of the site for threatened fauna species; and

2.1 PERSONNEL

The wildlife survey and assessment was conducted by the following personnel in accordance with the Office of Environment and Heritage (OEH) Scientific Licence and Department of Primary Industries (DPI) Animal Research Authority.

2.1.1 Stephen Cotter

a) Qualifications:

Bachelor of Arts (University of New England) in Australian Plants, Aquatic Ecology, Biogeography

Bachelor of Applied Science (Hons) (Southern Cross University)

Master of Science (Southern Cross University)

Graduate Diploma in Bushfire Protection (University of Western Sydney)

b) Licences / Approvals:

Scientific Licence Number S13254 (issued under s132c, NPW Act, 1974)

Animal Research Authority (granted by the Director General, Dept. Industry & Investment)

Animal Care and Ethics Committee approval (granted under the Director General's Animal Care and Ethics Committee, Dept. Industry & Investment)

c) Professional Membership:

Environmental Institute of Australia and New Zealand

Fire Protection Association of Australia

d) Experience:

More than 10 years in private environmental consultancy.

2.2 BACKGROUND RESEARCH

In completing this flora assessment, the following methods were applied during the survey:

- Review of previous studies completed in the area;
- Determination of threatened species possibly located in the area by a desktop search of the BioNet Atlas (OEH, 2015);

- A search of records of species listed under the schedules of the Commonwealth EPBC Act were obtained using the protected matters search tool (<http://www.environment.gov.au/topics/about-us/legislation/environment-protection-and-biodiversity-conservation-act-1999/protected>);
- The Native Vegetation Maps of the Cumberland Plain (NPWS 2002a) were overlayed on the proposed development site to determine the likelihood of the presence of endangered ecological communities (EECs); and
- Field-based surveys of the subject land comprising random walk and targeted threatened species surveys

The fauna survey targeted the riparian community along Parramatta River as limited habitat is present on the subject property:

- A review of previous studies of the area;
- Search of the BioNet Atlas for known occurrences of threatened species in the area;
- Night surveys including stag watching;
- Observations of proxy evidence (scats, tracks, diggings); and
- Diurnal bird surveys.

2.3 HABITAT ASSESSMENT

The habitat assessment focussed on recording the following features. Particular attention was paid to searching for scats, tracks or other signs of fauna activity.

- The presence of mature trees with hollows, fissures and/or other suitable roosting/nesting places;
- The condition, flow and water quality of drainage lines and bodies of water;
- Areas of dense vegetation;
- The presence of hollow logs/debris and areas of dense leaf litter;
- The presence of fruiting flora species;

- The presence of blossoming flora species, particularly winter-flowering species;
- Vegetation connectivity and proximity to neighbouring areas of intact vegetation;
- The presence of caves and man-made structures that may be suitable for bat roost sites; and
- The presence of bulky nests which may belong to raptors.

2.4 FIELD SURVEYS

An initial transverse of the subject property was made by foot to assess the existing vegetation and potential survey zones. The subject property was considered a single survey zone. A second area of focus for the field survey was the patch of vegetation between the southern boundary of the property and Loop Road. This area has the potential to be impacted by the proposed development and as such was included in the assessment as a second survey zone.

2.4.1 Flora assessment

The property contains limited vegetation. A random walk through areas of retained vegetation around the perimeter was considered adequate to assess any threatened flora present. The survey was undertaken by Stephen Cotter on 24th November 2015 in a 'random meander' (Floyd, 1990).

2.4.2 Fauna Survey

The subject property provides limited habitat for native fauna. The survey was restricted to assessing the potential for mature trees on adjoining public reserves and along the Parramatta River foreshore to support fauna and seeking proxy evidence of recent activity on the subject property. The following techniques were applied in the fauna survey.

a) Stag Watching

Hollow-bearing trees are suitable habitat for gliders and possums. Stag watches of

identified hollow-bearing trees commenced approximately half an hour before sunset, finishing an hour after sunset. A total of one hour was allocated to this survey

b) Spotlighting

No spotlighting was completed of this assessment. The subject property is surrounded by the existing road network and/or residential development that pose significant edge effects and barriers to fauna movement such that fauna would not be expected to occur on a property with limited habitat.

c) Trapping

The property consists of an existing Golf cart showroom with all native vegetation cleared. Consequently, following the recommendations for Wildlife Surveys provided by the Animal Research Review Panel (ARRP, 2008), it was determined that trapping would not be warranted for the fauna survey.

d) Scats, Tracks, Diggings and Other Searches

The area beneath the existing canopy vegetation was assessed for proxy evidence for recent arboreal animals and bird activity.

2.5 LIMITATIONS

2.5.1 Limitations of the flora survey

The flora survey was completed in one afternoon as part of the fauna assessment, and followed current threatened biodiversity assessment guidelines. The subject property provides very limited native vegetation and further assessment is not warranted. Whilst all reasonable attempts have been made to discern the vascular flora present, there is no assurance that other threatened species will not be encountered on the site.

2.5.2 Limitations of the fauna survey

The lack of suitable habitat on the subject property and the noise and light effects of the surrounding road network would restrict the potential for native fauna to occur in the general areas. Detailed fauna survey would not be justified.

As many faunal species are cryptic and/or nocturnal and/or wide-ranging and mobile, they may be unlikely to be detected even during seasonal surveys. The fauna assessment is, accordingly, largely an assessment of the potential of the subject site as habitat for various fauna species. With the exception of species definitely recorded from the site, there is no certainty as to the presence or absence of the species discussed. Therefore it is important to adopt the precautionary principle such that it is assumed that any threatened species is likely to occur at the site if suitable habitat exists.

3 PREVIOUS STUDIES

The proposed development site has been included in a range of ecological assessments as part of government policies and planning proposals for the redevelopment of the Shepherd's Bay/Meadowbank residential precinct. A review of applicable information obtained as part of these studies is provided below.

a) Vegetation Mapping

OEH has not mapped any vegetation communities along the foreshores to Parramatta River with the area described as either exposed sandstone platforms or poorly developed mangrove and saltmarsh communities within the intertidal zone.

b) Ryde public Reserves Flora and Fauna survey

A comprehensive survey of the existing flora and fauna of a range of public reserves within the CRC was conducted between 2006 and 2008. The foreshores along Shepherd's Bay were included in the survey in 2008 (Biosphere Environmental Consultants, 2008) although limited access due to construction activity prevented detailed survey within Settler's Park, either side of Ryde bridge. The foreshore vegetation consisted of poorly-developed grey mangrove (*Avicennia marina*) and saltbush adjacent to steep sandstone cliffs with most of the existing vegetation within the public reserves having been planted as part of previous foreshore redevelopment. No threatened flora or fauna were recorded in the area.

c) River to River Corridor project

The Shepherd's Bay foreshore area was included in the avifauna surveys conducted as part of the River to River Corridors project (Insight, 2012). The habitat along the foreshore environment provided on limited habitat for bird species due to recent revegetation within the public reserves. The current construction activity was also identified as a barrier to avifauna activity in the local area.

4 EXISTING ENVIRONMENTS

4.1 LANDSCAPE CONTEXT

The development is proposed in an area that is already extensively modified by the existing commercial use of the property. The subject lot is also completely surrounded by existing roads that pose a barrier to fauna movement with the current redevelopment of the Shepherd's Bay area also posing noise and lighting constraints.

4.1.1 Drainage corridors

The Parramatta River is located approximately 80 metres to the south of the proposed development with the foreshore riparian community included in public reserves that have been redeveloped for recreational use. Most of the existing vegetation within these reserves has been planted as part of this redevelopment.

Any redevelopment of the subject property should limit the impacts on the riparian vegetation along the foreshores or within Settlers Park.

4.2 GEOLOGY, SOILS AND TOPOGRAPHY

The subject property is within the Gynea soil landscape and comprises shallow podzolic, yellow earths and earthy sands on rolling rises and low hills overlying Hawkesbury Sandstone lithology (Chapman and Murphy, 1989). In places, steep slopes and exposed sandstone crops out forming low escarpments and rock ledges.

The area of proposed development occurs on gently sloping land on a low hill, overlooking the Parramatta River foreshore. No observable drainage lines were present on the property.

4.3 THREATENED SPECIES ASSESSMENT

The background search of the BioNet Atlas of NSW Wildlife (NPWS, 2015) and the EPBC Act using the Protected Matters Search Tool indicated that 19 records of threatened flora occurring within 10km of the subject site. The survey identified 45 fauna species within 10 km of the property. This was reduced to six species after consideration of the limited habitat on the property.

The results of this preliminary assessment of the potential for the subject property to contain habitat for threatened flora and fauna is provided in Appendix A. Targeted surveys were conducted for all species predicted to occur based on available habitat.

4.4 SITE SURVEY

A total of 13 flora species were recorded during the random walk around the property. The majority of these (90%) were either exotic species, or planted around the perimeter of the property as landscaping.

The property provides only limited habitat to support avifauna and no mammals were observed.

The lists of all species identified during the flora and fauna survey are included in Appendix B.

4.5 VEGETATION COMMUNITY DESCRIPTIONS

The vegetation communities present on the property or surrounding land were described with reference to the OEH Biometric Vegetation categories for the Sydney Metropolitan CMA as part of the OEH Vegetation Information System classification scheme

(<http://www.environment.nsw.gov.au/research/Visclassification.htm>).

This is based on the overstorey species present, characteristic shrub and small trees and the extent of native ground cover.

4.5.1 Survey zone 1: Subject property

The existing property does not contain any vegetation community that can be described using the Biometric Vegetation Types database. The majority of the vegetation is exotic species or planted landscaping at the perimeter of the property such as a row of she-oak trees at the southern boundary; the clump of five Queen Palms and hedgerow of bottlebrush next to Concord Road.

A single Port Jackson Fig had established from seed and was spreading over the brickwork on at the southern façade of the existing building (Figure 4).



Figure 4 Port Jackson Fig growing over brickwork with a ground layer of exotic herbs

4.5.2 Survey zone 2: Adjoining Parkland

The small public reserve immediately to the south of the subject property and before the Loop Road contains a mature Moreton Bay Fig with a managed understorey (Figure 5). The tree is separated from the development by a public walkway of managed grass overlying a high pressure oil pipeline (Figure 6).



Figure 5 Mature Moreton Bay Fig on public reserve immediately to south of proposed development



Figure 6 Public walkway and high pressure oil pipeline with branches from Moreton Bay Fig overhanging subject property boundary

4.5.3 Threatened Ecological Communities

No threatened ecological communities occur on the subject property, the neighbouring public reserves or along the foreshore reserve to the south. This area has been significantly impacted by past and existing land uses, with revegetation within the public reserve modifying the existing species composition.

4.6 THREATENED SPECIES AND POPULATIONS

4.6.1 Flora

No threatened flora was recorded during the survey of the development property or surrounding public reserves. The mangrove and saltmarsh communities along the foreshore are significant and measures to ensure these are not harmed by the development should be considered.

4.6.2 Fauna

The landscape plantings (Queen Palm, row of Black She—oak and hedgerow of Weeping bottlebrush)) and regrowth Port Jackson Fig on the subject property and the Moreton Bay Fig immediately to the south may provide temporary food resources for a number of threatened fauna including Grey-headed Flying-fox and Superb Parrot. There is no evidence that permanent roosting habitat is available on the property for these species.

4.7 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

Under the EPBC Act, a person must not, without an approval under the Act, take an action that has or will have, or is likely to have, a significant impact on a matter of National Environmental Significance (NES). These matters are listed as:

- The world heritage values of a declared World Heritage property;
- The ecological character of a declared Ramsar wetland;
- A threatened species or endangered community listed under the Act;
- A migratory species listed under the Act; or
- The environment in a Commonwealth marine area or on Commonwealth land.

The EPBC Act does not require Commonwealth approval for the redevelopment of the site property. It does, however, suggest that when rezoning land, planning authorities should consider whether to allow actions that could significantly affect NES matters or the environment of Commonwealth land. Matters of NES in NSW are:

- Declared World Heritage Areas;
- Declared Ramsar Wetlands;
- Listed threatened species under the EPBC Act ;

- Listed ecological communities under the EPBC Act; or
- Migratory species listed in the China Australia Migratory Bird Agreement (CAMBA), Japan Australia Migratory Bird Agreement (JAMBA) and Republic of Korea Australia Migratory Bird Agreement (ROKAMBA).

a) Site Assessment

Commonwealth assessment will be required for proposed activities on the site if they affect any matter of NES. The subject site is not a Declared World Heritage Area or does not contain any Declared Ramsar Wetlands. The Parramatta River provides important habitat for several species with limited development of mangrove and salt marsh communities. However, these foreshores are outside the limit of the proposed development.

No listed flora species were observed during the survey. No significant areas of native vegetation are to be cleared for this development, and hence there will not be any impact on available habitat for the species listed.

The mature Moreton Bay Fig tree within the public reserve to the south of the subject property will be available post development and provide locally-important seasonal food resources for a number of species. The landscape plan for the development should incorporate native species to compliment the revegetation works occurring along the foreshore areas.

b) Migratory Birds

No CAMBA, JAMBA or ROKAMBA species are known to occur at the site. The development is removed from the Parramatta River foreshore areas by existing road network and hence the proposed development is unlikely to have a significant impact on any CAMBA, JAMBA or ROKAMBA species should any migratory species arrive in the local area.

c) Koala Habitat Assessment

No records of sighting of koalas have been recorded within the immediate area and the surrounding property does not provide any suitable habitat for this species. There is no potential for koala habitat to be present and further assessment is not required.

As a result of the surrounding land uses and limited vegetation occurring on the subject property, the connectivity of habitat in the area is poor. The proposed development will not alter the level of connectivity.

d) Summary

In light of the considerations discussed above, Commonwealth assessment is not required for the proposed development of this property. The proposed commercial and retail building will replace existing structures and landscaping shall complement existing revegetation works along the foreshore areas to the south of the subject property.

4.8 GROUNDWATER DEPENDENT ECOSYSTEMS

The subject property is located within modified urban area. All drainage is underground through existing stormwater infrastructure with no areas of groundwater discharge observed on the subject property.

The development is within 100 metres of Parramatta River and next to public reserves along the foreshore to Shepherd's Bay. Erosion and sediment control measures during any construction will limit any significant impact on this environment.

4.9 HABITAT CONNECTIVITY

The property is surrounded by the existing road network including a major traffic route along Church Street/Concord Road/Ryde Bridge. The subject property is also surrounded by existing residential developments are part of the redevelopment of the Shepherd's Bay area. The foreshore environment along Parramatta River has been impacted previously by shipping activities and is in a degraded state. The public reserves in the area are managed for recreation, rather than providing habitat connectivity along the river.

Table 1 Assessment of Habitat Features of Subject Site

Feature	Assessment
<i>The presence of mature trees with hollows, fissures and/or other suitable Roosting/nesting places</i>	Absent, a Moreton Bay Fig is present within public reserve along foreshore that provides habitat. Other vegetation along the foreshore has recently been planted and not yet reached maturity for tree hollows to develop.
<i>The presence of Koala food trees</i>	Absent, SEPP 44 is not applicable.
<i>The presence of caves or hollows suitable for Molossidae species</i>	Absent on subject property, sandstone ledges and overhangs along foreshore provide only limited habitat.
<i>The presence of Petauridae feeding scars</i>	No evidence of feeding scars was observed.
<i>Condition, flow and water quality of drainage lines and bodies of water</i>	No surface drainage on property, foreshore along Parramatta River is degraded with managed public recreation areas, boardwalks and cycle ways.
<i>Areas of dense vegetation.</i>	Areas of dense vegetation do not occur in the development area.
<i>Presence of hollow logs/debris and areas of dense leaf litter</i>	Absent, property is managed as Golf Cart showroom.
<i>Presence of fruiting flora species</i>	Moreton Bay Figs occur in nearby public reserves, Queen Palms as landscaping along Church Street may provide food resource.
<i>Presence of blossoming flora species, particularly winter-flowering species</i>	Absent from development property, contained as revegetation of foreshore areas and reserves.
<i>Vegetation connectivity and proximity to neighbouring areas of intact vegetation</i>	Poor connectivity through residential areas, limited connectivity along foreshore of Shepherd's Bay. Surrounding vegetation will provide only limited seasonal resources for highly mobile fauna.
<i>Presence of caves and man-made structures that may be suitable for Microchiropteran bat roost sites</i>	Existing buildings were currently used and maintained. These are unlikely to provide habitat for micro-bat species. No other structures or caves are present on the development property. Overhangs and ledges in the sandstone escarpment along the foreshore to Shepherd's Bay may provide limited habitat for these species.
<i>Presence of bulky nests which may belong to raptors</i>	Absent, no Osprey nests were observed in the local area.

5 IMPACT ASSESSMENT

5.1 DIRECT IMPACTS

Schedule 3 of the TSC Act lists the following impacts that are likely to have a direct affect the local biodiversity as part of the development proposal:

- Loss of vegetation/habitat;
- Disruption to connectivity; and
- Injury and mortality to wildlife.

5.1.1 Loss of vegetation / habitat

Clearing for the proposal development will involve the removal of a juvenile Port Jackson Fig growing on the southern façade of the existing building. The clearing will also remove five Queen Palms planted as part of the landscaping along Church Street and a hedge row of bottlebrush trees. This vegetation may provide occasional food resources for avifauna.

The removal of the existing landscape plantings at the perimeter of the subject property is unlikely to affect the long-term survival of fauna in this area.

A mature Moreton Bay Fig occurs in the nearby public reserve with several of the branches overhanging the subject property. This tree may provide occasional food resources for avifauna and possibly Grey-headed flying-fox. As it is also likely that the structural root zone for this tree extends to the property boundary, any pruning of the overhanging branches should be supervised by a qualified arborist to ensure harm to this tree is minimised.

5.1.2 Connectivity

The development property has poor connectivity with areas of native vegetation due to the surrounding road infrastructure, existing land uses and current redevelopment of the Shepherd's Bay area. The foreshore to Parramatta provides a narrow strip of native

and exotic vegetation, surrounded by public reserves and cycle ways.

5.1.3 Injury and mortality

Prior to the commencement of any vegetation clearing, the areas of landscaping should be assessed for potential avifauna. As part of this pre-clearance assessment, a protocol should be established for the capture and relocation of any fauna to avoid harm or injury to wildlife. This protocol should be developed in consultation with an experienced fauna spotter or ecologist and involve input from wildlife service organisations.

5.2 KEY THREATENING PROCESSES

The proposal is likely to trigger the following Key Threatening Processes (KTP) as listed in the TSC Act:

- Clearing of native vegetation;
- Invasion of native plant communities by exotic perennial grasses;

In assessing the impact of potential KTPs; the following factors must be considered in relation to the habitat of the threatened species, endangered population and/or ecological community. Amelioration measures are provided to offset the potential impacts for these KTPs.

5.2.1 The extent to which habitat is likely to be removed or modified as a result of the action proposed

The proposed vegetation clearing will not place any fauna at risk of long-term survival in the area.

5.2.2 Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action

The existing habitat along the foreshore of Shepherd's Bay is already highly fragmented by past land uses. The proposed development is unlikely to create further fragmentation of the local environment.

5.2.3 The importance of the habitat to be removed, modified, fragmented or isolated to the long term survival of the species, populations or ecological communities in the locality.

a) Regrowth Fig tree

The Port Jackson Fig along the southern façade provided limited food resources for avifauna. This species is unlikely to reach maturity due to potential impacts to the existing building on the development site and would therefore be removed regardless of any development proposal.

Measures should be included to prevent any damage to the mature Moreton Bay Fig tree that occurs within the public reserve immediately to the south of the development site. This tree is likely to provide habitat for a range of species with branches and potentially roots encroaching upon the development site.

b) Landscape plants

The five Queen Palms and a hedge row of Weeping Bottlebrush along Church Street provide only limited food resources for avifauna. The removal of this vegetation will not place any species at risk of local extinction and can be offset by careful selection of plants within any landscaping plan for the proposed development.

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

There are no recovery plans or threat abatement plans applicable for the proposed development due to the extent of modification of the existing property. Measures to protect surrounding vegetation within the public reserves and to incorporate native planting within any landscaping plan are consistent with the policy of enhancing biodiversity along the foreshore areas of Shepherd's Bay.

5.2.5 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 is considered likely to initiate KTPs. Possible actions are considered below.

1. Clearing of native vegetation (as defined and described in the final determination of the Scientific Committee to list the key threatening process)

In the opinion of the NSW Scientific Committee, clearing of any area of native vegetation may have significant impacts upon biological diversity. The subject land has been substantially modified and is surrounded by existing residential areas. Clearing of a single Port Jackson Fig from the southern façade of the existing building near the boundary of the property will result in a loss of native vegetation. However, it is likely that this tree would be removed due to potential damage to the existing building regardless of any development proposal.

During any clearing, measures should be incorporated to prevent damage to existing mature vegetation within the public reserves where branches and/or root systems may encroach on the development property.

2. Invasion of native plant communities by exotic perennial grasses

In the view of the NSW Scientific Committee, the spread of exotic grasses is often aided by clearing. The proposed development is already affected by exotic grasses and weeds in areas currently poorly managed. There is the potential for these to spread into the public reserves and foreshore vegetation. Measures should be developed to prevent the spread of exotic grasses into the public reserve along the foreshore.

5.2.6 Impact to Threatened species

The 7 part test for the Assessment of Significance was not required. Habitat is not present on the property for any threatened species.

5.3 INDIRECT IMPACTS OF THE PROPOSAL

Indirect impacts of proposed development can include:

- Loss of shade/shelter;
- Erosion;
- Weed invasion;
- Fauna and flora displacement;
- Increased edge effects from construction activities on adjoining foreshore areas; and
- Increased lighting and noise due to the operation of the retail facility.

Measures to mitigate many of these impacts are to be incorporated into any Construction Environmental Management Plan (CEMP) of the development.

The design and location of lighting development should seek to limit the amount of light projecting towards the public reserve and foreshore to reduce the effects on fauna.

6 MITIGATION MEASURES

Any clearing of native vegetation, particularly where habitat features such as tree hollows, bark fissures, fallen branches or copious berry are available, the impacts should be fully offset by compensation measures to increase the available habitat and foraging resources for fauna.

For the loss of the regrowth Port Jackson Fig tree, the compensatory measures shall include weed management and native shrub and tree revegetation as part of the landscaping plan for the development

6.1 VEGETATION MANAGEMENT

A Landscaping Plan should be prepared for the development. This should incorporate native fruiting shrubs to offset the loss of planted vegetation surrounding the existing buildings. This will improve the available food resources for avifauna in the area and compliment existing revegetation works occurring along the foreshore areas.

6.2 CONTROLS ON EROSION

It is recommended that strategies are developed to limit any erosion during any construction works for the development. This should be developed in consultation with an appropriately qualified person. Erosion control measures need to be fully considered to prevent nitrification and sedimentation along the foreshore areas and public reserves.

6.3 LIGHTING

Careful design and positioning of the lighting for the development should seek to reduce the amount of light projecting towards the public reserve and foreshore area. This will lower the impacts on any fauna occurring in these areas.

6.4 RECOMMENDATION

The proposed redevelopment of a commercial site will involve the clearing of isolated vegetation from the boundary of the existing property. The remaining areas are already highly modified by the existing land use.

In view of the potential impacts of the proposed development on the local biodiversity, the following recommendations are made:

- An arborist should supervise any clearing of vegetation from the southern boundary of the property to ensure no impacts to the Moreton Bay Fig tree occurring in the adjacent public reserve; and

The Landscaping Plan should consider the need to provide winter and spring flowering native shrubs that will compliment available food resources within the foreshore environment.

7 CONCLUSIONS

Molino Stewart has completed a comprehensive biodiversity assessment for the proposed development.

The assessment was conducted in accordance with section 5A of the EP&A Act (1979), and followed the Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities (DEC, 2004) and current best practice methods. It included a desktop assessment followed by a single day of field survey by a qualified ecologist. No threatened flora or fauna were observed during the surveys. Habitat for any threatened species was also not observed on the existing property

Any clearing of existing vegetation, particularly the regrowth Port Jackson Fig tree near the southern façade of the existing building may result in loss of potential food resources for avifauna. Clearing of vegetation in this area may also impact on existing mature vegetation within the public reserve. Measures should be considered to prevent any damage to surrounding vegetation.

The impact of vegetation clearing that is proposed can be minimised by incorporation of appropriate species in any landscaping plan for the development. This may improve the limited connectivity with the foreshore areas along Parramatta River that currently exists.

No 7 part tests for the Assessment of Significance were required and the development will not impact on potential threatened species.

The survey results provide sufficient information for this assessment; no further investigation is warranted.

8 REFERENCES

Biosphere Environmental Consultants (2008) Ryde Flora and Fauna Study

Chapman G.A. and Murphy C.L., 1989, *Soil Landscapes of the Sydney 1:100,000 Sheet* report, Department of Conservation and Land Management, Sydney

DEC (2004) Threatened Biodiversity Survey and Assessment Guidelines for Developments and Activities Draft

InSight Ecology (2012) Avifauna communities of the River to River Corridors Project study area: April 2012 Survey Report.

APPENDIX A– LIKELIHOOD OF OCCURRENCE ASSESSMENT TABLE

Table 2Threatened flora recorded within 10km of subject property and included in either the TSC Act or EPBC Act

Family	Species	Common Name	Habitat	Likelihood at Subject Site
Convolvulaceae	<i>Wilsonia backhousei</i>	Narrow-leaved Wilsonia	Perennial sprawling matted shrub at the margins of salt marshes and lakes, known from along the Parramatta River	Unlikely
Dilleniaceae	<i>Hibbertia</i> sp. <i>Turramurra</i>	Julian's Hibbertia	Grows in forest with canopy species including Eucalyptus pilularis, E. resinifera, Corymbia gummifera and Angophora costata	Unlikely
Elaeocarpaceae	<i>Tetradlea glandulosa</i>		Associated with shale-sandstone transition environments with shallow stony soils	Unlikely
	<i>Tetradlea juncea</i>	Black-eyed Susan	found in low open forest/woodland with a mixed shrub understorey and grassy groundcover	Unlikely
Ericaceae	<i>Epacris purpurascens</i> var. <i>purpurascens</i>		Found in a range of vegetation communities growing in areas with strong shale soil influence	Unlikely
Fabaceae	<i>Acacia puegens</i>	Downy Wattle	Woodland and open forest on alluvium, shale and shale / sandstone landscapes	Unlikely
	<i>Acacia terminalis</i> var. <i>terminalis</i>	Sunshine Wattle	Coastal scrub and dry sclerophyll woodland on sandy soils	Unlikely
Lamiaceae	<i>Prostanthera marifolia</i>	Seaforth Mintbush	only known from the northern Sydney suburb of Seaforth and has a very highly restricted distribution within the Sydney Basin Bioregion	Unlikely
Myrtaceae	<i>Callistemon linearifolius</i>	Netted Bottle Brush	Dry sclerophyll forest on the coast, known from the Hornsby Plateau and within Ku-ring Gai N.P.	Unlikely

	<i>Darwinia biflora</i>		Occurs on the edges of weathered shale-capped ridges, where these intergrade with Hawkesbury Sandstone	Unlikely
	<i>Eucalyptus camfieldii</i>	Camfield's Stringybark	Poor coastal country in shallow sandy soils overlying Hawkesbury sandstone. Coastal heath mostly on exposed sandy ridges	Unlikely
	<i>Eucalyptus nicholii</i>	Narrow-leaved Black Peppermint	New England Tablelands in grassy woodlands on infertile soils derived from granite or metasedimentary bedrock	Unlikely
	<i>Leptospermum deanei</i>		Woodland on lower hill slopes or near creeks on sandy alluvial soil or sand over sandstone	Unlikely
	<i>Melaleuca deanei</i>	Deane's Paperbark	Ridgetop woodland on sandstone in two distinct areas at Berowra and Wedderburn	Unlikely
	<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	Littoral rainforest and coastal scrub	Unlikely
Orchidaceae	<i>Genoplesium baueri</i>	Bauer's Midge Orchid	Grows in dry sclerophyll forest and moss gardens over sandstone	Unlikely
Proteaceae	<i>Persoonia hirsuta</i>	Hairy Geebung	sandy soils in dry sclerophyll open forest, woodland and heath on sandstone	Unlikely
	<i>Persoonia nutans</i>	Nodding Geebung	Open Eucalypt woodlands on alluvial sediments (CPW)	Unlikely
Thymelaeaceae	<i>Pimelea curviflora</i> var. <i>curviflora</i>		Occurs on shaley/lateritic soils over sandstone and shale/sandstone transition soils on ridgetops and upper slopes amongst woodlands	Unlikely

Source: NPWS BioNet Atlas 7th November, 2017, Protected Matters Search Tool, 7th November, 2017

Table 3 Habitat of threatened fauna species and their likelihood of occurrence

Family	Scientific Name	Common Name	Habitat	Likelihood of Occurrence on Site
Amphibia				
	<i>Litoria aurea</i>	Green and Golden Bell Frog	Permanent unshaded dams and lakes, often in association with well-developed fringing vegetation. Has be observed in degraded and polluted environments	Unlikely
	<i>Pseudophryne australis</i>	Red-crowned Toadlet	Inhabits periodically wet drainage lines below sandstone Shelters under rocks and amongst masses of dense vegetation or thick piles of leaf litter.	Unlikely
Aves				
Accipitridae	<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	Coastal and Inland waterways (CAMBA)	Possible
	<i>Hieraaetus morphnoides</i>	Little Eagle	Open Eucalypt forest and woodland throughout most of NSW	Unlikely
	<i>Pandion cristatus</i>	Eastern Osprey	coastal areas, especially the mouths of large rivers, lagoons and lakes	Possible
Anatidae	<i>Nettapus coromandelianus</i>	Cotton Pygmy-Goose	Freshwater lakes, lagoons, swamps and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation	Unlikely

Apodidae	<i>Hirundapus caudacutus</i>	White-throated Needletail	Coastal environments CAMBA, JAMBA, ROKAMBA	Unlikely
Ardeidae	<i>Ardea ibis</i>	Cattle Egret	Grazing land in coastal zone CAMBA, JAMBA	Unlikely
	<i>Botaurus poiciloptilus</i>	Australasian Bittern	Permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (<i>Typha spp.</i>) and spikerushes (<i>Eleocharis spp.</i>).	Unlikely
	<i>Ixobrychus flavicollis</i>	Black Bittern	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation	Unlikely
Burhinidae	<i>Burhinus grallarius</i>	Bush Stone-curlew	Inhabits open forests and woodlands with a sparse grassy groundlayer and fallen timber	Unlikely
Charadriidae	<i>Charadrius leschenaultii</i>	Greater Sand-plover	entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Pluvialis fulva</i>	Pacific Golden Plover	Coastal / marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Pluvialis squatarola</i>	Grey Plover	Coastal / marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
Ciconiidae	<i>Wphippiorhynchus asiaticus</i>	Black-necked Stork	Floodplain wetlands (swamps, billabongs, watercourses and dams) of the major coastal rivers are the key habitat in NSW for the Black-necked Stork. Secondary habitat includes minor floodplains, coastal sandplain wetlands and estuaries	Unlikely

Columbidae	<i>Ptilinopus superbis</i>	Superb Fruit-Dove	Inhabits rainforest and similar closed forests where it forages high in the canopy, eating the fruits of many tree species such as figs and palms. It may also forage in eucalypt or acacia woodland where there are fruit-bearing trees	Possible
Falconidae	<i>Falco subniger</i>	Black Falcon	Widely distributed throughout NSW in low abundances within open woodland and dry sclerophyll forests; more common in inland areas	Unlikely
Haematopodidae	<i>Haematopus longirostris</i>	Pied Oystercatcher	Favours intertidal flats of inlets and bays, open beaches and sandbanks, foraging on exposed sand, mud and rock at low tide, for molluscs, worms, crabs and small fish.	unlikely
Laridae	<i>Hydroprogne caspia</i>	Caspian Tern	Coastal / Marine environments CAMBA, JAMBA	Unlikely
	<i>Sterna hirundo</i>	Common Tern	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Stenula albifrons</i>	Little Tern	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
Meliphagidae	<i>Epthianura albifrons</i>	White-fronted Chat	Foraging habitat include bare or grassy ground near wetlands	Possible
	<i>Xanthomyza phrygia</i>	Regent Honeyeater	Dry Open Forest and Woodland and riverine sheoak woodlands on the coast	Unlikely
Meropidae	<i>Merops ornatus</i>	Rainbow Bee-eater	JAMBA	Unlikely
Neosittidae	<i>Daphoenositta chrysoptera</i>	Varied Sittella	Open Eucalypt forest and woodland	Unlikely
Psittacidae	<i>Glossopsitta pusilla</i>	Little Lorikeet	Tall open forest, woodland, Melaleuca swamp,	Unlikely

			riparian and open forest	
	<i>Lathamus discolor</i>	Swift Parrot	Open Forest and Woodland, particularly Grey Box – Ironbark communities	Unlikely
Scolopacidae	<i>Actitis hypoleucos</i>	Common Sandpiper	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Arenaria interpres</i>	Ruddy Turnstone	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Calidris canutus</i>	Red Knot	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Calidris ferruginea</i>	Curlew Sandpiper	Coastal / Marine environments, occasionally inland wetlands during migration CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Calidris melanotos</i>	Pectoral Sandpiper	Coastal / Marine environments JAMBA, ROKAMBA	Unlikely
	<i>Calidris ruficollis</i>	Red-necked Stint	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Gallinago hardwickii</i>	Latham's Snipe	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Limosa lapponica</i>	Bar-tailed Godwit	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Limosa limosa</i>	Black-tailed Godwit	Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or	Unlikely

			sandflats CAMBA, JAMBA, ROKAMBA	
	<i>Numenius madascariensis</i>	Eastern Curlew	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Numenius minutus</i>	Little Curlew	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Numenius phaeopus</i>	Whimbrel	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Philomachus pugnax</i>	Ruff	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Tringa brevipes</i>	Grey-tailed Tattler	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Tringa glareola</i>	Wood Sandpiper	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
	<i>Tringa nebularia</i>	Common Greenshank	Coastal / Marine environments CAMBA, JAMBA, ROKAMBA	Unlikely
Strigidae	<i>Ninox connivens</i>	Barking Owl	Eucalypt Woodlands, Open Forest, Swamp Woodlands and timber along watercourses	Unlikely
	<i>Ninox strenua</i>	Powerful Owl	Woodland to Tall moist forest and rainforest	Unlikely
Tytonidae	<i>Tyto novaehollandiae</i>	Masked Owl	Dry Sclerophyll Forests and woodlands but requires large tree hollows or caves for nesting	Unlikely
Mammalia				
Burramyidae	<i>Cercartetus nanus</i>	Eastern Pygmy-possum	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest	Unlikely

			and woodland to heath, but in most areas woodlands and heath appear to be preferred	
Dasyuridae	<i>Dasyurus viverrinus</i>	Eastern Quoll	Occurs in dry sclerophyll forest, scrub, heathland and cultivated land	Unlikely
Peramelidae	<i>Perameles nasuta</i>	Long-nosed Bandicoot population in inner western Sydney	Shelter mostly under older houses and buildings and forage in parkland and back-yards	Possible
Petauridae	<i>Petaurus australis</i>	Yellow-bellied Glider	Wet and open dry sclerophyll forests	Unlikely
Pteropidae	<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	Rainforest, tall sclerophyll forests and woodland	Possible
Vespertiliidae	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	Preference for riparian vegetation containing tree hollows	Unlikely
	<i>Miniopterus australis</i>	Little Bentwing-bat	Coastal heath, woodland and forest vegetation , particularly associated with melaleuca sp.	Unlikely
	<i>Miniopterus schreibersii</i>	Eastern Bentwing-bat	Caves old growth forest with tree hollows, known to utilise man-made stormwater management structures and disused buildings for roosting	Unlikely

Source: NPWS Wildlife Atlas as at 7th November, 2017, Protected Matters Search Tool, 7th November, 2017.

APPENDIX B – SPECIES RECORDED

Table 4 Flora recorded on subject property

Family	Botanical name	Common Name
<i>Arecaceae</i>	<i>Syagrus romanzoffiana</i> * (p)	Queen Palm
<i>Asteraceae</i>	<i>Bidens pilulosa</i> *	
	<i>Conyza bonariensis</i> *	Fleabane
	<i>Euchiton sphaericus</i> *	Cudweed
	<i>Hypochaeris radicata</i> *	Cat's Ear
<i>Casuarinaceae</i>	<i>Allocasuarina littoralis</i> (p)	Black She-oak
<i>Cyperaceae</i>	<i>Cyperus</i> sp.	
<i>Lauraceae</i>	<i>Cinnamomum camphor</i> *	Camphor Laurel
<i>Moraceae</i>	<i>Ficus rubiginosa</i>	Port Jackson Fig
<i>Myrtaceae</i>	<i>Callistemon saligna</i> (p)	Weeping Bottlebrush
<i>Poaceae</i>	<i>Cynodon dactylon</i> *	Couch
	<i>Paspalum dilatatum</i> *	Paspalum
	<i>Pennisetum clandestinum</i> *	Kikuyu
Recorded in Survey zone 2, outside of subject property		
<i>Moraceae</i>	<i>Ficus macrophylla</i>	Moreton Bay Fig

* Introduced species

(p) Planted landscaping plants or not local within CRC

Table 5 Faunal List

Scientific Name	Common Name	Detection
Aves		
<i>Rhipidura leuophrys</i>	Willie Wagtail	Observed
<i>Manorina melanocephala</i>	Noisy Minor	Observed