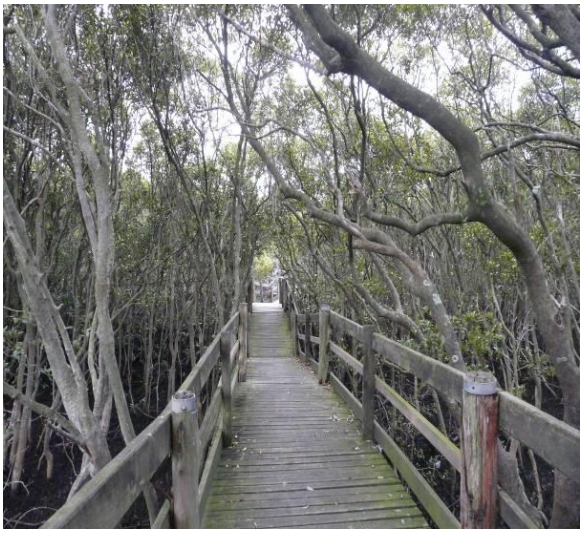
REVIEW OF NOISE, LIGHT & BIRD STRIKE POTENTIAL

Woolooware Bay Town Centre

Prepared for
Bluestone Property Solutions Pty Ltd

12 February 2013



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ITEM	DETAIL
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Contents

List of Figures

1 Introduction

This report has been prepared by Eco Logical Australia (ELA) at the request of Bluestone Property. It has been prepared in response to items raised under the Concept Plan Approval for the Woolooware Bay Town Centre. It focuses on management of noise and lighting to minimise impacts to sensitive ecosystems in the area. It also makes recommendations regarding potential 'bird strike'.

The proposed Woolooware Bay Town Centre is situated adjacent to mangroves fringing the bay. The position of the subject site relative to Towra Point Nature Reserve and Taren Point Shorebird Reserve is depicted in **Figure 1**. The mangroves and reserves provide habitat for threatened species such as *Myotis macropus* (Large-footed Myotis) and various migratory birds.

Figure 1: Regional context of subject site

2 Noise

The following comments are based on a review of the Retail Noise Impact Assessment by Acoustic Logic (24/1/2013).

2.1 ECOLOGICAL CONSIDERATIONS

Animals rely on meaningful sounds for communication, navigation, avoiding danger and finding food against a background of noise. The effects of noise on most species are poorly understood and fauna will perceive noise impacts differently (AMEC Americas Ltd 2005; Office of Planning, Environment & Realty[1]; Eco Logical Australia 2006). Some fauna become stressed by noise, which can affect foraging or breeding, or they may leave an area, whereas other species or populations do not seem to be affected or may adjust to noise over time.

As far as determining impacts to fauna, the nature of the noise (e.g. high or low pitch; sudden or continuous) needs to be considered as well as the 'loudness' (measured in dB(A)) because animals perceive noise differently to humans. For example, bats are more attuned to the high frequency band (e.g. metal on metal sounds), so may not be concerned by steady low pitch traffic noise (e.g. bats often inhabit road culverts). However, loud traffic noise may make it difficult for bats to hear prey, which can adversely affect foraging (Siemers & Schaub 2011). As another example, many bird species are more sensitive to sudden loud noises (e.g. dogs barking) rather than continuous noise or noise that builds and fades away (e.g. aircraft).

For the purposes of this discussion, sensitive ecological areas are identified as follows:

- The mangroves in the channel on the western side of the stadium and on the northern side of the proposed development
- Towra Point Nature Reserve, which is located more than 0.5 km away (**Figure 1**)

2.2 EXISTING NOISE

Acoustic Logic states that:

- Existing noise levels have been recorded at between 50-64 dB(A) adjacent Captain Cook Drive where the mangrove channel meets the road (next to the culvert) and at Towra Point (details of Towra Point monitoring not provided in the report)
- Noise levels at the mangroves on the northern side of the subject site have not been measured
- Examples of existing sources of noise that impact the adjacent mangroves and Towra Point have been approximated by Acoustic Logic in Table 14 (p.28) of their report and include boats, traffic noise, sporting events and aircraft noise

[1] http://www.fhwa.dot.gov/environment/noise/noise_effect_on_wildlife/effects/wild00.cfm

ELA notes that existing noise in close proximity to the mangroves would include sporting activities associated with training and games on the existing rugby field (location of proposed residential development), significant noise due to crowds etc during 'game day' at the Toyota Stadium and intermittent traffic parking noise on the eastern carpark (site of proposed retail facility). There would also be periods of relative quiet.

2.3 PREDICTED NOISE DURING CONSTRUCTION

Predicted construction noise levels at surrounding locations (including the adjacent mangroves and Towra Point) are presented in Table 15 (p.29) of the Acoustic Logic report. By comparing these predicted noise levels against existing noises (based on information in Table 14), it is expected that construction activities will result in higher than existing noise levels in areas of close proximity.

For example, existing noise at the adjacent mangroves during sporting events is approximately 65-70 dB(A) L_1. This would rise to 87 dB(A) when hydraulic hammers are being used at that site during construction, 81 dB(A) if they are used 20 m from the mangroves, and 50 dB(A) at Towra Point Nature Reserve (the closest part of the reserve is 500 m from the site – see **Figure 1**). The hammers would only be used for short periods (e.g. to remove the existing car park surface).

It is uncertain if an increase in construction noise will impact fauna at Woolooware Bay. However, it is unlikely that the bats would be affected by construction noise as long as significant noise occurs during daylight. Birds that forage in the mangroves are likely to move elsewhere around the bay during the construction period. Fauna inhabiting the Towra Point Nature Reserve are unlikely to be affected.

2.4 PREDICTED NOISE DURING OPERATION

Table 16 (p.30) of the Acoustic Logic report presents DECCW noise objectives to be complied with during future operation of the retail centre, cycleway and playground. If these levels are met then noise will be at or below current noise levels in the mangroves and at Towra Point. However, the nature of the noise (e.g. sudden loud noises) may adversely impact fauna.

Acoustic Logic indicates that proposed mechanical plant will be assessed at a later date. Based on experience with similar developments, Acoustic Logic advises that acoustic treatments are both possible and practical using acoustic treatments such as lining of ductwork, acoustic silences, variable speed controllers, time switches, acoustic screens etc.

2.5 RECOMMENDATIONS

Despite the uncertainty around the nature of noise likely to be experienced and the lack of understanding about how different fauna species may react to noise, we can state that the greatest risk of adverse impacts appears to be during the construction phase. It is recommended that construction noise be limited to daylight hours, so that peak fauna foraging periods at dawn, dusk and night-time are avoided, particularly when construction activity is in close proximity to the mangroves.

It is further recommended to the agencies, outside the scope of this development proposal, that further research be conducted to better understand the sensitivity of Australian fauna to noise.

3 Lighting

Lighting for the Town Centre is being designed by Haron Robson. This review focuses on potential ecological impacts associated with artificial lighting that will be installed along the edges of paths and boardwalks adjacent the riparian buffer of the mangroves and channel. Possible mitigation measures are identified.

3.1 BACKGROUND

Excessive lighting not only causes light pollution and wastes energy but also impacts on the natural environment by affecting the activity rhythms of both plants and animals (Outen 1998). The mangroves adjacent the proposed Town Centre provide habitat for nocturnal species such as bats, including the *Myotis macropus* (Large-footed Myotis) which is listed as vulnerable under the NSW *Threatened Species Conservation Act 1995*.

Bats are affected by artificial lighting because of the following reasons (Fure 2006, Jones 2000):

- Many species of bats are known to sample the light levels before emerging from their roost; only emerging for their night's hunting when the light intensity outside reaches a critical level after sunset (Swift 1980)
- Artificial lighting disrupts the normal 24-hour pattern of light and dark which is likely to affect the natural behaviour of bats. Light near a roost access point will delay bats from emerging and shorten the amount of time available to them for foraging
- Bright light may reduce social flight activity and cause bats to move away from the light area to an alternative dark area
- Illuminating a bat roost creates disturbance and may cause the bats to desert the roost
- Artificial lighting can also affect the feeding behaviour of bats. In most bat species there is an evening period of activity followed by another at dawn. These two flights correlate with the peak flight times of nocturnal insect prey. Insects are attracted to light particularly if it is a single light source in a dark area
- Artificial lighting can increase the chances of predation. It is believed that *Myotis* species shun bright light as a predator avoidance strategy

3.2 RECOMMENDATIONS

The following recommendations for lighting design aim to ensure public safety and amenity while minimizing adverse ecological impacts:

- Install lights along the side of the path which is opposite the mangroves rather than adjacent
- Install low bollards (1-2 m height) where possible, with post tops (4-5 m height) installed at key pedestrian junctions if required for public safety
- Utilise low pressure sodium lamps with UV filters
- Minimise the time during which the lighting is used
- Use lowest possible brightness
- Direct light below the horizontal plane towards the path and shield mangroves by fitting lights with hoods

- Do not illuminate bat roosts / mangroves
- Ensure that bat habitat/flyways are not cut-off by installation of light sources i.e. don't install lights on bridges across the channel or on boardwalks through the mangroves

4 Bird strike potential

4.1 BACKGROUND

A significant numbers of birds are killed or injured due to impact with windows on buildings, particularly when buildings are situated within migratory flight paths. Birds hit windows for three reasons:

- They don't see them as a barrier and attempt to fly through them
- They see habitat reflected in them and attempt to navigate to some point in the reflection
- They are attracted to lights on buildings at night and fly near to them

Complete or faceted reflective facades appear to be especially problematic.

4.2 MITIGATION MEASURES

The proposed design of buildings at the Woolooware Bay Town Centre seek to reduce potential for bird strike by having significant proportion of glazed surfaces on the northern façade setback and below covered awnings, dining areas etc. The glazed portions of the building façade comprise a small percentage of the overall building façade.

Further architectural measures that could be considered include:

- Prevention of direct sight paths through buildings
- Treatment of glass so that it appears visible to birds – there are a number of products that can achieve this so that patterns may or may not be visible to the human eye (e.g. Ornilux glass)

There is scope to change behaviour of future residents so that bird strike risks are reduced. Measures could include:

- Use of window furnishing (curtains, blinds etc)
- Minimising lights in buildings at night so that birds do not collide with unseen windows when chasing insects

Information regarding prevention of bird strike could be presented as part of an integrated environmental education brochure that highlights the amenity and ecological values of Woolooware Bay and surrounds, and states how these values can be protected (e.g. prevention of rubbish, weeds, trampling).

References

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