

23 June 2022

Strategic Programmes – Integrated Networks
Auckland Transport

Attention: Panmure Busway Bridge Avifauna Assessment

Scope

Beca Ltd has been engaged by Auckland Transport to undertake a review of publicly available information to determine the presence of native avifauna in proximity to the Panmure Busway bridge as well as any likely adverse ecological effects from the feature lighting beneath the bridge. This assessment has been instigated following concerns from residents about the potential impacts on local bird populations.

This report provides a summary of the avifauna species present and likely to be present, in proximity to the bridge to determine potential adverse effects of the feature lighting. The summary also includes recommendations to minimise any adverse ecological effects on birds.

Panmure Busway Bridge Lighting Design Overview

The ambient lighting of the access ramp and bridge deck as well as the accent lighting underneath the bridge provide functional lighting for pedestrian movement and highlights historical features of the bridge (Figure 1). All lighting consists of LED luminaires and is switched on/off via an astronomical timeclock.

The ambient lighting colour temperature is 3000K warm white, while the accent lighting is 4000K neutral white. The underneath bridge deck feature lighting is blue in colour to accentuate the white finish of the swing mechanism as well as to differentiate this area from the rest of the bridge lighting¹. The lights are illuminated between the hours of 9:00 PM – 5:30 AM.

The light spill extent of the accent lighting, which is defined as the horizontal lux levels > 1 lux , is mainly contained to within the footprint of the road bridge and extends approximately 2 – 4 m outside of the immediate bridge footprint (Figure 2). The lighting equipment uses monochromatic LED chips in static blue. The calculated lux levels of the blue lighting are generally 1.5 lux and lower.

¹ Beca. 2020. Swing Bridge Feature Lighting Design. Prepared for Auckland Transport.



Figure 1. Panmure Bridge lighting and accent lighting at night.

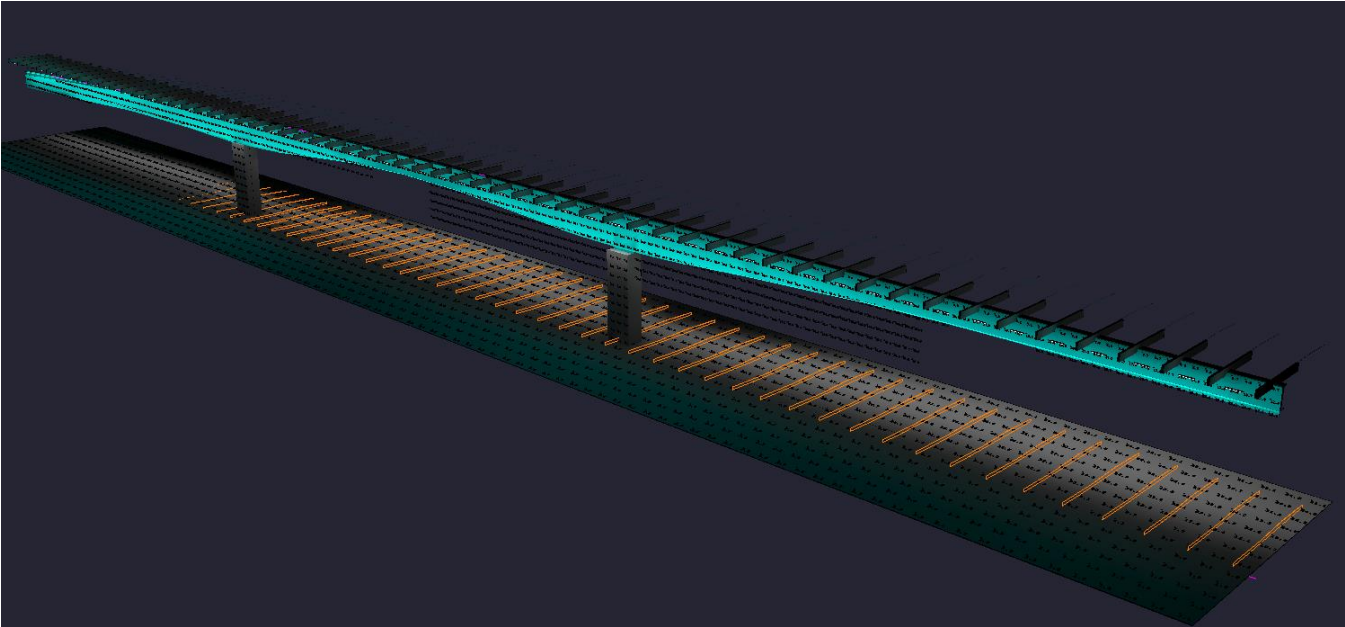


Figure 2. Calculated spill lighting extent indicates that the blue light extends approximately 2 – 4 m outside of the immediate bridge footprint.

Avifauna Assessment

A site visit was conducted on 17/06/2022 on an outgoing tide to identify bird species present, habitat features, and likely habitat used by birds within proximity to the bridge. The site survey included vantage point observations along the banks adjacent to the bridge with all birds seen or heard recorded during the site visit. A habitat assessment was also completed during the site visit noting vegetation, structures and landforms suitable for roosting, foraging and nesting of birds.

Suitable avifauna habitat within 100m of the busway bridge includes mature native and exotic trees along the true right and left banks (Figure 3), a narrow band of intertidal mudflats used for low-tide foraging by coastal waders while the creek channel itself provides high-tide fishing for other shorebird species. Dense mangrove forest and scrub were observed > 300 m from the Panmure Bridge (Figure 4) which supports foraging and refuges for cryptic wader species while both the road bridge and the new busway bridge structures themselves provide roosting and nesting habitat for gulls.

The utilisation of these features was verified during the site visit where several species of native avifauna were identified including kingfisher (*Todiramphus sanctus*) and pied shags (*Phalacrocorax varius*) within 100 m of the bridge, a white-faced heron (*Egretta novaehollandiae*) over 300 m, and away from the view of Panmure Bridge, several black-backed gulls (*Larus dominicanus*), and numerous, red-billed gulls (*Chroicocephalus novaehollandiae copulinus*) were observed roosting directly under the bridge and are known to nest here too. Most of these species make transient use of the foraging and roosting features present beneath and immediately adjacent to the bridge, while red-billed gulls (At Risk – Declining) have established nesting sites on the adjacent roadway bridge itself.



Figure 3. Typical bank-side vegetation on the north-east boundary of the Tāmaki River (photo taken 17/06/2022).



Figure 4. Mangrove forest and scrub habitat observed > 300 m and out of view of the Panmure Bridge (photo taken 17/06/2022).

Potential Impacts of Artificial Lighting on Avifauna

Artificial lighting at night (ALAN) is ubiquitous in the built environment and is essential for improving safety and visibility during the night. However, ecological light pollution (artificial lighting) is an emerging environmental issue and is known to have severe ecological impacts on a range of avifauna species. Specifically, ALAN is known to lead to disorientation and collision with illuminated objects – potentially due to the distraction and attraction caused by lights².

The new Panmure Bridge busway design has the additional accent blue lighting feature underneath the bridge, which did not previously exist on the old bridge. As such, the underneath area of the bridge is now illuminated each evening and into the early morning, whereas it would previously have remained dark. The species located within proximity to the Panmure Bridge and the lit environment around and underneath the bridge is mainly limited to pied shags, red-billed gulls, and black-backed gulls.

Currently, available literature suggests that increased lighting at night is proving advantageous to visual feeders, as it provides increased foraging opportunities due to increased visibility for a longer period. This behaviour has been observed in black-backed gulls, where increased available lighting at night allows them to feed on flying insects which are attracted to these lights³. This has also been seen in other species of gull including brown-hooded gull (*Larus maculipennis*) and Audouin's gull (*Ichthyaetus audouinii*)⁴. Pied shags mainly feed on fish and crustaceans and can dive to depths of 10 m. As such, the bridge lighting is unlikely to impact the foraging behaviours of pied shags due to the restricted extent of lighting and the large area of foraging habitat available within the wider coastal environment and adjacent Panmure Basin.

The main adverse ecological impact of concern is the effect of artificial lighting on the growth and development of fledglings, which are generally more attracted to the lights and can become disorientated and collide with illuminated objects. There is widespread research on this regarding Procellariidae species however, there remains little available research conducted on the impact of this on gull species in particular. Additionally, increased artificial lighting at night increases vulnerability to predation from visual predators and can result in higher rates of disturbance and energy expenditure on prey species as they attempt to remain concealed.

Recommendations

The following recommendations have been made to reduce the adverse ecological impacts of artificial lighting on avifauna species:

- Where bridge lighting (such as the accent lighting) is not deemed necessary and/or essential for the movement and safety of people, it should ideally be turned off/not in use to reduce light pollution in the area.
- Alternatively, reduction of lighting intensity and unnecessary light usage during peak fledgling season, for red-billed gull and black-backed gull (January to May) to reduce potential mortality and predation of fledglings nesting on or adjacent to the bridge.

At this stage, additional avifauna surveys and/or field surveys are not deemed necessary to make further assessments of the ecological impacts of the bridge lighting. Should lighting design, type, colour, and/or duration change following this report, then further surveying may be required.

² Adams, C.A., Fernández-Juricic, E., Bayne, E.M. *et al.* Effects of artificial light on bird movement and distribution: a systematic map. *Environ Evid* **10**, 37 (2021). <https://doi.org/10.1186/s13750-021-00246-8>

³ See 2

⁴ See 2

Overall, the impact of the Panmure Bridge lighting on marine and terrestrial avifauna species is considered to be low due to the low diversity of avifauna frequenting the area and the restricted extent of light spill.

Yours sincerely,

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