



M.J. & A.R. Bamford
CONSULTING ECOLOGISTS
23 Plover Way,
Kingsley, WA, 6026
ph: 08 9309 3671
em: bamford.consulting@iinet.net.au
ABN 84 926 103 081

Yanchep Rail Extension Part 2

Proposal for fauna crossings; response to the outcomes of workshop held on 7th March 2019

Purpose

The PTA is developing the Yanchep Rail Extension (YRE) Project as part of the Western Australian Government's METRONET vision. The YRE project consists of two proposals, the Yanchep Rail Extension Part 1 (YRE Part 1) which is a 7.3km extension from Butler Station to Eglinton and Yanchep Rail Extension Part 2 (YRE Part 2) which is a 7.2 km extension from Eglinton to Yanchep.

Concerns have been raised during the environmental assessment process regarding the potential impact of both YRE Part 1 and YRE Part 2 on fauna movements in the area. On 7 March 2019 the PTA held a workshop with EPA Services and M.J. and A.R. Bamford Consulting Ecologists (Bamford Consulting Ecologists) to discuss constraints and opportunities around fauna crossings for both YRE Part 1 and YRE Part 2. The main objective of the fauna crossings is to maintain fauna linkage.

This memo considers the suitability of the proposed PTA fauna crossing design criteria for the YRE Part 2 Proposal, as discussed in the 7 March 2019 workshop. YRE Part 2 passes through Ningana Bushland, recognised as a Bush Forever site. Concerns have been raised regarding the impact of on fauna movements in the area, and how these impacts might be addressed.

Background

Fauna crossings can consist of underpasses or overpasses and need to be well located and designed in order to be effective, with these factors and design issues considered at the workshop.

The initial risk and impact assessment undertaken for Yanchep Part 2 identified that the railway extension will fragment the Ningana Bushland and lead perhaps to the reduction in its overall carrying capacity for large fauna. A Yanchep Rail Extension Part 2 Fauna Desktop Study (Bamford Consulting Ecologists 2019a) was prepared to provide a revised species list to assess the likely value of fauna crossings in Ningana Bushland.

To provide additional information on fauna crossing design, the Yanchep Rail Extension Part 2 Fauna Underpass Assessment Statement (Bamford Consulting Ecologists 2019b) was prepared, in which no locations were found that indicated well defined fauna movement corridors along the YRE Part 2 route. This report noted that underpasses should be sited in

locations that link similar habitats and in landscape features such as valleys that may offer more shelter. The PTA considered this report and prepared a set of design criteria for fauna crossings (Attachment 1).

To overcome potential impacts to fauna, the PTA has proposed an underpass in the Southern portion of Ningana Bushland, and an overpass in the Northern portion of Ningana Bushland. At the 7 March workshop, it was noted that as YRE Part 2 is not yet at the final design stage, the final locations and detailed design for the proposed underpass and overpass are not able to be assessed. However, the PTA has proposed to implement a set of design criteria in the underpass and overpass design process.

Proposed YRE PTA design principles for fauna crossings

At the 7 March workshop, design issues were discussed, including:

- consideration of siting;
- limiting human access;
- height and width of the underpass;
- width of the overpass;
- provision of cover adjacent to and within each crossing whilst still allowing for passage of larger animals; and
- fencing to guide animals towards the crossings.

The outcome of this discussion was a memorandum (1st April 2019; Reference A4133414) which provides design principles for the underpass and overpass, based on previous recommendations in the two fauna reports for YRE Part 2 (Bamford Consulting Ecologists 2019a; 2019b). See Attachment 1 for the proposed PTA design principles.

Advice on suitability of the proposed PTA fauna crossing design principles

The PTA requested my advice on the suitability of the design principles, in terms of practicality and effectiveness. I have commented on each principle for the whole YRE alignment (including Part 1 and Part 2) in Attachment 1.

Recommended length, height and width are based on a review of crossing design prepared by Bamford Consulting Ecologists, although overpass width is less well-studied than underpass width.

Some features need to be refined once detailed design work is undertaken. These include:

- what sort of cover/shelter (plantings, logs, rock, brush) to provide within and at the ends of the crossings (this includes internal design of underpasses with a need for cover but also a need for an open run for larger species)
- investigation of the sorts of plants that may be able to be grown on an overpass to provide cover, and what would be needed to maintain these plants, and;
- the design of fencing intended to keep animals off the rail alignment and guide them towards the crossings.

Management and monitoring considerations will also need to be addressed once final design is undertaken; these were not discussed at the workshop. Potential considerations may

include management of usage by feral species, monitoring of usage by large fauna species (e.g. Western Grey Kangaroo and Emu) and monitoring of human usage.

For YRE Part 2 the application of the fauna crossing design principles should maximise the usefulness of the crossings for fauna and lay the foundation for detailed engineering plans.

M.J. Bamford

26th April 2019

References

Bamford Consulting Ecologists 2019a. Yanchep Rail Extension Part 2 Fauna Desktop Study. Report prepared for Public Transport Authority. 10 January 2019.

Bamford Consulting Ecologists 2019b. Yanchep Rail Extension Part 2 Fauna Underpass Statement. Report prepared for Public Transport Authority. 11 January 2019.

Attachment 1: Comments on suitability of PTA proposed YRE fauna crossing design principles

PTA Design Principle	Suitability comments
1. PTA provides two underpass crossings and one overpass along the YRE alignment	Will be useful for larger fauna species that might be at risk of mortality when crossing the rail, and/or for which fencing along the rail would be a barrier. Will maintain connectivity of populations in the bushland west of the alignment with larger populations to the east.
2. PTA design the underpass crossings to the minimum length (entry to entry) required for the above railway infrastructure and maintenance requirements to encourage more fauna usage (aiming to reduce from original estimates of 70m+ in length to 40m or less).	The shortest length possible is desirable, but 40m has been found to be used by a range of fauna species.
3. PTA to design the underpasses to encourage use by target fauna species, including height and width requirements. Height restrictions will allow fauna usage and discourage human usage, with the minimum height determined to be 1.2m. A minimum width of 2.4m was determined to allow for optimal usage by a wide range of fauna species.	The recommended minimum height and width have been determined from previous experience with a similar fauna assemblage.
4. PTA ensures underpass design includes plentiful shelter at entry and exits to reduce predation opportunities, including artificial shelter or vegetation. Shelter or furniture also to be provided within the underpass, such as recycled logs, rocks and leaf litter for smaller species such as reptiles and mammals.	Such shelter is critical for smaller species, but need not obstruct movement of larger species. Shelter is likely to need to be managed such as replacing plants and brush.
5. PTA design suitable flooring within the underpasses. Floors are required to be dry and suited to key target fauna species, i.e. clear passage for Western Grey Kangaroo usage is required.	The interior of the underpasses will need to provide dense cover (e.g. rocks, brush) for small species but a clear way for kangaroos and other large fauna. There may need to be some internal support framework to ensure that cover does not move and block the underpass.
6. PTA to install fencing to direct fauna to the underpass opening and prevent access to the railway.	This is essential. There are design criteria for this sort of fauna fencing including having a buried skirt and a height that will stop kangaroos. The mesh needs to be suitable to stop fauna and needs to be of a diameter that will not entrap larger lizards.
7. PTA to ensure the overpass is designed to discourage human usage through	Restricting human usage is likely to be difficult and

PTA Design Principle	Suitability comments
<p>entrance restrictions such as heavy vegetation which will not limit usage by target species.</p>	<p>therefore overpass may need to be designed assuming humans will use it. The important consideration may be to minimise disturbance of cover provided across the overpass.</p>
<p>8. PTA to ensure the overpass is designed with suitable gradient for usage by target fauna species and suitable vegetation to provide shelter, whilst not risking the structural integrity of the train passage below.</p>	<p>As low a gradient as possible is recommended; possibly the overpass will link one dune-top to another across the alignment. Research will be needed to determine what plant species (if any) can grow in shallow soil of the overpass, or if shelter can only be provided by rocks and brush.</p>
<p>9. PTA to ensure the overpass is designed to a suitable width to encourage usage by target fauna species. Minimum width was determined to be 3m, not including safety barriers.</p>	<p>The overpass will need some sort of barrier to prevent smaller species from falling off. The greatest width that is practical is recommended.</p>