

MEMORANDUM

Date	21 September 2017	Title	Lot 28 Lewis Rd, Wattle Grove - Bed and Banks Permit Application Report
Ref.	PHA17001/02	Distribution	Department of Water and Environmental Regulation
Authors	Kellie Bauer-Simpson Gabriela Martinez	Reviewer	Kellie Bauer-Simpson

Background

An area of Lot 28 Lewis Road, Wattle Grove (**Figure 1**) is proposed for the construction and operation of a building that will serve the purposes of a place of worship, a sanctuary and a community centre. A perennial stream, Yule Brook, flows through the property, and it is proposed that a formal crossing be constructed by installing a culvert, to enable vehicular access to the rear of the property, for both users of the facilities and emergency vehicles, should the need arise.

The proposed installation of a culvert and construction of a vehicular crossing over Yule Brook, within the development site constitutes interference with a waterway bed or bank, and therefore will require approval of a Bed and Banks Permit.

Peter Hunt Architect were engaged by the project team to design the building and assist with management of the project. On behalf of the proponent, Peter Hunt Architect commissioned Focused Vision Consulting Pty Ltd (FVC) to assist with preparation of a Bed and Banks Permit application.

The proposed disturbance footprint for installation of a culvert and construction of vehicular crossing over Yule Brook totals approximately 0.042 ha (402 m²) as presented in **Figure 2**.

This report provides information to support the Bed and Banks Permit application submitted, requesting approval to clear the native vegetation within the proposed footprint, and to undertake the construction that will interfere with the stream bed and banks.



0 10 20 30 40 m

GDA 94 / MGA Zone 50

**Figure 1 - Lot 28 Lewis Road,
Wattle Grove**



Legend



Lot Boundary



Maximum Footprint for Culvert

**FOCUSED
VISION**
consulting



0 2.5 5 7.5 10 m

GDA 94 / MGA Zone 50

Figure 2 - Impacted Native Vegetation



Legend

- Maximum Footprint for Culvert
- Corymbia calophylla*, 13 m tall, DBH <50 cm
- Corymbia calophylla*, 13 m tall, DBH 58.5 cm
- Kingia australis*, 1 mature plant

Methodology

The Department of Water and Environmental Regulation (DEWR) issues licences and permits under the *Rights in Water and Irrigation Act 1914* to:

- take water
- construct wells (including bores and soaks)
- interfere with the bed and banks of a watercourse.

An inspection of the study area was conducted by Principal Ecologist, Kellie Bauer-Simpson and Senior Botanist, Gabriela Martinez, on 31 August and again on 6 September 2017 to gather detailed information on current site conditions at the Yule Brook crossing, to assist with the preparation of a Bed and Banks Permit application (Form 3P). The inspections were made on foot, and included a focused assessment of the areas proposed for installation of a culvert and construction of a vehicular crossing over Yule Brook.

In order to obtain specific information to be provided with the Bed and Banks Permit application the following scope of works were undertaken:

- Record additional information about the site conditions, including water depth, bank stability, bank gradients, nature of the bed substrate, status of adjacent riparian vegetation and other observable features.
- Inspection of a nearby culvert of similar size and design to that which is proposed.
- Photographs to be taken to support the application.
- Liaise with the contractor/s regarding proposed design and construction methods for the culvert and crossing, sufficient to complete the application.

Engineering Design and Construction Proposed

The proposed installation of a culvert and construction of vehicular crossing over Yule Brook will comprise of a 3.5 m wide road with batters up to 9 m wide on each side, and a 1,800 mm diameter halcoil corrugated pipe, tapered to be longer on the base. The batters will be backfilled with local fill, stoned pitched and concreted in order to stabilise them. There is an existing culvert of identical design at a crossing of Yule Brook on a neighbouring property, as shown in **Plate 1**.



Plate 1: Existing culvert on neighbouring property

The concrete base with underlying pipe currently present on the creek bed will be removed with minimal excavation to level for stabilisation of the bed.

Aprons will be constructed on the ends of the culvert base (upstream and downstream edges of the culvert on the bed), where they fall on the stream bed, to prevent any dam or weir effect and erosion.

A small revegetation program is also planned as part of the project. Once the culvert is constructed, during a suitable season, some planting of native species (trees, shrubs and rushes/sedges) will be carried out, along with soil stabilization (mulch and/or matting), as and if appropriate.

Existing Site Conditions

Most of the Yule Brook catchment is highly modified. It has a diversity of urban uses such as light to medium industry and high-density residential developments, as well as agricultural uses such as horticulture and poultry. The hills suburb of Lesmurdie is located in the upper catchment. The steep section in the middle catchment on the Darling Scarp retains areas of heath vegetation, with pockets of wandoo, marri and jarrah forest, and includes Lesmurdie Falls National Park. Apart from this small area, little remnant vegetation remains in the catchment. The soils in the lower Yule Brook catchment are a combination of permeable Southern River sands and Guildford yellow, duplex soils. The upper catchment to the east consists of the sandy gravels, shallow red and yellow earths and rocky outcrops common on the Darling Scarp. In low lying areas, the drains of the Yule Brook catchment intercept the groundwater (Department of Water 2014).

The area on Lot 28 Lewis Road, proposed to be cleared for installation of a culvert and construction of vehicular crossing over Yule Brook supports no intact native vegetation, with just a few isolated native trees and shrubs on the west bank. The vegetation on the east bank comprises mainly introduced grasses and other weeds, including *Watsonia meriana*, *Plantago debilis*, *Trifolium* sp. and *Cenchrus clandestinum*, with non-endemic (planted) Lemon-scented Gums further up the bank (**Plate 2**).



Plate 2: Vegetation present at location proposed for culvert and vehicular crossing, with an eastern-facing view

The vegetation on the western bank comprises mainly of weeds and introduced grasses including:

- *Cenchrus clandestinum*
- *Ehrharta longiflora*
- *Gladiolus caryophyllaceus*
- *Oxalis pes-caprae*
- *Plantago debilis*
- *Poa annua*
- *Romulea rosea*
- *Trifolium* sp.
- *Watsonia meriana*.

On the west bank, there are two mature marri (*Corymbia calophylla*) trees present, in positions shown in **Figure 2**, which for both trees, is largely inside the clearing footprint (if not inside the impact zone, the trees' root systems would be compromised to the degree that their survival would be unlikely). These trees are both approximately 13 m tall, and the tree closest to the stream (on the far right in **Plate 3**) has a diameter at breast height (DBH) less than 50 cm. The other Marri tree within the proposed clearing footprint (positioned approximately in the centre of **Plate 3**) has a DBH of 58.5 cm. Given that this tree's DBH is greater than 50 cm, it is considered a habitat tree (potential future breeding tree) for Black-cockatoos. Neither tree supports any visible hollows.



Plate 3: Vegetation present at location proposed for culvert and vehicular crossing, with a western-facing view

Also visible in **Plate 3** (directly to the left of the large dead Eucalypt trunk) is a single, mature *Kingia australis*, and in the immediate foreground of this, a single, juvenile *Trymalium floribundum* shrub. Along with the two Marri trees, these plants comprise the only native species within the proposed clearing footprint necessary for the construction of the proposed culvert, in accordance with the current design.

At the proposed crossing site, soils are clay with lateritic gravel, and relatively stable. The stream width is approximately 3 m. The western bank gradient is approximately 10 degrees and the eastern approximately 30 degrees.

There is currently a concrete structure with underlying pipe on the bed of the creek at the existing crossing which will be removed prior to installation of the culvert and vehicular crossing (**Plate 4**). The downstream edge of this structure is creating a weir effect concentrating high velocity flows which are causing erosion in the creek bed. Additionally, the pipe is inadequate for winter stream volumes (**Plate 5**). Removal of this structure will benefit the integrity of the stream bed and maintaining stream flows.



Plate 4: Bed of creek showing concrete structure



Plate 5: Choked stream flows exiting the existing pipe

There is also some erosion present on the eastern bank resulting from vehicle access (**Plate 6**), and formalising a crossing over the brook will prevent any further such erosion.



Plate 6: Erosion from vehicle access on eastern bank

Conclusions

The planned culvert and vehicular crossing construction would impact no intact native vegetation, although would result in the loss of four individual native plants (one small and immature; *Trymalium floribundum*), including two mature Marri trees, one of which is considered a habitat (potential future breeding) tree for Threatened Black-cockatoos.

However, despite these negative impacts, the overall result of the proposed project would result in net positive impacts for the immediate Yule Brook environs, resulting from:

- improved natural stream flow velocities from removal of the piped concrete structure currently present on the bed
- cessation of bed erosion resulting from the weir effect on the downstream side of the existing concrete structure
- cessation of bank erosion from vehicular access on the banks and over the bed
- revegetation efforts planned to be invested following construction of the culvert and crossing.

Additionally, the crossing would formalize safe access for emergency vehicles (DFES) should it ever be required for fire-fighting efforts or other emergency response.

Closing

Should you require further information or clarification regarding the information provided in this report, please do not hesitate to contact the undersigned.

Best regards,

Kellie Bauer-Simpson

Director & Principal Ecologist/Environmental Manager

Focused Vision Consulting Pty Ltd

0408 766 346

kellie@focusedvision.com.au