

**1818 LAKES RD NORTH DANDALUP**  
**DETERMINATION OF FORESHORE SETBACK**

**Prepared for**

**Valley Holdings WA Pty Ltd**  
252 Fitzgerald St  
PERTH WA 6000

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## INTRODUCTION

Valley Holdings WA Pty Ltd proposes to rezone Lot A39 (No. 1818) Lakes Road, North Dandalup (the subject land) for rural-residential use. The rezoning is intended to facilitate the future subdivision of the 194.7ha property into approximately 120 lots with a minimum size of 1ha. Figure 1 shows the location of the subject land. Figure 2 shows an aerial photograph of the site and surroundings.

The North Dandalup River flows through the centre of the subject land. In accordance with WAPC Policy DC2.3, the river and its immediate surrounds will be protected in a foreshore reserve. Bayley Environmental Services was commissioned in March 2025 to determine an appropriate foreshore setback for the development.

Foreshore reserve requirements for waterways are governed by WAPC Development Control Policy No. DC2.3: *Public Open Space in Residential Areas*. DC2.3 specifies a default foreshore reserve width of 30 metres for waterways but includes provision to vary the default setback for reasons of topography, condition of banks, floodway protection or other factors. DPAW policy on foreshore setbacks is set out in River Restoration Series No. RR16 – *Determining Foreshore Reserves* (WRC, 2001) and Foreshore Policy 1 - *Identifying the Foreshore Area* (WRC, 2002). These documents also set out a methodology for determining the foreshore setback in each case. The assessment of the foreshore setback for the subject land presented in this report follows the methodology described in RR16.

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## **DETERMINATION OF FORESHORE SETBACK USING THE METHODOLOGY SET OUT IN RIVER RESTORATION SERIES 16**

### **Step 1: Background information and preliminary investigations**

#### *Waterway significance and management issues*

The North Dandalup River is a major tributary of the Murray River, which is the major river of the Peel Region. The North Dandalup River is significant in ecological, hydrological and amenity terms. The principal management issues facing the river are water quality, which has suffered as a result of nutrient inputs from development in its catchment, and the loss of riparian vegetation due to agricultural clearing and stock trampling in the lower reaches of the river.

The North Dandalup River was dammed by a small pipehead dam in 1971. The larger North Dandalup Dam was opened in 1995. The effect of the damming has been to significantly reduce flows from the upper catchment into the lower reaches of the river. The main North Dandalup Dam has not overflowed since its commissioning in 1995.

#### *Aerial photography*

Figures 1-3 show aerial photographs of the river within the subject land.

*Maps of extent of floodway and floodplains, topographical features, cadastral boundaries, soils, underlying geology and vegetation complexes.*

These features are shown on Figure 3.

#### *Relevant reports on the river and region*

The Murray Drainage and Water Management Plan (DWMP) (DoW, 2011) presented the results of stream gauging and flood modelling for the North Dandalup River. The Floodplain Management Strategy (GHD, 2010) undertaken for the DWMP concluded that the North Dandalup Dam would not overflow in any storm event less than 500-year ARI, and that the upper catchment would therefore not contribute to flood levels in the lower reaches of the river.

#### *Site Visit*

A detailed inspection of the river within the subject land was carried out in April 2025. Figure 4 shows photographs of the river and its fringing vegetation.

#### *Relevant stakeholders*

Lot 39 Lakes Rd is owned by Mr Bruce Campbell. Valley Holdings WA Pty Ltd is negotiating to purchase the subject land and is the proponent of the development plan.

## **Step 2: Biophysical criteria of the waterway**

### *Floodway and floodplain – 1 in 100 yr flood levels, peak flow and river hydrology*

The main channel of the river through the subject land is mostly well defined and deeply incised. In the north the banks are relatively gentle, with slopes of around 30%. In the south the watercourse is more deeply incised, with banks up to 4m high and in places nearly vertical.

The Department of Water (DoW) mapped the 100-year floodplain of the North Dandalup River in 2011 as part of the Murray DWMP. Figure 3 shows the DoW floodplain mapping. The DoW study did not differentiate the floodway from the flood fringe. The DoW modelling predicted that the 100-year ARI flood level would be 26.25m AHD at Lakes Road, 25m AHD at the eastern boundary of the subject land and 19.5m AHD at the south-western boundary.

Pentium (2025) modelled the extent of the 100-year floodway using XPSWMM in July 2025. In essence, the modelling simulates filling of the floodplain to the point where the filling obstructs the 100-year flow sufficiently to cause an increase of 0.2m in river levels upstream. The remaining “unfilled” part of the floodplain is designated as the floodway and the region outside of this is designated as the flood fringe.

In this case, the modelling focussed on those sections within the subject land where the floodplain impinged on developable land. Elsewhere, the modelling went only so far as to show that the floodway was wholly contained within the proposed foreshore reserve. As a result, the modelling over-estimates the extent of the floodway in some parts of the subject land.

Figure 3 shows the boundaries of the floodway resulting from the Pentium (2025) modelling.

### *Landforms and drainage lines important to watercourse function*

The river bed falls from an elevation of about 22.5m AHD at the north-eastern boundary of the subject land to about 16.5m AHD at the south-western boundary. The top of the bank falls from about 24.5m AHD to 19m AHD over the same distance. Away from the river, the land rises gently to the north-west and south-east at gradients of between about 3% and less than 0.2%

Two main tributaries enter the river within the subject land. The first is a creekline that rises adjacent to the South Western Highway 3.5km east of the subject land and joins the river just south of the centre of the subject land. Calculations using the rational method indicate that the critical (2-3 hour) 100-year ARI storm would generate peak flows of approximately 21m<sup>3</sup>/sec in this tributary at its entry to the subject land.

The second tributary is a minor creek that rises in farm paddocks 1.5km to the east and joins the river just before its exit from the subject land. Rational method calculations

suggest that a critical (50 minute) 100-year ARI storm would generate a peak flow of approximately 4.5m<sup>3</sup>/sec in this tributary at its entry to the subject land.

The junctions of these tributaries are complex, with multiple channels and overflows. Other minor paddock drains flow into the river from the north-west. Figure 3 shows the tributaries.

#### *Soil types prone to erosion*

The North Dandalup River follows a meandering course within the subject land. The river is undercutting its banks on the outside of several bends and depositing sediment on the insides of the bends. The soils surrounding the river channel are light, friable silts and sandy clays, which are easily eroded by the water flow. In the south of the subject land there are a number of cut-off meanders that show where the river has changed its course over time.

Landgate aerial photography since 1974 shows that the alignment of the watercourse within and near the subject land has not changed significantly in that time ([www.landgate.wa.gov.au/corporate.nsf/web/Aerial+Photography](http://www.landgate.wa.gov.au/corporate.nsf/web/Aerial+Photography)). However, the visible undercutting on some parts of the bank suggests that it would be prudent to allow for some movement of the channel over time.

#### *Soils that support riparian vegetation*

The Geological Survey of Western Australia (GSWA, 1978) maps the North Dandalup River bed as Qha: Holocene Alluvium, with soils of Clayey Sandy Silt (Msc1). Away from the immediate vicinity of the river the GSWA maps the land as Qpb/Qpa: Thin veneer of Bassendean Sand over Guildford Formation sandy clay.

#### *Riparian vegetation*

The riparian vegetation in the subject land is mostly restricted to the banks and flats of the river, with the remainder of the subject land being mostly cleared. In the northern half of the subject land, the native fringing vegetation extends to between a few metres and 60m from the main river channel. In the south, the main channel and tributaries form a network of channels and billabongs, and the fringing vegetation forms a patchy band up to 300m wide.

The native fringing vegetation consists mostly of mature Marri (*Corymbia calophylla*), Flooded Gum (*Eucalyptus rudis*) and Swamp Paperbark (*Melaleuca raphiophylla*) over bare ground, pasture grasses and weeds. Occasional *Astartea ?fascicularis*, *Acacia ?cyanophylla* and sedges (*Juncus sp.*) occur in the watercourse but there is otherwise little native understorey or mid storey due to heavy cattle grazing and trampling. A number of weeds including Asian Bulrush (*Typha orientalis*), Narrow-leaf Cottonbush (*Gomphocarpus fruticosus*), Kikuyu (*Pennisetum clandestinum*), Couch Grass (*Cynodon dactylon*) and Veldt Grass (*Ehrharta sp.*) are also present in the watercourse. Near the centre of the subject land on the southern side of the channel is a patch of planted eucalypts, probably Bluegum (*E. globulus*). There is also a small number of Wandoo (*E. wandoo*) in this area, which may be naturally occurring or planted.

The overall condition of the vegetation is Degraded to Completely Degraded. Figure 4 shows views of the river and its fringing vegetation.

The riparian vegetation in the vicinity of the subject land is mapped by Heddle *et al.* (1980) as 32: Guildford Complex, described as "...a mixture of open-forest, in sections a tall open-forest, of marri-wandoo-jarra and a woodland of *E. rudis*-*M. raphiophylla* along the streams..." Heddle *et al.* (1980) noted that the Guildford Complex has been heavily logged and cleared since European settlement due to its fertile soils and good water availability, with the result that little of the complex remains undisturbed. In 1997, when the Peel Region Scheme Environmental Review was being prepared, approximately 4.2% of the Guildford Complex remained in the Peel Region and only 0.02% was reserved.

The riverine vegetation of the North Dandalup River, including that within the subject land, has been mapped as a Regionally Significant Natural Area under the *Swan Bioplan: Peel Regionally Significant Natural Areas* (EPA Bulletin EPB12, December 2010). This designation has no statutory force but indicates the EPA's view of the vegetation as regionally significant.

#### *Habitat areas*

The watercourse and fringing vegetation offer limited habitat for disturbance-tolerant birds and terrestrial fauna. Kangaroos were observed in the fringing woodland during the site inspection. The lack of dense understorey means that small mammals such as Quenda would be unlikely to persist in the area. Birds observed during the site inspection included magpies, ravens, willie wagtails, honeyeaters, thornbills and twenty-eight parrots. No black cockatoos were seen or heard, although the marri trees near the watercourse would probably be used as a food resource.

#### *Adjacent land use with potential to affect the foreshore*

The current grazing land use on the subject land has had significant impacts on the river, including clearing of fringing vegetation, trampling and bank erosion. In places the river banks are severely eroded by cattle accessing the river. This erosion is ongoing.

Development of the subject land as planned will benefit the river by removing the impact of cattle and allowing native vegetation to regenerate, thereby helping to stabilise the river banks. Development will also provide opportunities for rehabilitation of degraded parts of the foreshore.

#### *Aboriginal Heritage Sites*

The watercourse of the North Dandalup River is listed on the DPLH Aboriginal Heritage Database as registered Aboriginal heritage site No. 27937: Mythological. The mapped site extends 30m each side of the centreline of the watercourse and is associated with the Waugyl mythology. Figure 3 shows the mapped boundaries of the Aboriginal site.

Authorisation under Section 18 of the Aboriginal Heritage Act will be required for any physical work or ground disturbing activities within the boundaries of the registered site.

### **Step 3: Other factors**

#### *Fire Management*

The vegetation in the foreshore zone currently presents a low fire hazard due to the absence of heavy understorey or middle storey vegetation. With the removal of grazing there could be increased growth of grasses and weeds, which could pose an increased fire risk unless it were managed. Therefore, weed control, removal or mowing of grasses and/or replacement with native low understorey species will be required to manage the fire hazard.

#### *Risks and consequences resulting from the proposed foreshore alignment*

The principal consequence of establishing a foreshore reserve in this location will be the opportunity to undertake rehabilitation of the foreshore. This will improve the ecological value of the foreshore as well as providing increased social amenity.

The main risk in the proposed alignment is the possibility of flooding above the modelled 100 year flood level, which could affect development outside the foreshore setback. However, any buildings within the flood fringe will have a floor level at least 0.5m above the modelled 100-year flood level so the risk of property damage is low.

### **Step 4: Finalisation of the alignment**

#### *Rationale for the alignment*

The key factors in the delineation of the foreshore setback are:

- Compliance with policy - The WAPC's Development Control Policy 2.3 specifies a default minimum setback of 30m from waterways. The foreshore reserve extends between 30m and 265m from the top of the river bank.
- 100 year floodway - The proposed foreshore reserve encompasses the entire 1-year ARI floodplain of the river, as modelled by Pentium (2025).
- Vegetation - The foreshore setback includes all remaining riparian vegetation. It also includes all of the riverine fringing vegetation mapped as Peel Regionally Significant Natural Area (RSNA).
- Shoreline processes - The foreshore setback is sufficiently wide to accommodate anticipated variations in the alignment of the watercourse, including undercutting of the outside of bends in the foreseeable future.
- Aboriginal heritage - The registered Aboriginal heritage site no. 27937 extends 30m each side of the river banks. The Aboriginal site is within the minimum default 30m foreshore reserve.

*Map of Foreshore Setback*

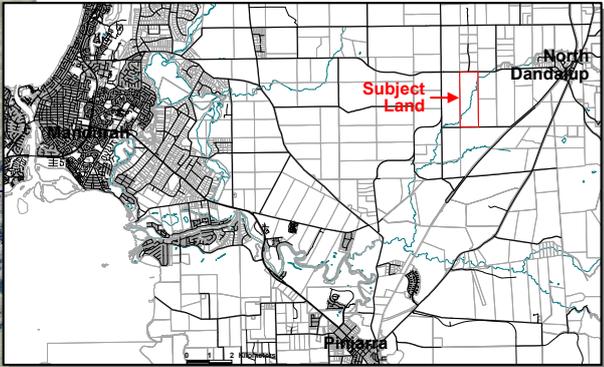
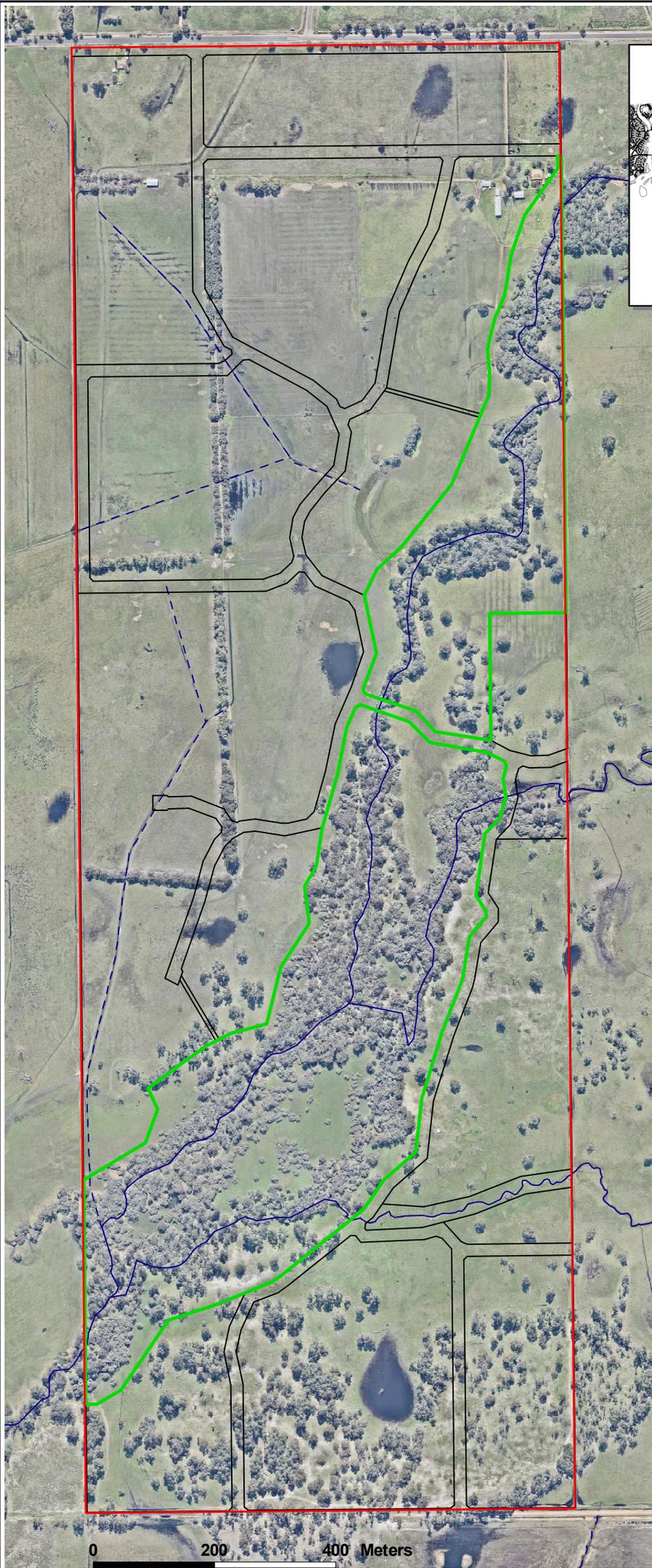
Figure 1 shows the proposed boundary of the foreshore reserve.

**FORESHORE TENURE AND MANAGEMENT**

The river and foreshore within the subject land are currently privately owned and zoned rural under both the Shire of Murray Town Planning Scheme (TPS) and the Peel Region Scheme (PRS). With the rezoning and subdivision of the subject land, the river and foreshore reserve are expected to be ceded as Public Open Space to the Shire.

A condition of subdivision approval is expected to be the preparation of a Foreshore Management Plan to address rehabilitation, completion criteria and ongoing management of the foreshore reserve. Once the rehabilitation works set out in the Foreshore Management Plan have been completed and the agreed completion criteria have been achieved, the foreshore reserve will be handed over to the Shire of Murray, to be managed primarily for conservation.

# Figures



- Subject land boundary
- Conceptual road alignment
- Watercourse
- - - Paddock drain
- Proposed foreshore reserve

Figure 1

LOCATION AND LAYOUT



599 m

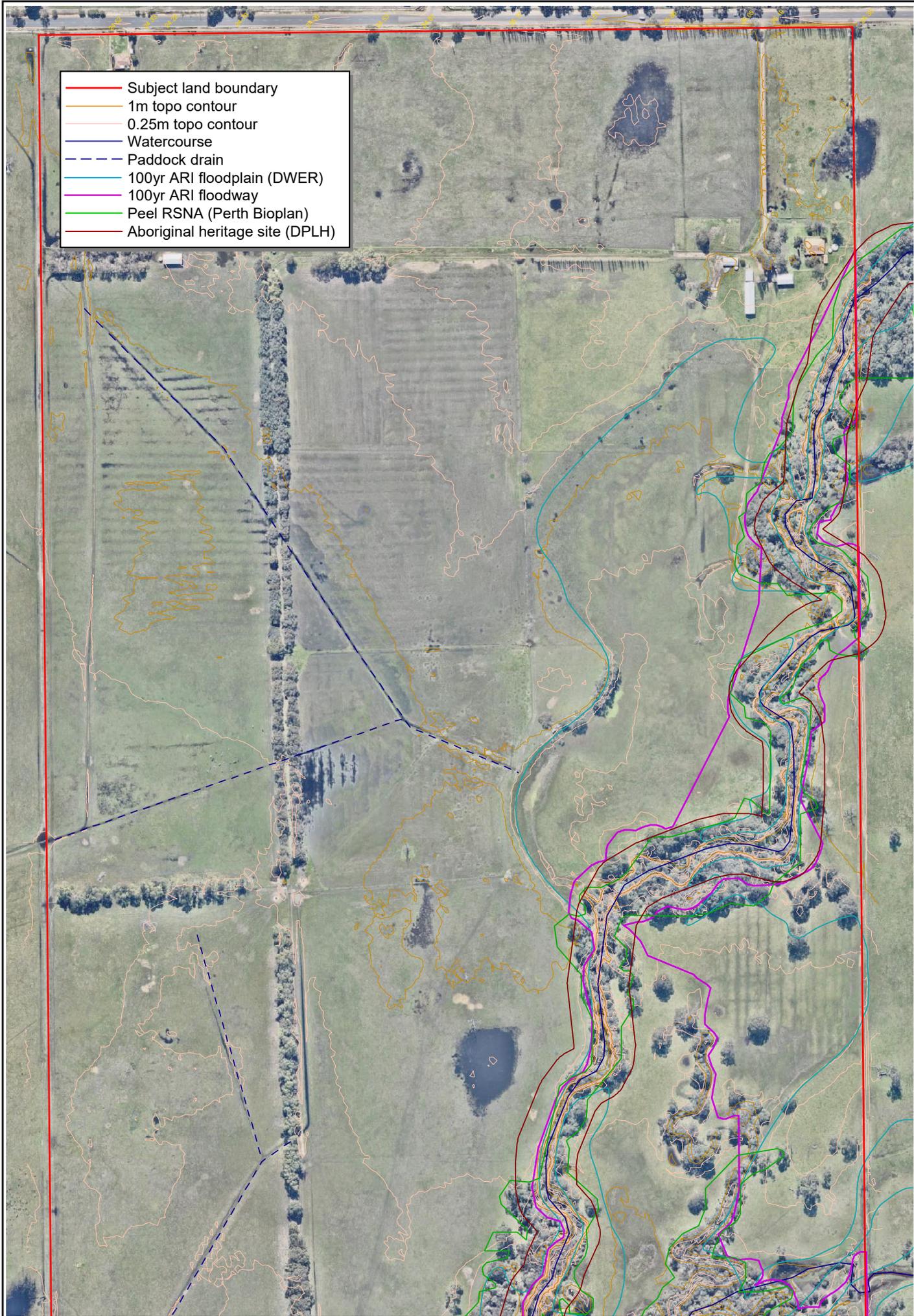
Image Landsat / Copernicus  
Image © 2025 Airbus  
Image © 2025 Vexcel Imaging US, Inc.  
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Google Earth

Figure 2

THE SITE AND SURROUNDINGS

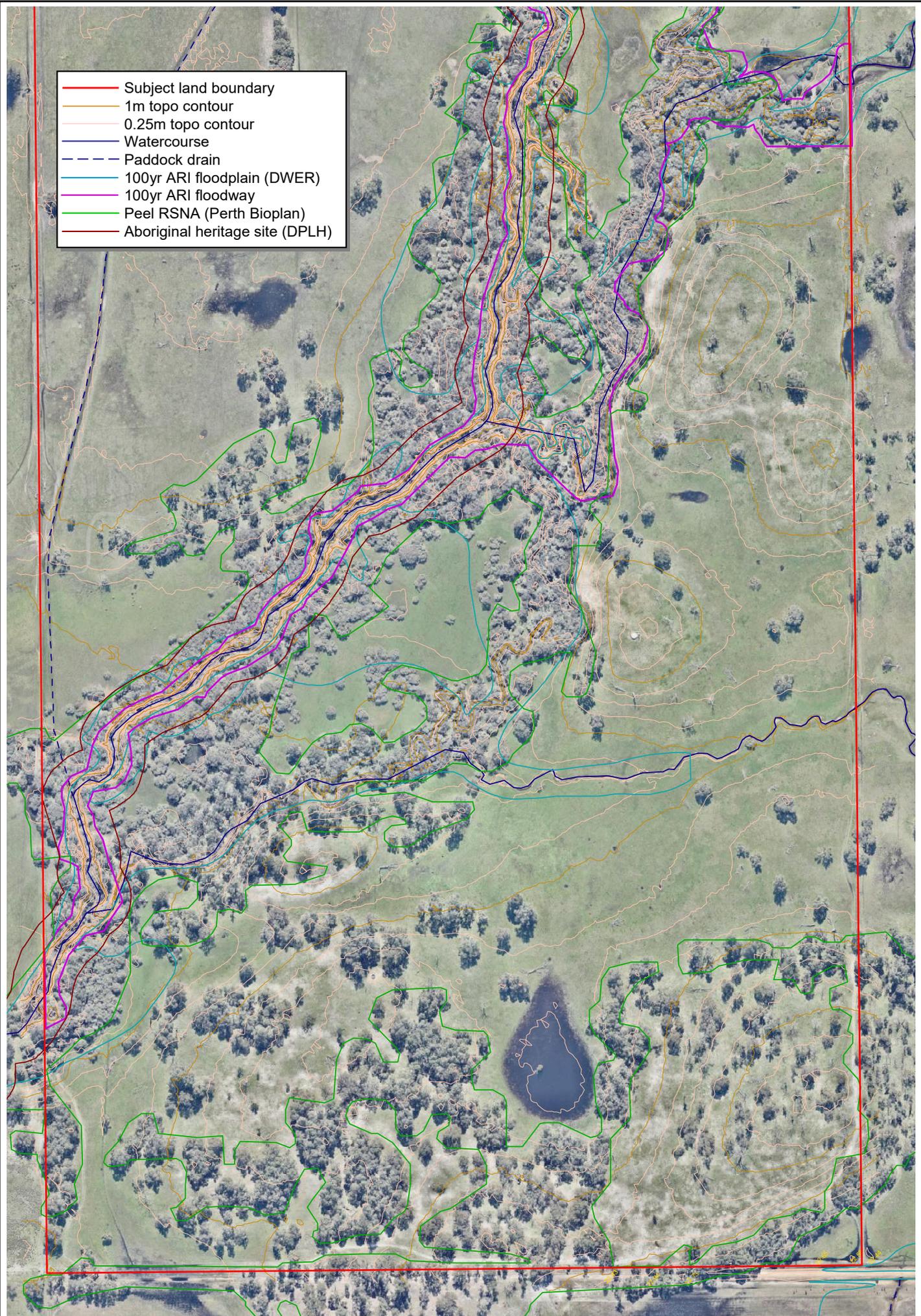




- Subject land boundary
- 1m topo contour
- 0.25m topo contour
- Watercourse
- - - Paddock drain
- 100yr ARI floodplain (DWER)
- 100yr ARI floodway
- Peel RSNA (Perth Bioplan)
- Aboriginal heritage site (DPLH)

0 100 Meters

Figure 3a



- Subject land boundary
- 1m topo contour
- 0.25m topo contour
- Watercourse
- Paddock drain
- 100yr ARI floodplain (DWER)
- 100yr ARI floodway
- Peel RSNA (Perth Bioplan)
- Aboriginal heritage site (DPLH)

0 100 Meters

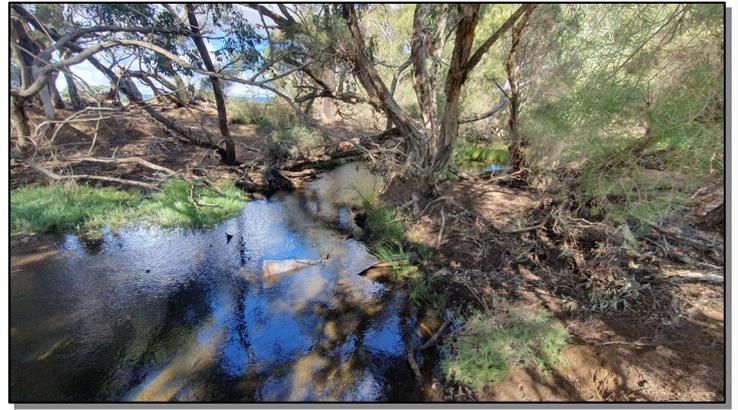
Figure 3b

ENVIRONMENTAL FEATURES





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105



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109



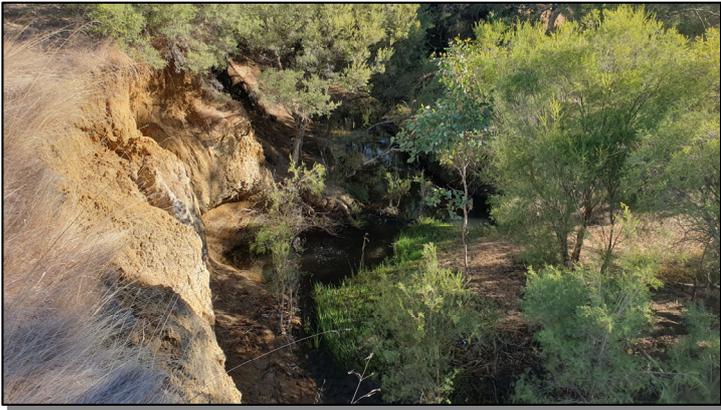
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116

See Figure 4c for photo locations

Figure 4a  
WATERCOURSE  
PHOTOGRAPHS



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126



132



134



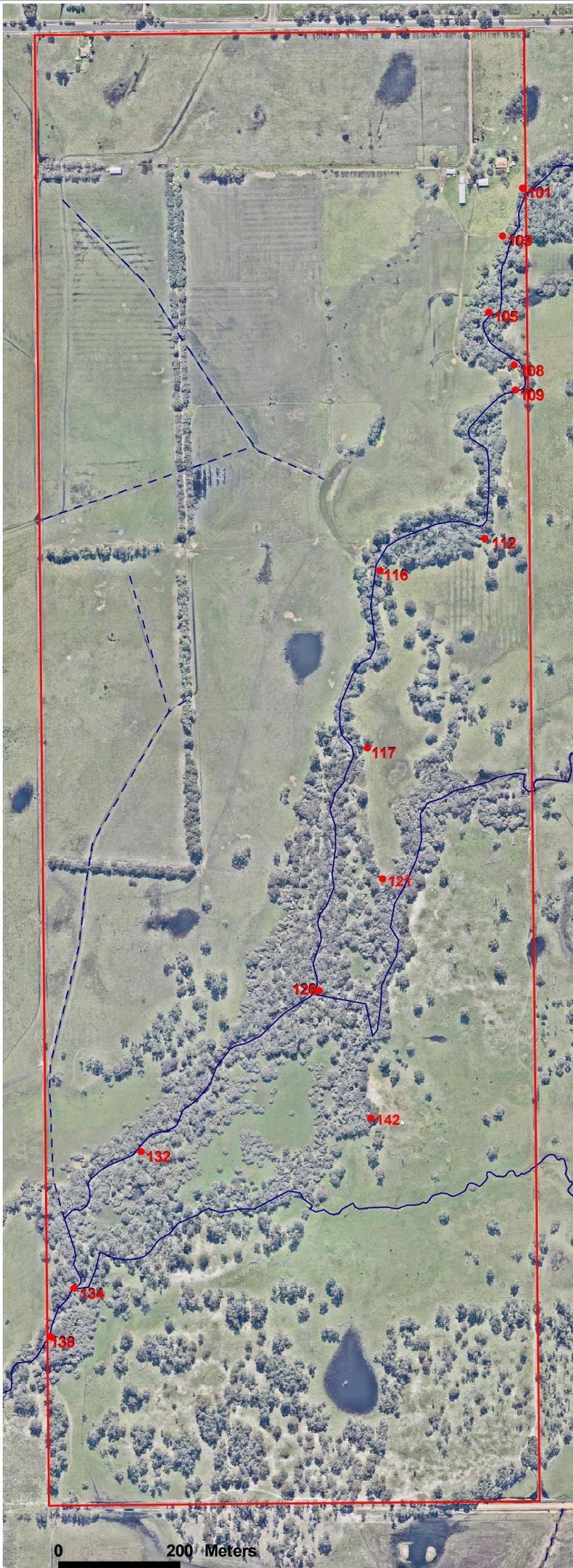
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See Figure 4c for photo locations

Figure 4b  
WATERCOURSE  
PHOTOGRAPHS



- Subject land boundary
- Photo point (see Figures 4a & 4b)

Figure 4c

**WATERCOURSE  
PHOTOGRAPHS**