



## CLEARING PERMIT

*Granted under section 51E of the Environmental Protection Act 1986*

<b>Purpose Permit number:</b>	CPS 9946/1
<b>Permit Holder:</b>	City of Canning
<b>Duration of Permit:</b>	From 19 August 2023 to 19 August 2033

The permit holder is authorised to clear *native vegetation* subject to the following conditions of this permit.

### **PART I – CLEARING AUTHORISED**

#### **1. Clearing authorised (purpose)**

The permit holder is authorised to clear *native vegetation* for the purpose of removal of *Typha orientalis*.

#### **2. Land on which clearing is to be done**

Lot 8 on Diagram 15245, Wilson  
Lot 1 on Plan 2936, Cannington  
Lot 14 on Plan 2936, Cannington  
Lot 5 on Plan 2936, Cannington  
Lot 3 on Plan 2936, Cannington  
Lot 11 on Plan 2936, Cannington  
Lot 2 on Plan 2936, Cannington  
Lot 54 on Plan 10806, Ferndale  
Lot 55 on Plan 10797, Ferndale  
Lot 172 on Plan 11200, Parkwood  
Lot 506 on Plan 16216, Parkwood  
Lot 5069 on Diagram 67653, Parkwood  
Lot 2 on Diagram 53768, Ferndale  
Lot 1 on Plan 7430, Lynwood  
Lot 51 on Deposited Plan 24362, East Cannington  
Lot 50 on Deposited Plan 24362, East Cannington  
Lot 4991 on Deposited Plan 37864, Parkwood  
Lot 0 on Diagram 1258, Queens Park  
Lot 103 On Diagram 66838, Willetton  
Lot 104 on Diagram 66838, Willetton  
Bridge Street, Road Reserve (PIN 11803420), Wilson  
Metcalf Road, Road Reserve (PIN 11809600), Ferndale  
Alyxia Place, Road Reserve (PIN 11806810), Ferndale  
Iveston Road, Road Reserve (PIN 11809602), Lynwood

**3. Clearing authorised**

The permit holder must not clear more than 0.79 hectares of *native vegetation* within the area cross-hatched yellow in Figures 1-14 of Schedule 1.

**4. Period during which clearing is authorised**

The permit holder must not clear any *native vegetation* after 19 August 2033.

**PART II – MANAGEMENT CONDITIONS**

**5. Avoid, minimise, and reduce impacts and extent of clearing**

In determining the *native vegetation* authorised to be cleared under this permit, the permit holder must apply the following principles, set out in descending order of preference:

- (a) avoid the clearing of *native vegetation*;
- (b) minimise the amount of *native vegetation* to be cleared; and
- (c) reduce the impact of clearing on any environmental value.

**6. Weed and dieback management**

When undertaking any clearing authorised under this permit, the permit holder must take the following measures to minimise the risk of introduction and spread of *weeds* and *dieback*:

- (a) clean earth-moving machinery of soil and vegetation prior to entering and leaving the area to be cleared;
- (b) ensure that no known *dieback* or *weed*-affected soil, *mulch*, *fill*, or other material is brought into the area to be cleared; and
- (c) restrict the movement of machines and other vehicles to the limits of the areas to be cleared.

**7. Directional clearing**

The permit holder must:

- (a) conduct clearing activities in a slow, progressive manner towards adjacent *native vegetation*; and
- (b) allow a reasonable time for fauna present within the area being cleared to move into adjacent *native vegetation* ahead of the clearing activity.

**8. Fauna Management**

- (a) Prior to undertaking any clearing authorised under this permit, the permit holder must inspect the area authorised to be cleared under this permit prior to works commencing and for the duration of clearing for any native fauna that may be present.
- (b) Where fauna have been identified under condition 8(a), works must cease until the fauna have escaped into adjacent habitat ahead of the clearing activity or translocated into adjacent *native vegetation*.



## 9. Weed Management – Chemical

The permit holder must only undertake spot spraying of Glyphosate solution during the driest period of the year and during calm conditions.

## PART III - RECORD KEEPING AND REPORTING

### 10. Records that must be kept

The permit holder must maintain records relating to the listed relevant matters in accordance with the specifications detailed in Table 1.

**Table 1: Records that must be kept**

No.	Relevant matter	Specifications
1.	In relation to the authorised clearing activities generally	<ul style="list-style-type: none"><li>(a) the species composition, structure, and density of the cleared area;</li><li>(b) the location where the clearing occurred, recorded using a Global Positioning System (GPS) unit set to Geocentric Datum Australia 2020 (GDA2020), expressing the geographical coordinates in Eastings and Northings;</li><li>(c) the date that the area was cleared;</li><li>(d) direction of clearing;</li><li>(e) the size of the area cleared (in hectares);</li><li>(f) actions taken to avoid, minimise, and reduce the impacts and extent of clearing in accordance with condition 5;</li><li>(g) actions taken to minimise the risk of the introduction and spread of <i>weeds</i> and <i>dieback</i> in accordance with condition 6.</li><li>(h) Fauna management actions undertaken in accordance with condition 8</li><li>(i) The date that chemical weed control occurred in accordance with condition 9</li></ul>

### 11. Reporting

The permit holder must provide to the *CEO* the records required under condition 10 of this permit when requested by the *CEO*.

## DEFINITIONS

In this permit, the terms in Table have the meanings defined.

**Table 2: Definitions**

Term	Definition
CEO	Chief Executive Officer of the department responsible for the administration of the clearing provisions under the <i>Environmental</i>

Term	Definition
	<i>Protection Act 1986.</i>
clearing	has the meaning given under section 3(1) of the EP Act.
condition	a condition to which this clearing permit is subject under section 51H of the EP Act.
dieback	means the effect of <i>Phytophthora</i> species on native vegetation.
department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> (WA) and designated as responsible for the administration of the EP Act, which includes Part V Division 3.
EP Act	<i>Environmental Protection Act 1986</i> (WA)
fill	means material used to increase the ground level, or to fill a depression.
mulch	means the use of organic matter, wood chips or rocks to slow the movement of water across the soil surface and to reduce evaporation.
native vegetation	has the meaning given under section 3(1) and section 51A of the EP Act.
weeds	means any plant – <ul style="list-style-type: none"> <li>(a) that is a declared pest under section 22 of the <i>Biosecurity and Agriculture Management Act 2007</i>; or</li> <li>(b) published in a Department of Biodiversity, Conservation and Attractions species-led ecological impact and invasiveness ranking summary, regardless of ranking; or</li> <li>(c) not indigenous to the area concerned.</li> </ul>

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**END OF CONDITIONS**




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Mathew Gannaway  
MANAGER  
NATIVE VEGETATION REGULATION

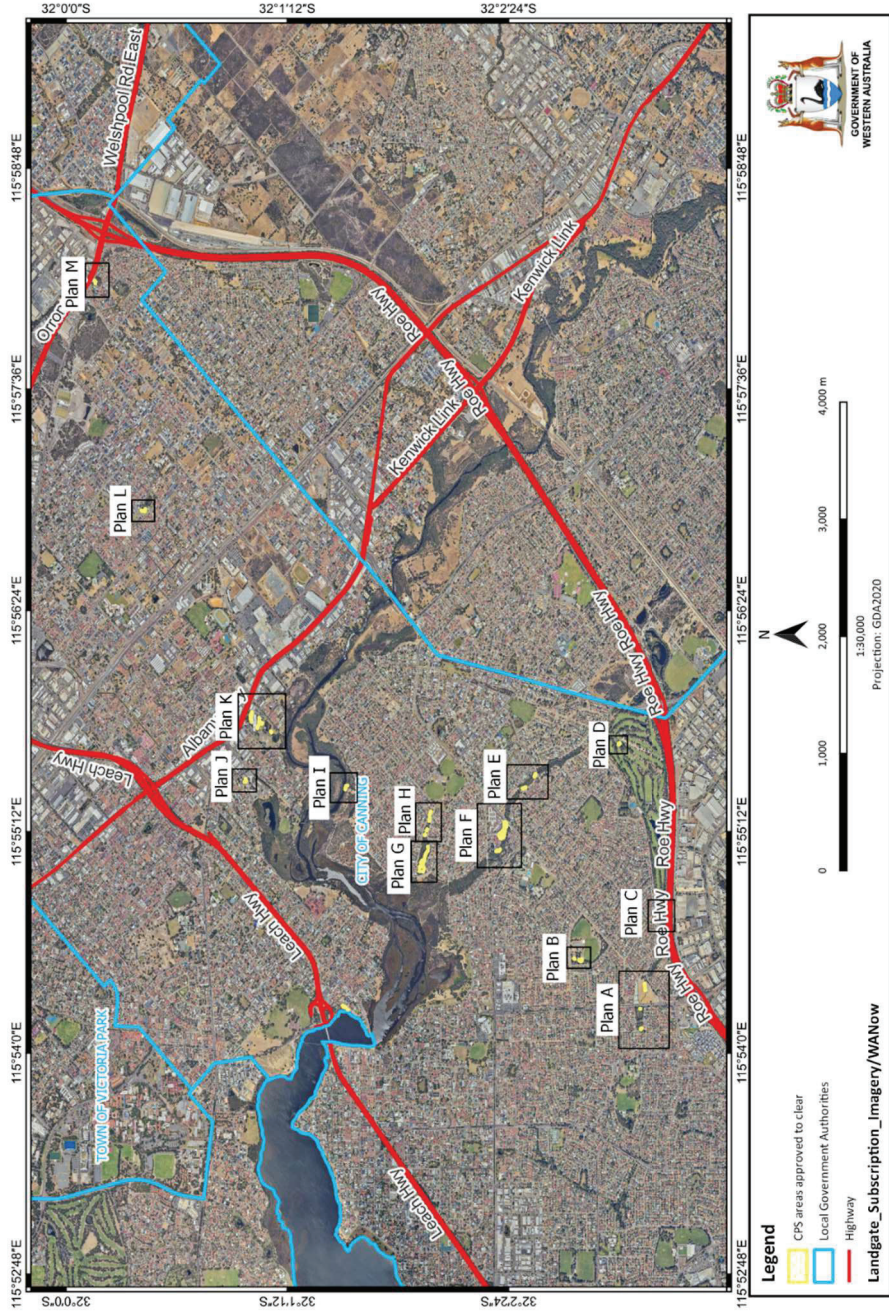
*Officer delegated under Section 20  
of the Environmental Protection Act 1986*

26 July 2023

# Schedule 1 Plan 9946/1

The boundary of the area authorised to be cleared is shown in the map below (Figure 1-14).

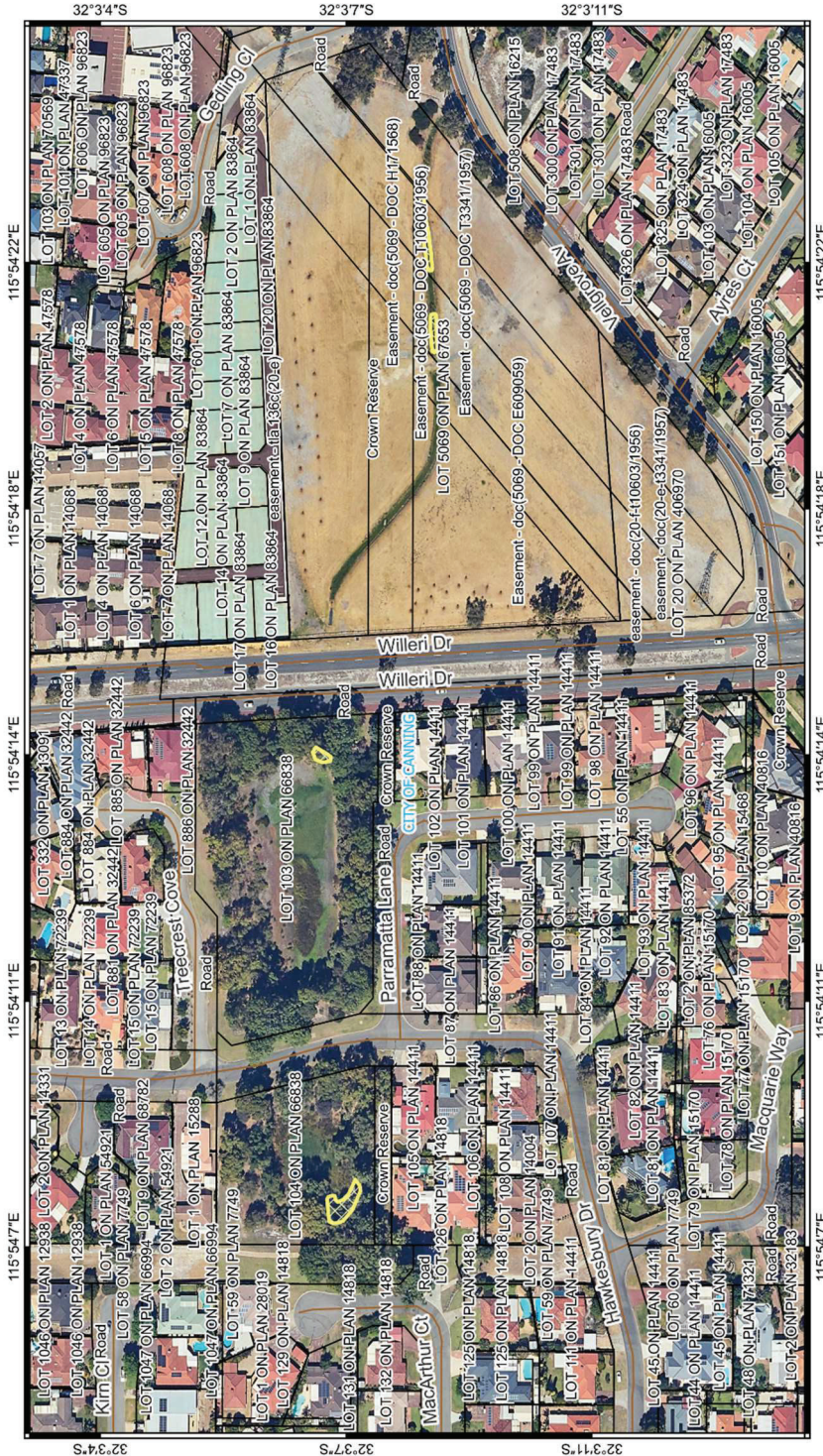
## CPS 9946/1 - Context Map



**Figure 1: Context Map of the boundary of the area within which clearing may occur**



# CPS 9946/1 - Plan A



**Legend**

- CPS areas approved to clear
- Land Tenure (LGATE\_226) - SLIP
- Local Government Authorities
- Local Rd - Stalled

Scale: 0, 50, 100, 150, 200 m  
 1:1,500  
 Projection: GDA2020

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**Figure 2: Map of the boundary of the area within which clearing may occur**



# CPS 9946/1 - Plan B



Figure 3: Map of the boundary of the area within which clearing may occur



# CPS 9946/1 - Plan C



Figure 4: Map of the boundary of the area within which clearing may occur



# CPS 9946/1 - Plan D



Figure 5: Map of the boundary of the area within which clearing may occur



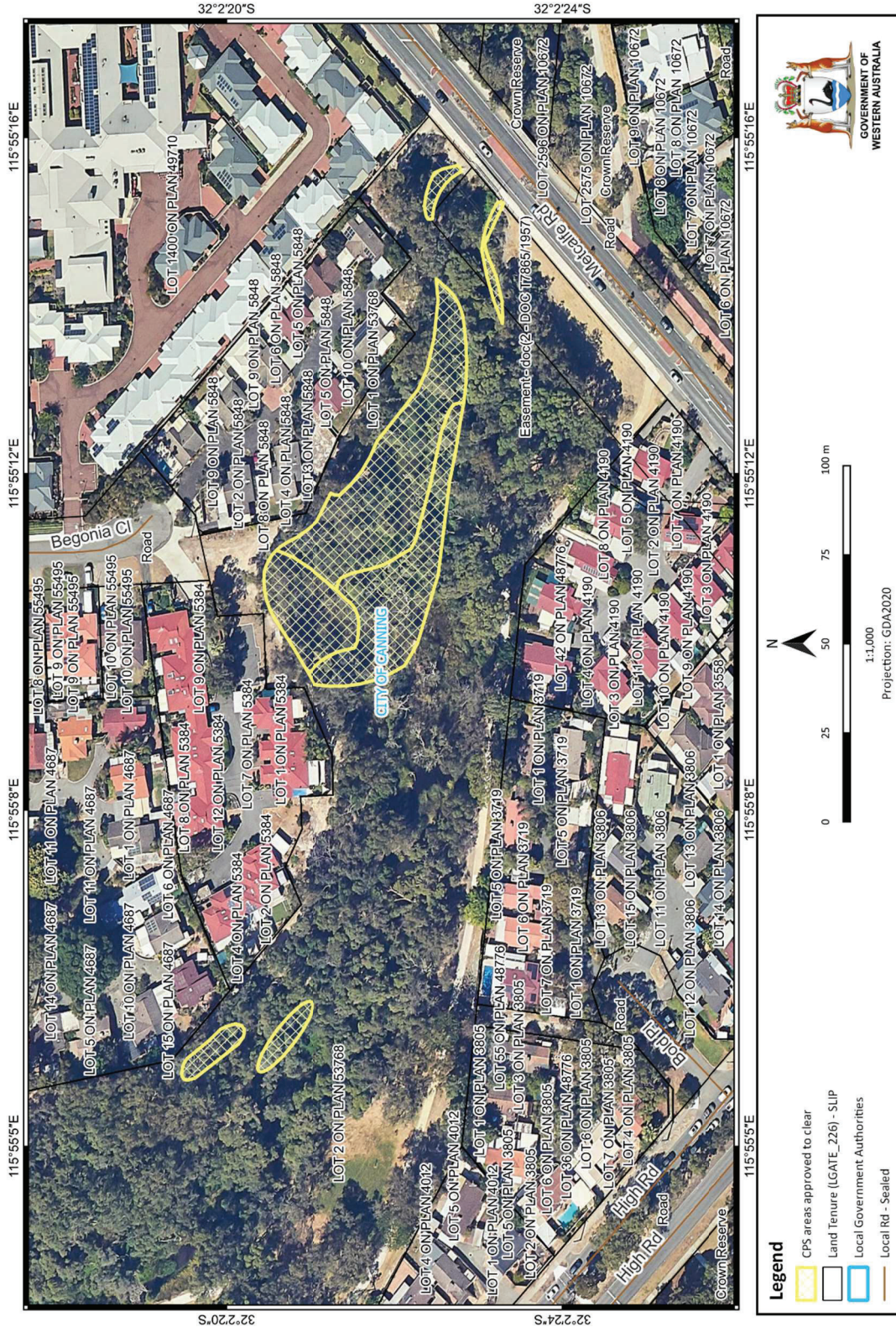
# CPS 9946/1 - Plan E



**Figure 6: Map of the boundary of the area within which clearing may occur**



# CPS 9946/1 - Plan F



**Figure 7: Map of the boundary of the area within which clearing may occur**



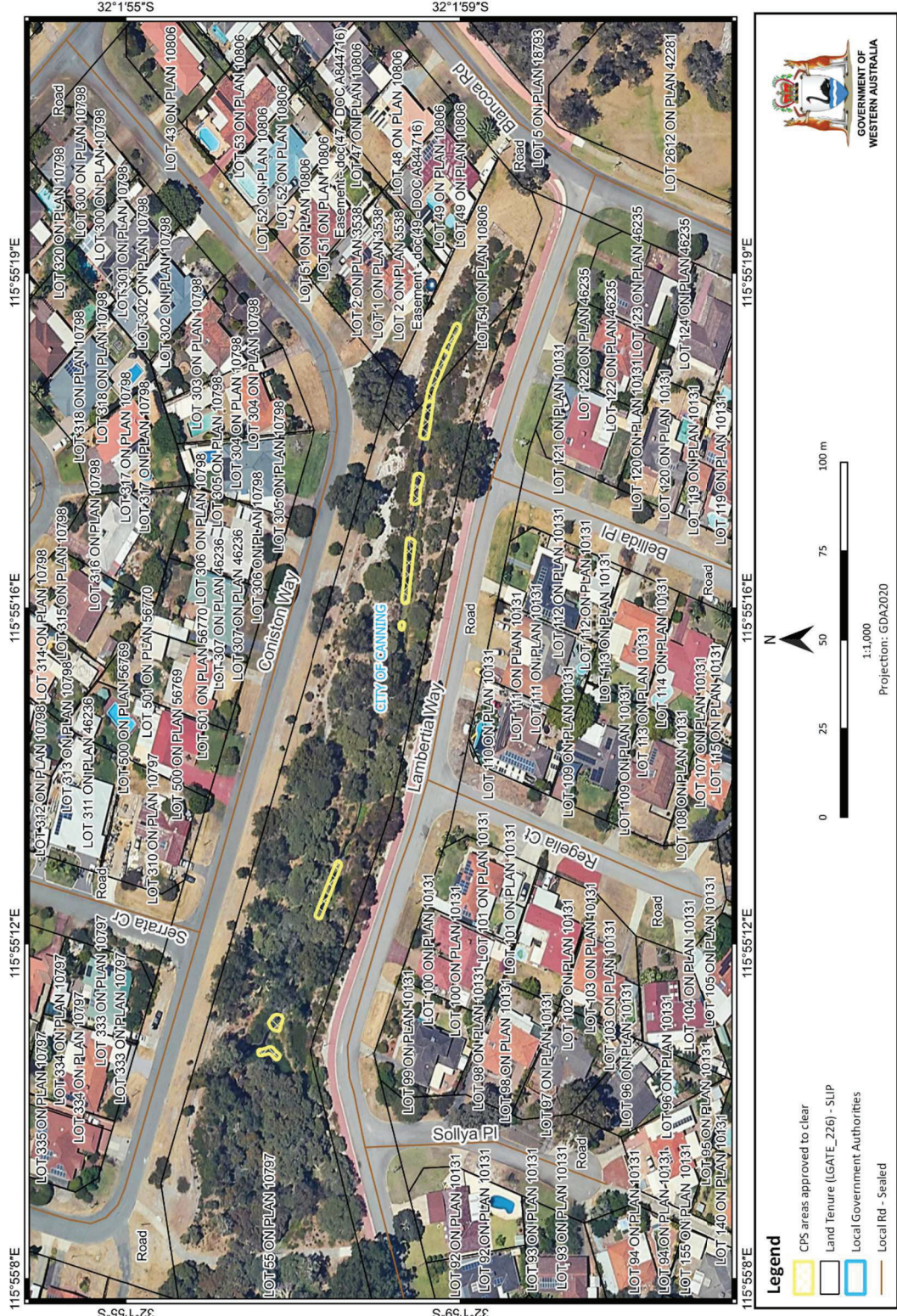
# CPS 9946/1 - Plan G



**Figure 8: Map of the boundary of the area within which clearing may occur**

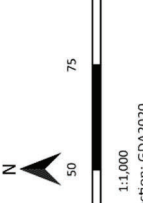


# CPS 9946/1 - Plan H



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WESTERN AUSTRALIA

1:1,000  
Projection: GDA2020



- Legend**
- CPS areas approved to clear
  - Land Tenure (LGATE\_226) - SLIP
  - Local Government Authorities
  - Local Rd - Sealed

**Figure 9: Map of the boundary of the area within which clearing may occur**



# CPS 9946/1 - Plan I



**Figure 10: Map of the boundary of the area within which clearing may occur**



# CPS 9946/1 - Plan J



**Figure 11: Map of the boundary of the area within which clearing may occur**



# CPS 9946/1 - Plan K

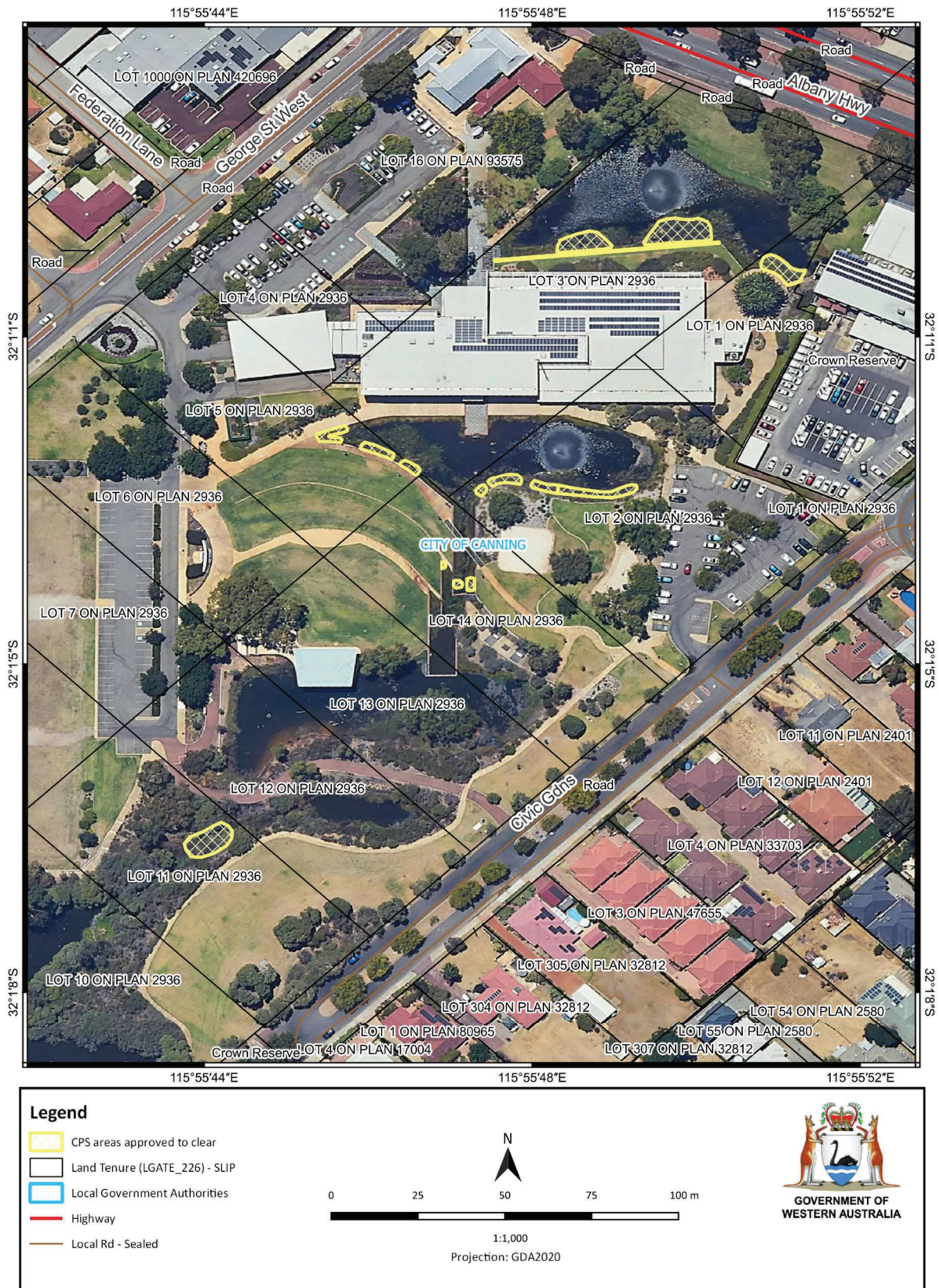


Figure 12: Map of the boundary of the area within which clearing may occur



# CPS 9946/1 - Plan L

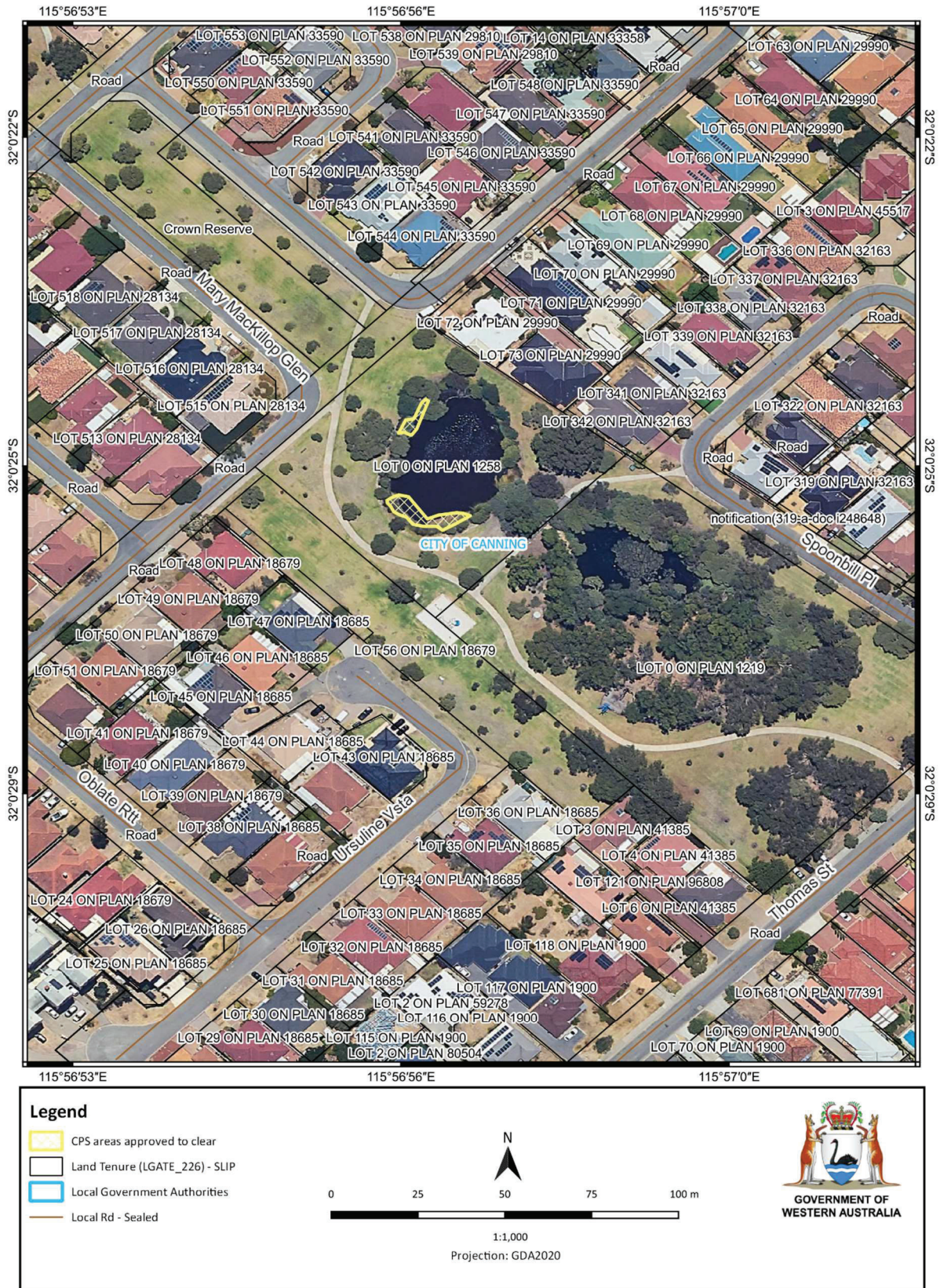


Figure 13: Map of the boundary of the area within which clearing may occur



# CPS 9946/1 - Plan M

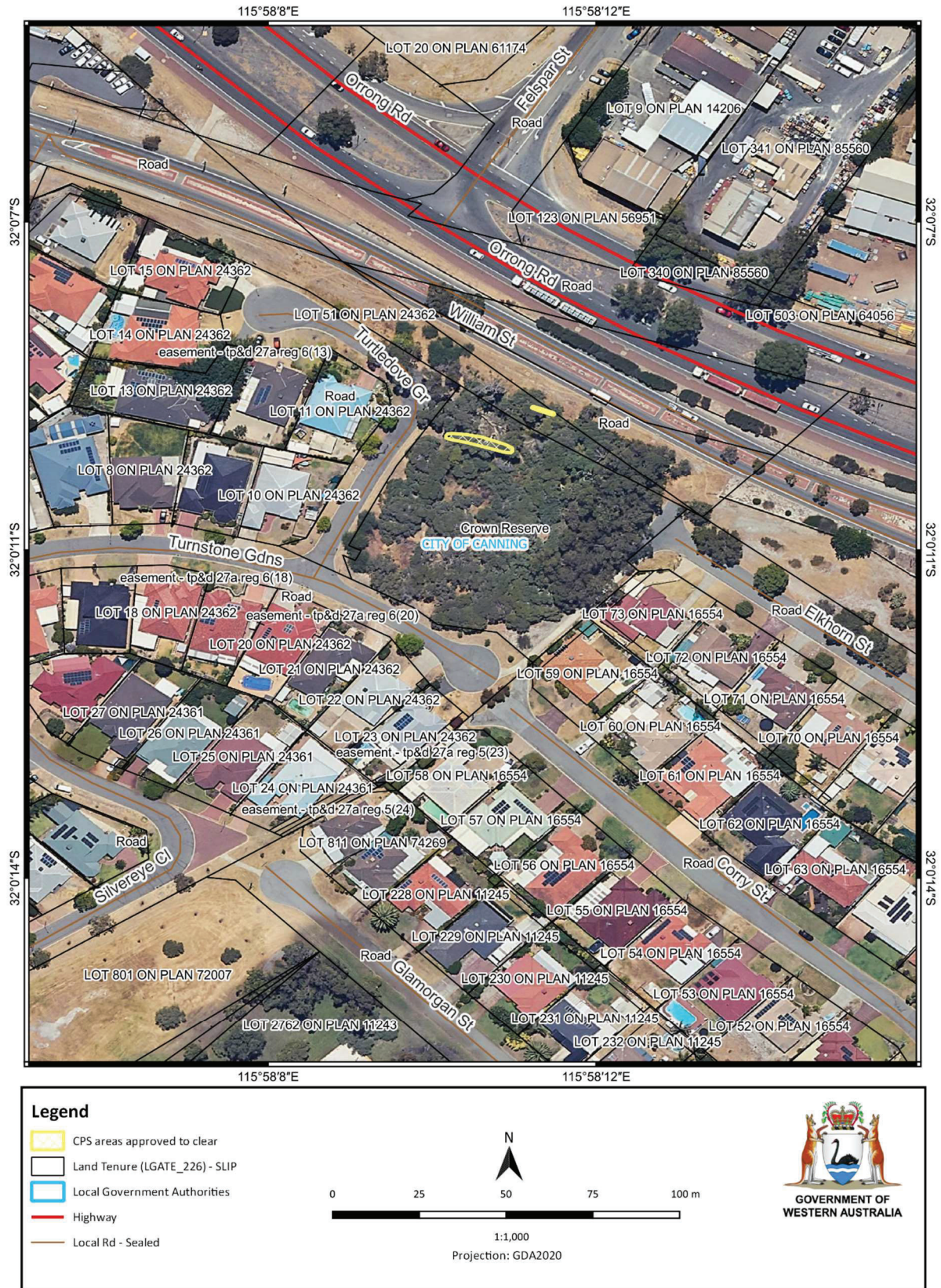


Figure 14: Map of the boundary of the area within which clearing may occur





# Clearing Permit Decision Report

## Application details and outcome

### 1.1. Permit application details

Permit number:	CPS 9946/1
Permit type:	Purpose permit
Applicant name:	City of Canning
Application received:	4 November 2022
Application area:	0.79 hectares of native vegetation (revised)
Purpose of clearing:	removing <i>Typha orientalis</i>
Method of clearing:	Mechanical removal
Property:	List of properties (Refer to Appendix A)
Location (LGA area/s):	City of Canning
Localities (suburb/s):	Cannington, East Cannington, Ferndale, Lynwood, Parkwood, Queens Park, , Willeton, Wilson

### 1.2. Description of clearing activities

The application is for targeting the removal of *Typha orientalis*, distributed across 63 stands of Typha (See Section 1.5, Figures 1-14; City of Canning 2023a), within various properties managed by the applicant. The applicant has chosen three methods of clearing the Typha; cutting shoots 15 cm below the water surface, cutting shoots above water and wiping or spraying with Roundup Biactive or mechanical removal with heavy machinery.

The application was revised during the assessment process from 2.67 hectares to 0.79 hectares to reduce the impact to the Swan and Canning development control area and the Canning river protected under the *Rights in Water and Irrigation Act 1914* (RIWI Act) (City of Canning, 2023b).

### 1.3. Decision on application

Decision:	Granted
Decision date:	26 July 2023
Decision area:	0.79 hectares of native vegetation, as depicted in Section 1.5, below.

### 1.4. Reasons for decision

This clearing permit application was submitted, accepted, assessed and determined in accordance with sections 51E and 51O of the *Environmental Protection Act 1986* (EP Act). The Department of Water and Environmental Regulation (DWER) advertised the application for 21 days. No submissions were received.

In making this decision, the Delegated Officer had regard for the site characteristics (see Appendix B), relevant datasets (see Appendix E.1), the clearing principles set out in Schedule 5 of the EP Act (see Appendix C), relevant planning instruments and any other matters considered relevant to the assessment (see Section 3). The Delegated Officer also took into consideration the purpose of the clearing is to manage *Typha orientalis*, which has invasive tendencies.

The assessment identified that the proposed clearing may result in:

- the potential introduction and spread of weeds and dieback into adjacent vegetation, which could impact on the quality of the adjacent vegetation and its habitat values and
- the loss of native vegetation that is suitable habitat for blue billed duck.

After consideration of the available information, as well as the applicant's minimisation and mitigation measures (see Section 3.1), the Delegated Officer determined the proposed clearing is unlikely to lead to appreciable land degradation or have long-term adverse impacts on environmental values and is unlikely lead to an unacceptable risk to environmental values.

The Delegated Officer decided grant a clearing permit subject to conditions to:

- avoid, minimise to reduce the impacts and extent of clearing
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback
- undertake slow, progressive one directional clearing to allow fauna to move into adjacent habitat ahead of the clearing activity
- pre-clearing site inspections prior to works commencing and ongoing during works for any fauna that may be present. If found and are not able to escape to adjacent habitat, the City of Canning is to cease works until the identified fauna has been translocated
- undertake spraying of Glyphosate during the driest period of the year when the water level is at its lowest and during calm conditions

1.5. Site map

CPS 9946/1 - Context Map

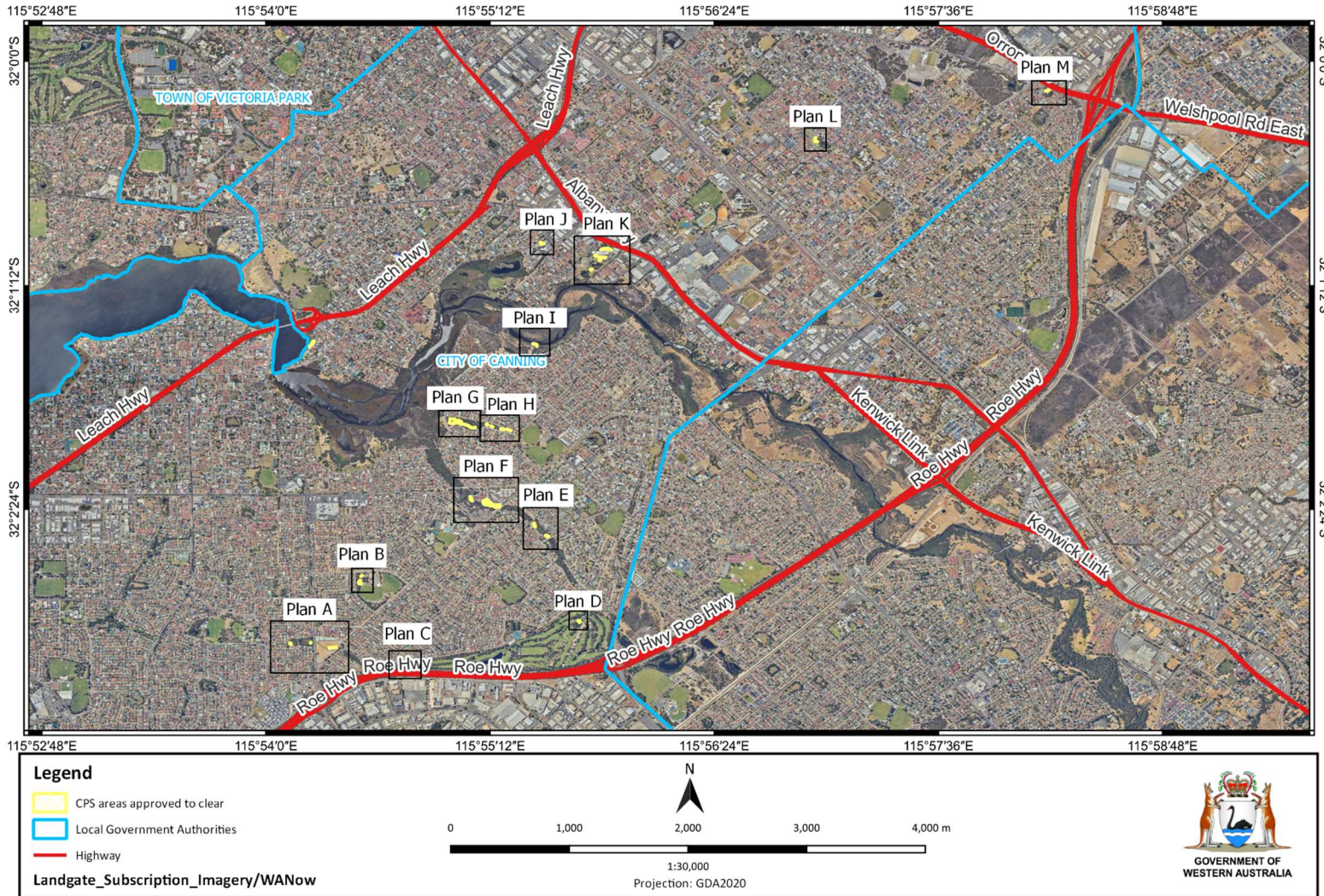


Figure 1 Context Map of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit

CPS 9946/1 26 July 2023



# CPS 9946/1 - Plan A



Figure 2 Plan A of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



# CPS 9946/1 - Plan B



Figure 3 Plan B of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



# CPS 9946/1 - Plan C



Figure 4 Plan C of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



# CPS 9946/1 - Plan D



Figure 5 Plan D of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit.



# CPS 9946/1 - Plan E



Figure 6 Plan E of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit



# CPS 9946/1 - Plan F



Figure 7 Plan F of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit



# CPS 9946/1 - Plan G



Figure 8 Plan G of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit



# CPS 9946/1 - Plan H



Figure 9 Plan H of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit




# CPS 9946/1 - Plan I




**Legend**


- CPS areas approved to clear
- Land Tenure (LGATE\_226) - SLIP
- Local Government Authorities
- Local Rd - Sealed



0      25      50      75      100 m



1:1,000  
Projection: GDA2020



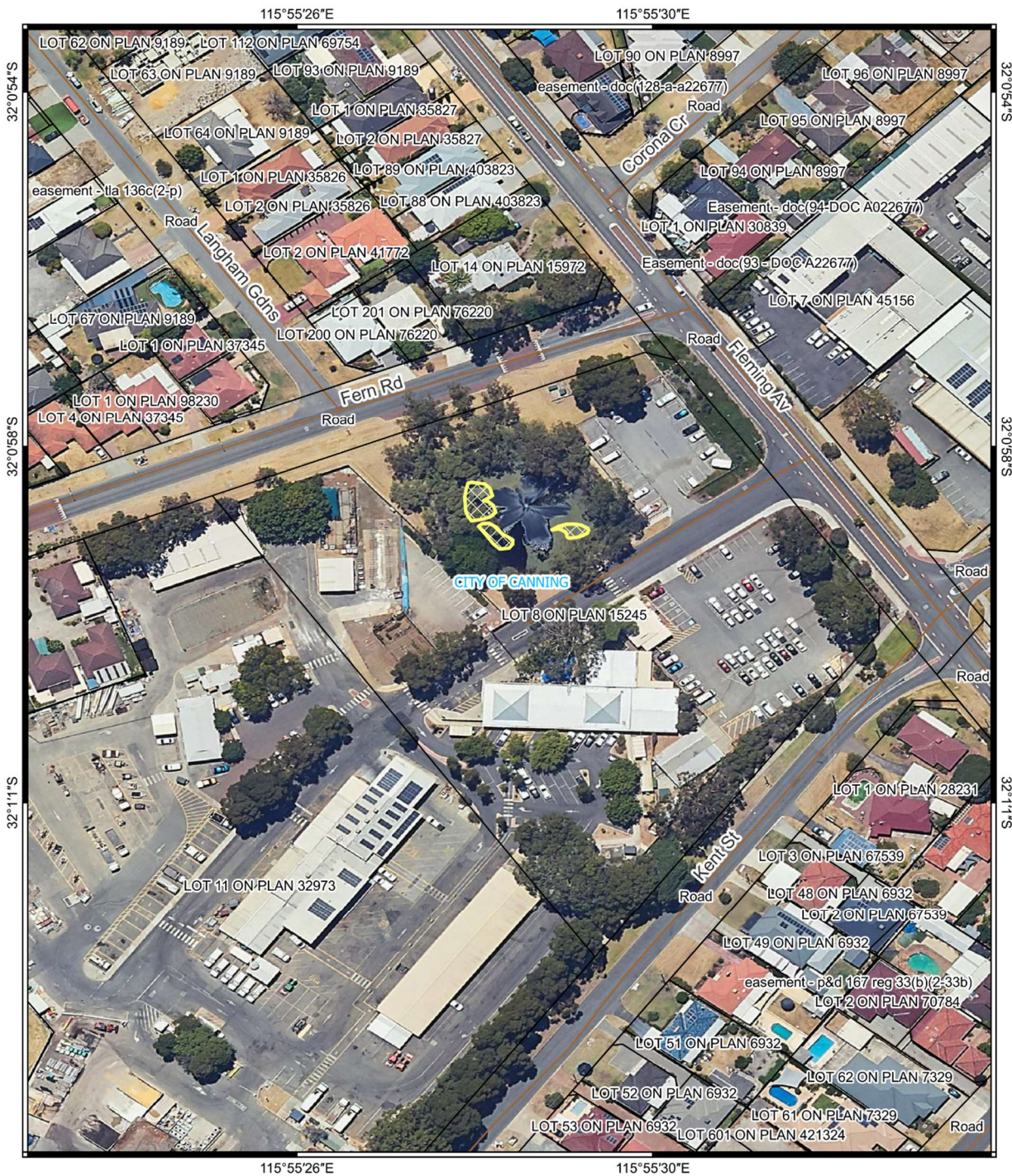
**GOVERNMENT OF  
WESTERN AUSTRALIA**

Figure 10 Plan I of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit



# CPS 9946/1 - Plan J



**Legend**

- CPS areas approved to clear
- Land Tenure (LGATE\_226) - SLIP
- Local Government Authorities
- Local Rd - Sealed

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Projection: GDA2020

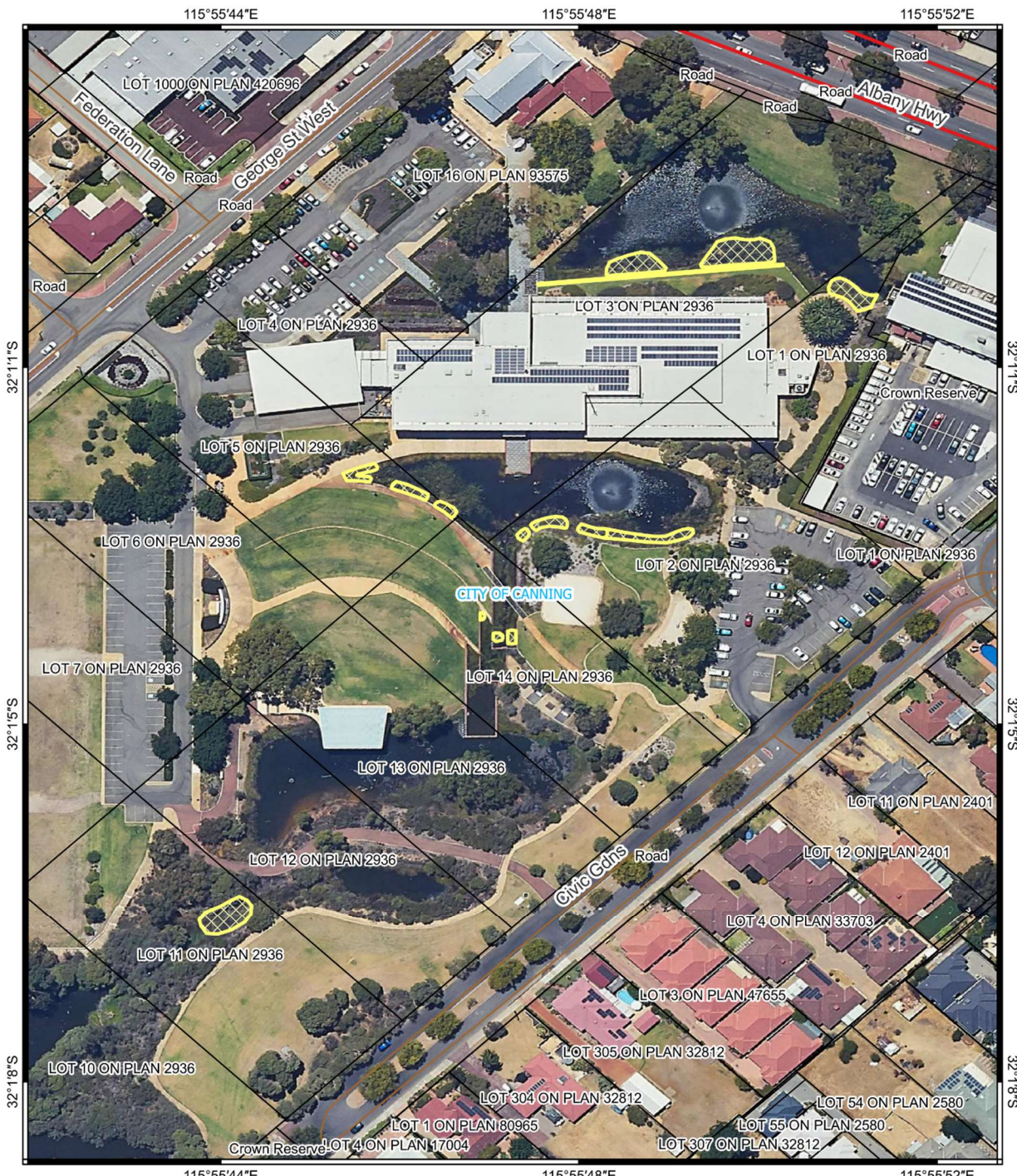
GOVERNMENT OF WESTERN AUSTRALIA

Figure 11 Plan J of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit




# CPS 9946/1 - Plan K



**Legend**


- CPS areas approved to clear
- Land Tenure (LGATE\_226) - SLIP
- Local Government Authorities
- Highway
- Local Rd - Sealed



0 25 50 75 100 m

1:1,000

Projection: GDA2020



**GOVERNMENT OF WESTERN AUSTRALIA**

Figure 12 Plan K of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit



# CPS 9946/1 - Plan L

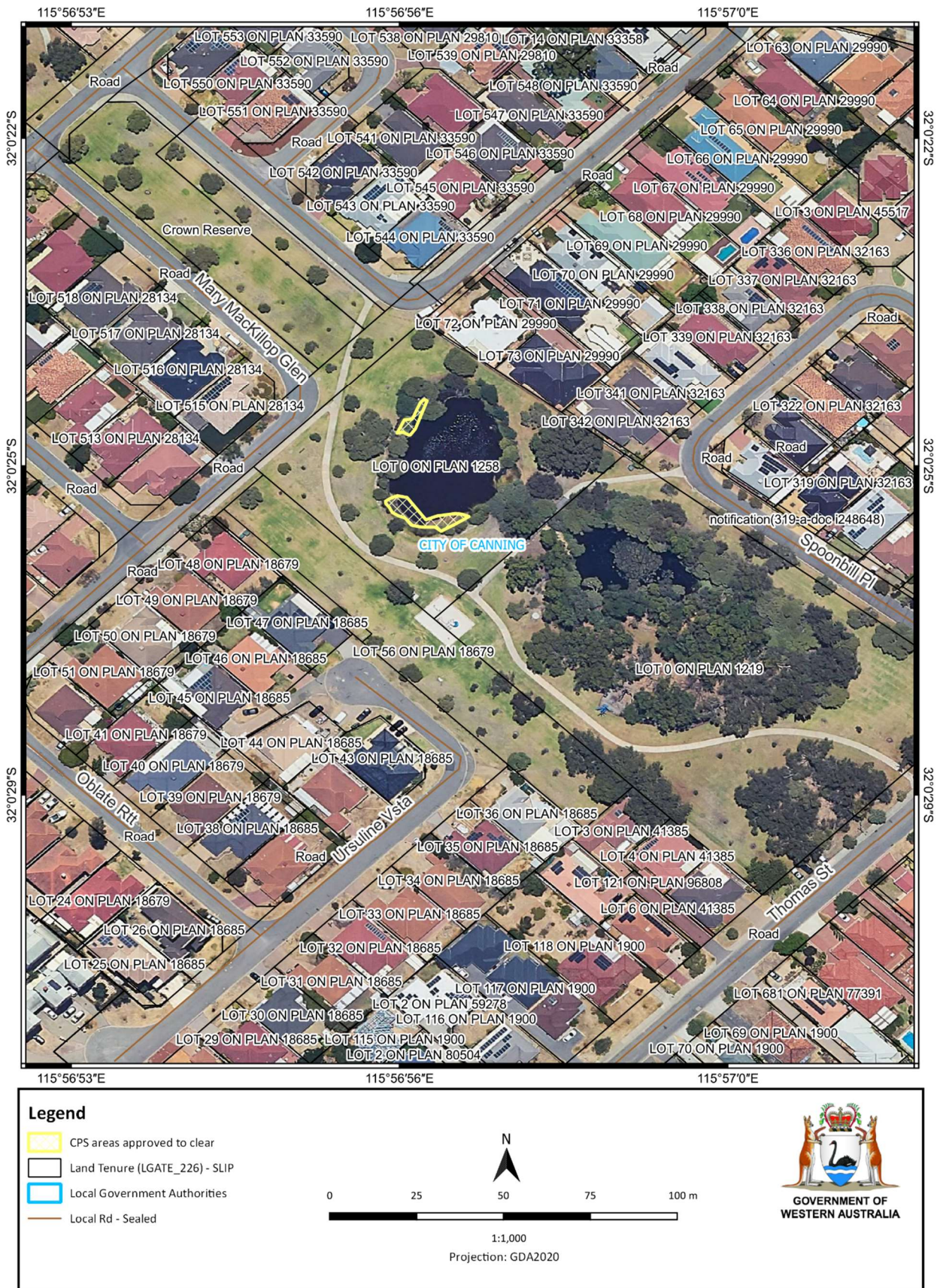


Figure 13 Plan L of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit




# CPS 9946/1 - Plan M




**Legend**

- CPS areas approved to clear
- Land Tenure (LGATE\_226) - SLIP
- Local Government Authorities
- Highway
- Local Rd - Sealed


N



0 25 50 75 100 m



1:1,000  
Projection: GDA2020



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WESTERN AUSTRALIA

Figure 14 Plan M of the application area

The areas crosshatched yellow indicates the areas authorised to be cleared under the granted clearing permit



## 2 Legislative context

The clearing of native vegetation in Western Australia is regulated under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*.

In addition to the matters considered in accordance with section 51O of the EP Act (see Section 1.4), the Delegated Officer has also had regard to the objects and principles under section 4A of the EP Act, particularly:

- the precautionary principle
- the principle of intergenerational equity; and
- the principle of the conservation of biological diversity and ecological integrity.

Other legislation of relevance for this assessment include:

- *Biodiversity Conservation Act 2016* (WA) (BC Act)
- *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act)
- *Planning and Development Act 2005* (WA) (P&D Act)
- *Contaminated Sites Act 2003* (the CS Act)
- *Swan and Canning Rivers Management Regulations 2007*; and
- *Soil and Land Conservation Act 1945* (WA).

The key guidance documents which inform this assessment are:

- *A guide to the assessment of applications to clear native vegetation* (DER, December 2013); and
- *Procedure: Native vegetation clearing permits* (DWER, October 2019).

## 3 Detailed assessment of application

### 3.1. Avoidance and mitigation measures

The applicant has proposed three methods of *Typha orientalis* removal. Methods include:

- cutting shoots 15 cm below the water surface
- cutting shoots above water and wiping or spraying with Roundup Biactive
- mechanical removal with heavy machinery such as an excavator.

Once removed the City of Cannington would, where appropriate, replace the invasive *Typha orientalis* species with other natives such as *Juncus kraussii*, *Baumea juncea* and *Ficinia nodosa* (City of Canning, 2023).

The Delegated Officer was satisfied that the applicant has made a reasonable effort to avoid and minimise potential impacts of the proposed clearing on environmental values.

### 3.2. Assessment of impacts on environmental values

In assessing the application, the Delegated Officer has had regard for the site characteristics (see **Error! Reference source not found.**) and the extent to which the impacts of the proposed clearing present a risk to biological, conservation, or land and water resource values.

The assessment against the clearing principles (see Appendix D) identified that the impacts of the proposed clearing present a risk to fauna, adjacent flora and vegetation and land and water resources. The consideration of these impacts, and the extent to which they can be managed through conditions applied in line with sections 51H and 51I of the EP Act, is set out below.

#### 3.2.1. Biological values (flora) – Clearing Principles (a and c)

##### Assessment

According to the available databases, none of the 44 conservation significant flora recorded within the local area are recorded within the application area. As the proposed clearing will only target *Typha*, it is unlikely that any conservation significant flora will be negatively impacted during removal.

##### Conclusion

Based on the above assessment, the proposed clearing is unlikely to result in a significant loss in biodiversity or impact significant populations of threatened and priority flora. Suitable habitat for species listed in Appendix B.3 is unlikely to be significantly impacted by the proposed clearing.

##### Conditions



To address the above impacts, the following management measures will be required as conditions on the clearing permit:

- The permit holder must only undertake spot spraying of Glyphosate solution during the driest period of the year and during calm conditions.

### 3.2.2. Biological values (fauna) – Clearing Principle (b)

#### Assessment

According to available datasets, 19 conservation significant fauna species associated with water courses, wetlands and coastal habitats have been recorded within the local area.

These include 15 migratory shore bird species that could use the application area as foraging habitat. The species are *Actitis hypoleucos* (common sandpiper), *Calidris acuminata* (Sharp-tailed sandpiper), *Calidris subminuta* (Long-toed Stint), *Charadrius dubius* (little ringed plover), *Limosa lapponica* (Bar-tailed godwit), *Limosa limosa* (Black-tailed godwit), *Pandion cristatus* (Eastern osprey), *Philomachus pugnax* (Ruff), *Plegadis falcinellus* (Glossy ibis), *Pluvialis fulva* (Pacific golden plover), *Pluvialis squatarola* (Grey plover), *Thalasseus bergii* (Crested tern), *Tringa glareola* (Wood sandpiper), *Tringa nebularia* (Common greenshank) and *Tringa stagnatilis* (Marsh sandpiper). Whilst these species may temporarily utilise the application area, it is unlikely to comprise significant habitat to these migratory species due to the lack of suitable breeding habitat. Therefore impacts on these species are likely to be minimal.

The four other species recorded within the local area include *Hydromys chrysogaster* (water rat or rakali), *Ixobrychus dubius* (Australian little bittern), *Oxyura australis* (Blue-billed duck) and *Westralunio carteri* (Carter's freshwater mussel).

There are 31 records of the Priority 4 *Hydromys chrysogaster* (water rat or rakali) in the local area with only one within 800 m from the application area. Rakali are amphibious or semiaquatic mammals reaching up to 70 centimetres in length (from nose to end of the tail), feeding largely underwater, on a wide range of prey including large insects, crustaceans, mussels and fishes, and even frogs, lizards, small mammals and water birds. Although dependent on water for foraging, Rakali live on land, in burrows on low banks of rivers, lakes, wetlands, and estuaries including coastal areas. Intact riparian vegetation and associated bank stability is critical to their survival (DWER, 2021).

Rakali have not been recorded in the application area, however the high number of records indicate that this species may range through the application area, as ranging territory can be up to 4 kilometres of riverbank (DWER, 2021). It is unlikely the proposed clearing will impact this species as *Typha* does not form a critical component of its habitat.

The Priority 4 *Ixobrychus dubius* (Australian little bittern) has been recorded 6.6 km from the application area and has similar habitat requirements to the Australasian bittern, mainly where tall rushes, reeds, *Typha*, shrub thickets or other dense cover is inundated by at least 30 centimetres of water. It can be found in extensive swamps, but often inhabits small patches of dense wetland vegetation such as *Typha* along drains or in small urban lakes (Bird life Australia, 2022b). Little bittern can occur as a migrant in south-west Australia from late August to early April, breeding in the north of the state in winter (Bird life Australia 2020). Little bittern may visit wetlands on the Swan Coastal Plain, and there is a possibility of the species occurring within the application area, but the probability is low (DBCA, 2021).

The Priority 4 *Oxyura australis* (Blue-billed duck) has 484 records within the local area. This species can breed from August to March, mostly between October to January (DBCA 2021). Breeding habitat is typically secluded densely vegetated situations, with the nest constructed in *Typha* beds or other vegetation, in permanent water. Nests are usually constructed from dead *Typha* leaves and sometimes thinly lined with down (Birdlife Australia, 2020). Given the purpose of the clearing permit is to clear *Typha*, the proposed clearing may impact the breeding habitat of this species.

The Vulnerable *Westralunio carteri* (Carter's freshwater mussel) has 44 records within the local area. The current distribution of Carter's freshwater mussel is bounded by Gingin Brook in the north to the Kent, Goodga and Waychinicup Rivers in the south, within 50-100 kilometres of the coast. The species has been found to have undergone a 49 per cent reduction in extent of occurrence in less than three generations, due primarily to secondary salinisation. Apart from salinity, perenniality of stream flow was identified to be the other major limiting variable in the distribution of Carter's freshwater mussel, suggesting that habitat drying, inadequate provision of environmental stream flows and dewatering could pose further conservation constraints on the species (Klunzinger et al., 2015).

According to available datasets, Carter's freshwater mussel does not occur within the application area, however suitable habitat may occur. The nearest record of the mussel is a historical record 240 m away but in a separate water body and the remaining mussels in the local area are one kilometre or more upstream and should not be impacted by the proposed clearing.

The adjacent vegetation is susceptible to weed invasion and dieback in which the clearing process may exacerbate, thereby reducing habitat quality.



## Conclusion

Based on the above assessment, the stands of *Typha* may provide breeding habitat and a source of nest building material for blue billed duck. There is a low probability of the Australian little bittern and other migratory shore bird species utilising the application area for breeding, however they may temporarily utilise the wetlands as foraging habitat. The rakali may also range through the application area. Pre-clearance inspections and slow, directional clearing of the application area will reduce the potential for impacts to individuals that may be present at the time of clearing. Weed and dieback management practices will reduce the potential for secondary impacts to adjacent habitat.

## Conditions

To address the above impacts, the following management measures will be required as conditions on the clearing permit, in areas comprising permanent water and dense stands of *Typha*:

- pre-clearing site inspections prior to works commencing and ongoing during works for any fauna that may be present. If found and are not able to escape into adjacent habitat, the City of Bayswater is to cease works until the identified fauna has left the clearing area
- undertake slow, progressive one directional clearing to allow terrestrial and avian fauna to move into adjacent habitat ahead of the clearing activity; and
- take hygiene steps to minimise the risk of the introduction and spread of weeds and dieback.

### **3.2.3. Biological values (threatened ecological community) – Clearing Principle (d)**

#### Assessment

A part of the application area is mapped as a Subtropical and Temperate Coastal Saltmarsh, listed as a Vulnerable Threatened Ecological Community (TEC) under the EPBC Act and Priority 3 priority ecological community (PEC) by the Department of Biodiversity, Conservation and Attractions (DBCA). The community consists mainly of salt-tolerant vegetation (halophytes) including grasses, herbs, reeds, sedges and shrubs. Succulent herbs and grasses generally dominate, and vegetation is generally <0.5m tall with the exception of some reeds and sedges, however *Typha* is not a component of this vegetation unit (DBCA, 2019). Several parts of the application area are mapped as Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region. *Typha* is also not a critical component associated with the Banksia Woodlands. Given the purpose of the clearing permit is to remove *Typha orientalis* and *Typha* is known to colonise and dominate ecosystems, the proposed clearing will be beneficial to these TECs.

#### Conclusion

Based on the above assessment, the proposed clearing will not result in a significant impact to either the Subtropical and Temperate Coastal Saltmarsh or the Banksia Dominated Woodlands of the Swan Coastal Plain IBRA region TECs. No additional management actions are required to be imposed on the clearing permit.

### **3.2.4. Environmental values (land and water resources) Clearing Principles (f, g and i)**

#### Assessment

The proposed clearing is for the purpose of controlling the occurrence of *Typha* due to its invasive nature and adverse impacts on wetlands in the absence of management. Given the proposed clearing will target *Typha* or areas where *Typha* infestation is anticipated, the proposed clearing is not likely to result in any long-term impact to the ecological values of the riparian vegetation communities and associated wetlands within the application area.

The EnvGeol Msc1 Phase soil unit mapped within the application area has a high land degradation risk in subsurface acidification, flood risk, water logging and phosphorus export risk. As *Typha* regrowth necessitates the control of *Typha* stands on a long-term basis, it is expected to stabilise the cleared embankments and ensure any erosion impacts are minimised. *Typha* has been found to assist in neutralising acidity on re-wetting in areas that are prone to acid sulphate soils (DBCA, 2019).

The removal of *Typha* has the potential to increase sedimentation and turbidity in wetlands within the application area, thereby possibly impacting surface water quality. However, due to the small scale of the clearing, it is not likely to cause long-term deterioration in the quality of surface water.

#### Conclusion

Based on the above assessment, the proposed clearing will not result in a significant impact to the riparian vegetation communities and associated wetlands, land degradation risk or water quality. The selective clearing of *Typha* within



the application area is not likely to lead appreciable land degradation in the form of subsurface acidification, phosphorus export, water logging and flooding. No management conditions are required in relation to this environmental value.

### **3.3. Relevant planning instruments and other matters**

Advice provided by the water licencing branch (DWER, 2023a) identified that a bed and banks permit under the *Rights in Water and Irrigation Act 1914* was required. Additionally, a Form 7 application for a Permit under the Swan and Canning Rivers Management Regulations 2007 was also required (DBCA, 2023). However due to the reduction in application size, the application area no longer impacted the Canning River and the permits were no longer required.

Advice provided by Contaminated Sites (DWER, 2023b) identified one site with contaminated – restricted use. The City of Canning is advised to follow the 'Site Management Plan, City of Canning Depot, 51 Fleming Avenue and 18 Fern Road Wilson, Western Australia' within this area (See Appendix B.6).

It is the permit holder's responsibility to comply with the *Aboriginal Heritage Act 1972 (WA)* and ensure that no Aboriginal Sites of Significance are damaged through the clearing process.

**End**



## Appendix A. Property list

Property	Locality
Lot 8 on Diagram 15245	Wilson
Lot 1 on Plan 2936	Cannington
Lot 14 on Plan 2936	Cannington
Lot 5 on Plan 2936	Cannington
Lot 3 on Plan 2936	Cannington
Lot 11 on Plan 2936	Cannington
Lot 2 on Plan 2936	Cannington
Lot 54 on Plan 10806	Ferndale
Lot 55 on Plan 10797	Ferndale
Lot 172 on Plan 11200	Parkwood
Lot 506 on Plan 16216	Parkwood
Lot 5069 on Diagram 67653	Parkwood
Lot 2 on Diagram 53768	Ferndale
Lot 1 on Plan 7430	Lynwood
Lot 51 on Deposited Plan 24362	East Cannington
Lot 50 on Deposited Plan 24362	East Cannington
Lot 4991 on Deposited Plan 37864	Parkwood
Lot 0 on Diagram 1258	Queens Park
Lot 103 On Diagram 66838	Willetton
Lot 104 on Diagram 66838	Willetton
Bridge Street, Road Reserve (PIN 11803420)	Wilson
Metcalfe Road, Road Reserve (PIN 11809600)	Ferndale
Alyxia Place, Road Reserve (PIN 11806810)	Ferndale
Iveston Road, Road Reserve (PIN 11809602)	Lynwood

## Appendix B. Site characteristics

The information provided below describes the key characteristics of the area proposed to be cleared and is based on the best information available to DWER at the time of this assessment. This information was used to inform the assessment of the clearing against the Clearing Principles, contained in Appendix C.

### B.1. Site characteristics

Characteristic	Details
Local context	The application area comprises a total of 63 <i>Typha orientalis</i> stands distributed across various properties managed by the City of Canning municipality. The proposed clearing will be restricted to the removal of <i>Typha orientalis</i> from wetland vegetation including a portion of the Canning River foreshore, associated inlets, and wetlands (see section 1.5, Figure 1) plus a number of manmade lakes within natural remnant vegetation and parkland. Approximately 85 percent of the native vegetation has been cleared from the local area.
Ecological linkage	There are Perth Regional Ecological Linkages mapped within the application area. The proposed clearing of the application will not sever or severely impact the function of these ecological linkages.
Conservation areas	The application area intersects a Bush forever area. As the weed removal and vegetation would provide a net environmental benefit through the re-establishment of a native vegetation community, there is not likely to be any significant impacts to the Bush Forever area.
Vegetation description	The proposed clearing targets the removal of <i>Typha orientalis</i> growing in association with natural water courses, and manmade lakes. As a result of <i>Typha orientalis</i> occurring in association with manmade water bodies, the distribution on <i>Typha orientalis</i> can be inconsistent with mapped vegetation. Listed below is a summary of



Characteristic	Details
	<p>mapped vegetation types within the local area that may include <i>Typha orientalis</i> as a natural component.</p> <p>Mapped vegetation types (Hedde et al. 1980), include:</p> <ul style="list-style-type: none"> <li>• Bassendean Complex – Central and South 44: Vegetation ranges from woodland of <i>Eucalyptus marginata</i> (Jarrah) - <i>Allocasuarina fraseriana</i> (Sheoak) - Banksia species to low woodland of Melaleuca species, and sedgeland on the moister sites. This area includes the transition of <i>Eucalyptus marginata</i> (Jarrah) to <i>Eucalyptus todtiana</i> (Pricklybark) in the vicinity of Perth.</li> <li>• Southern River Complex 42: Open woodland of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus marginata</i> (Jarrah) - Banksia species with fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark) along creek beds.</li> <li>• Cannington Complex 40: Mosaic of vegetation from adjacent vegetation complexes of Bassendean, Karrakatta, Southern River and Vasse.</li> <li>• Guildford Complex 32: A mixture of open forest to tall open forest of <i>Corymbia calophylla</i> (Marri) - <i>Eucalyptus wandoo</i> (Wandoo) - <i>Eucalyptus marginata</i> (Jarrah) and woodland of <i>Eucalyptus wandoo</i> (Wandoo) (with rare occurrences of <i>Eucalyptus lane-poolei</i> (Salmon White Gum)). Minor components include <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark).</li> <li>• Swan Complex 33: Fringing woodland of <i>Eucalyptus rudis</i> (Flooded Gum) - <i>Melaleuca raphiophylla</i> (Swamp Paperbark) with localised occurrence of low open forest of <i>Casuarina obesa</i> (Swamp Sheoak) and <i>Melaleuca cuticularis</i> (Saltwater Paperbark).</li> </ul>
Vegetation condition	<p>Aerial imagery indicate the vegetation within the proposed clearing area is in an degraded to excellent (Keighery, 1994) condition.</p> <p>The full Keighery (1994) condition rating scale is provided in Appendix D.</p>
Climate and landform	<p>The climate is classified as Mediterranean, with dry, hot summers and cool, wet winters with a mean maximum temperature of 33.2 degrees in January and a mean minimum temperature of 8.8 degrees in July. Rainfall is highest in the winter months of June, July and August (BOM, 2023).</p> <p>The 63 stands of <i>Typha orientalis</i> comprise two landforms including:</p> <ul style="list-style-type: none"> <li>• Pinjarra System: Swan Coastal Plain from Perth to Capel. Poorly drained coastal plain with variable alluvial and aeolian soils. Variable vegetation includes Jarrah, marri, wandoo, paperbark sheoaks and rudis.</li> <li>• Bassendean System: Swan Coastal Plain from Busselton to Jurien. Sand dunes and sandplains with pale deep sand, semi-wet and wet soil. Banksia-paperbark woodlands and mixed heaths.</li> </ul>
Soil description	<p>The soil is mapped as:</p> <ul style="list-style-type: none"> <li>• EnvGeol Msc1 Phase: Clayey sandy silt - pale brown, angular to rounded sand, low cohesion, of alluvial origin</li> <li>• EnvGeol S10 Phase: Sand - as S8 as relatively thin veneer over sandy clay to clayey sand of eolian origin.</li> <li>• EnvGeol S8 Phase: Sand - very light grey at surface, yellow at depth, fine to medium-grained, sub-rounded quartz, moderately well sorted of eolian origin</li> <li>• EnvGeol Sc Phase: Clayey sand - silty in part, pale grey to brown, medium to coarse-grained, poorly sorted, subangular to rounded, frequent heavy minerals, rare feldspar, of alluvial origin</li> <li>• EnvGeol Sp1 Phase: Peaty sand - grey to black, fine to medium-grained, moderately sorted quartz sand, slightly peaty, of lacustrine origin (DPIRD 2019)</li> </ul>
Land degradation risk	<p>There is a high amount of variability in the land degradation risk, between the five soils occurring across the application area. EnvGeol Msc1 Phase soil unit was found to be of high land degradation risk in subsurface acidification, flood risk, water logging and phosphorus export risk. See the table in B.5. for a full analysis of soil risks.</p>



Characteristic	Details												
Waterbodies	The desktop assessment and aerial imagery indicated that the application area is adjacent to the Swan-Canning Estuary, an important wetland in Australia. It intersects various manmade and natural waterbodies in the Canning river area and intersects six high value wetlands.												
Hydrogeography	The table below lists stands of <i>Typha orientalis</i> that intersect flood plain areas. <table border="1"> <thead> <tr> <th>Name/type of water body</th> <th>FPM flood plain area</th> <th><i>Typha orientalis</i> stand area (ha)</th> </tr> </thead> <tbody> <tr> <td>Canning River</td> <td>(1%) AEP</td> <td>0.02</td> </tr> <tr> <td>Canning River</td> <td>(10%) AEP</td> <td>&lt;0.01</td> </tr> <tr> <td>Canning River and Yagan Park</td> <td>Designated flood event floodplain</td> <td>0.03</td> </tr> </tbody> </table>	Name/type of water body	FPM flood plain area	<i>Typha orientalis</i> stand area (ha)	Canning River	(1%) AEP	0.02	Canning River	(10%) AEP	<0.01	Canning River and Yagan Park	Designated flood event floodplain	0.03
Name/type of water body	FPM flood plain area	<i>Typha orientalis</i> stand area (ha)											
Canning River	(1%) AEP	0.02											
Canning River	(10%) AEP	<0.01											
Canning River and Yagan Park	Designated flood event floodplain	0.03											
Flora	A total of 131 species of conservation significant flora occur within the local area. There are 44 species of conservation significant flora that are known to be associated with wetland or swamp habitats and could possibly occur adjacent to <i>Typha orientalis</i> stands. Refer to Flora analysis table section Appendix B.2. for further flora analysis of the 44 wetland species. Noting the purpose of the clearing is to target Typha, clearing is not expected to impact these species.												
Ecological communities	There are 19 Threatened and Priority ecological communities in the local area, with 'Banksia dominated woodlands of the Swan Coastal Plain' and 'Subtropical and Temperate Coastal Saltmarsh' priority ecological communities intersecting the application area and four others; 'Herb rich shrublands in clay pans', ' <i>Banksia attenuata</i> woodlands over species rich dense shrublands', 'Shrublands on dry clay flats' and 'Shrublands and woodlands on Muchea limestone of the Swan Coastal Plain' within 1 km of the application area. Noting the purpose of the clearing, clearing is not expected to impact these communities.												
Fauna	A total of 78 conservation significant fauna species were recorded in the local area. Of the 78 species, 19 were recorded in habitats similar to the application area.												

## B.2. Flora analysis table

With consideration for the site characteristics set out above, relevant datasets (see Appendix E.1), impacts to the following conservation significant flora required further consideration.

Species name	Conservation status	Number of known records (total)	Distance of closest record to application area (km)	Suitable habitat features? [Y/N]	Suitable soil type? [Y/N]	Likelihood
<i>Amanita fibrillopes</i>	P3	9	2.05	Y	Y	High
<i>Amanita quenda</i>	P1	7	2.91	Y	Y	High
<i>Andersonia gracilis</i>	T	10	0.32	Y	Y	High
<i>Angianthus micropodioides</i>	P3	8	0.21	Y	Y	High
<i>Aponogeton hexatepalus</i>	P4	14	0.82	Y	Y	High
<i>Babingtonia urbana</i>	P3	11	0.32	Y	Y	High
<i>Bolboschoenus fluviatilis</i>	P1	3	2.70	Y	Y	High
<i>Byblis gigantea</i>	P3	23	0.24	Y	Y	High
<i>Caladenia huegelii</i>	T	64	0.15	Y	Y	High
<i>Calandrinia uncinella</i>	P1	3	2.27	Y	Y	High
<i>Calectasia grandiflora</i>	P2	3	2.12	Y	Y	High
<i>Calytrix breviseta</i> subsp. <i>brevisetata</i>	T	18	2.32	Y	Y	High
<i>Carex tereticaulis</i>	P3	2	2.43	Y	Y	High
<i>Dampiera triloba</i>	P3	3	4.84	Y	Y	High



Species name	Conservation status	Number of known records (total)	Distance of closest record to application area (km)	Suitable habitat features? [Y/N]	Suitable soil type? [Y/N]	Likelihood
<i>Diuris drummondii</i>	T	2	1.63	Y	Y	High
<i>Diuris purdiei</i>	T	23	0.24	Y	Y	High
<i>Drosera occidentalis</i>	P4	10	0.29	Y	Y	High
<i>Eleocharis keigheryi</i>	T	7	1.57	Y	Y	High
<i>Eremophila glabra</i> subsp. <i>chlorella</i>	T	15	0.24	Y	Y	High
<i>Eryngium pinnatifidum</i> subsp. <i>Palustre</i> (G.J. Keighery 13459)	P3	2	2.12	Y	Y	High
<i>Eryngium</i> sp. <i>Subdecumbens</i> (G.J. Keighery 5390)	P3	3	2.12	Y	Y	High
<i>Grevillea thelemanniana</i>	T	51	0.32	Y	Y	High
<i>Haloragis scoparia</i>	P1	1	0.52	Y	Y	High
<i>Hydrocotyle lemnoides</i>	P4	10	2.12	Y	Y	High
<i>Hydrocotyle striata</i>	P1	2	0.49	Y	Y	High
<i>Jacksonia gracillima</i>	P3	13	4.01	Y	Y	High
<i>Johnsonia pubescens</i> subsp. <i>cygnorum</i>	P2	11	1.69	Y	Y	High
<i>Lepidosperma rostratum</i>	T	40	1.86	Y	Y	High
<i>Levenhookia preissii</i>	P1	4	0.32	Y	Y	High
<i>Melaleuca viminalis</i>	P2	4	2.55	Y	Y	High
<i>Ornduffia submersa</i>	P4	11	2.65	Y	Y	High
<i>Poranthera moorokatta</i>	P2	3	6.87	Y	Y	High
<i>Ptilotus pyramidatus</i>	T	3	2.65	Y	Y	High
<i>Ptilotus sericostachyus</i> subsp. <i>roseus</i>	P1	1	0.32	Y	Y	High
<i>Schoenus benthamii</i>	P3	12	0.32	Y	Y	High
<i>Schoenus capillifolius</i>	P3	10	2.12	Y	Y	High
<i>Schoenus natans</i>	P4	4	0.24	Y	Y	High
<i>Schoenus pennisetis</i>	P3	13	1.05	Y	Y	High
<i>Schoenus</i> sp. <i>Waroona</i> (G.J. Keighery 12235)	P3	1	2.12	Y	Y	High
<i>Stylidium aceratum</i>	P3	5	0.24	Y	Y	High
<i>Stylidium longitubum</i>	P4	6	3.12	Y	Y	High
<i>Stylidium paludicola</i>	P3	5	1.97	Y	Y	High
<i>Synaphea</i> sp. Fairbridge Farm (D. Papenfus 696)	T	3	1.63	Y	Y	High
<i>Verticordia lindleyi</i> subsp. <i>lindleyi</i>	P4	49	0.30	Y	Y	High

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

### B.3. Fauna analysis table

Species name	Common name	Conservation status	Distance of closest record to application area (km)	Suitable habitat features? [Y/N]	Number of records	Likelihood
<i>Actitis hypoleucos</i>	common sandpiper	MI	2.83	Y	2	High
<i>Calidris acuminata</i>	Sharp-tailed sandpiper	MI	1.88	Y	30	High



Species name	Common name	Conservation status	Distance of closest record to application area (km)	Suitable habitat features? [Y/N]	Number of records	Likelihood
<i>Calidris subminuta</i>	Long-toed Stint	MI	1.41	Y	12	High
<i>Charadrius dubius</i>	little ringed plover	MI	3.15	Y	3	High
<i>Hydromys chrysogaster</i>	water-rat, rakali	P4	0.79	Y	31	High
<i>Ixobrychus dubius</i>	Australian little bittern	P4	6.64	Y	5	High
<i>Limosa lapponica</i>	Bar-tailed godwit	MI	1.80	Y	37	High
<i>Limosa limosa</i>	Black-tailed godwit	MI	3.15	Y	7	High
<i>Oxyura australis</i>	Blue-billed duck	P4	0.03	Y	484	High
<i>Pandion cristatus</i>	Eastern osprey	MI	0.33	Y	18	High
<i>Philomachus pugnax</i>	Ruff (reeve)	MI	3.15	Y	2	High
<i>Plegadis falcinellus</i>	Glossy ibis	MI	0.23	Y	34	High
<i>Pluvialis fulva</i>	Pacific golden plover	MI	3.15	Y	9	High
<i>Pluvialis squatarola</i>	Grey plover	MI	3.15	Y	144	High
<i>Thalasseus bergii</i>	Crested tern	MI	0.03	Y	292	High
<i>Tringa glareola</i>	Wood sandpiper	MI	1.41	Y	21	High
<i>Tringa nebularia</i>	Common greenshank	MI	0.01	Y	206	High
<i>Tringa stagnatilis</i>	Marsh sandpiper	MI	2.83	Y	12	High
<i>Westralunio carteri</i>	Carter's freshwater mussel	VU	0.24	Y	44	High

T: threatened, CR: critically endangered, EN: endangered, VU: vulnerable, P: priority

#### B.4. Ecological community analysis table

Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	N	N	N	0	N/A
Subtropical and Temperate Coastal Saltmarsh	Priority 3	Y	N	Y	0	N/A
Herb rich shrublands in clay pans (floristic community type 8 as originally described in Gibson et al. (1994))	Vulnerable	N	N	N	0.36	N/A



Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
Banksia attenuata woodlands over species rich dense shrublands (floristic community type 20a as originally described in Gibson et al. (1994))	Endangered	N	N	N	0.41	N/A
Shrublands on dry clay flats (floristic community type 10a as originally described in Gibson et al. (1994))	Endangered	N	N	N	0.43	N/A
Shrublands and woodlands on Muchea Limestone of the Swan Coastal Plain	Endangered	N	N	N	0.72	N/A
Tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain	Priority 3	N	N	N	1.41	N/A
Wooded wetlands which support colonial waterbird nesting areas	Priority 2	N	N	N	1.64	N/A
Herb rich saline shrublands in clay pans (floristic community type 7 as originally described in Gibson et al. (1994))	Vulnerable	N	N	N	2.07	N/A
Southern wet shrublands, Swan Coastal Plain (floristic community type 2 as originally described in Gibson et al. (1994))	Endangered	N	N	N	2.47	N/A
Corymbia calophylla - Kingia australis woodlands on heavy soils, Swan Coastal Plain (floristic community type 3a as originally described in Gibson et al. (1994))	Critically Endangered	N	N	N	2.56	N/A
Corymbia calophylla - Eucalyptus marginata woodlands on sandy clay soils of the southern Swan Coastal Plain (floristic community type 3b as originally described in Gibson et al. (1994))	Vulnerable	N	N	N	4.21	N/A
Shrublands and woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20c as originally described in in Gibson et al. (1994))	Critically Endangered	N	N	N	4.35	N/A



Community name	Conservation status	Suitable habitat features? [Y/N]	Suitable vegetation type? [Y/N]	Suitable soil type? [Y/N]	Distance of closest record to application area (km)	Are surveys adequate to identify? [Y, N, N/A]
Corymbia calophylla - Xanthorrhoea preissii woodlands and shrublands, Swan Coastal Plain (floristic community type 3c as originally described in in Gibson et al. (1994))	Critically Endangered	N	N	N	4.46	N/A
Banksia attenuata and/or Eucalyptus marginata woodlands of the eastern side of the Swan Coastal Plain (floristic community type 20b as originally described in Gibson et al. (1994))	Endangered	N	N	N	4.72	N/A
Central Northern Darling Scarp Granite Shrubland Community	Priority 4	N	N	N	5.27	N/A
Low lying Banksia attenuata woodlands or shrublands	Priority 3	N	N	N	7.82	N/A
Northern Spearwood shrublands and woodlands	Priority 3	N	N	N	8.45	N/A
Callitris preissii (or Melaleuca lanceolata) forests and woodlands, Swan Coastal Plain (floristic community type 30a as originally described in Gibson et al. (1994))	Vulnerable	N	N	N	9.95	N/A

### B.5. Land degradation risk table

Risk categories	EnvGeol Msc1 Phase	EnvGeol S10 Phase	EnvGeol S8 Phase	EnvGeol Sc Phase	EnvGeol Sp1 Phase
Wind erosion	L1	M2	H1	M1	L1
Water erosion	H1	M1	L1	L1	H2
Water repellence	L1	M1	H2	L1	L1
Salinity	M2	M1	L1	M1	L1
Subsurface Acidification	H2	H2	H2	H2	H2
Flood risk	H2	M2	L1	L1	H2
Water logging	H2	H1	L2	H2	H2
Phosphorus export risk	H2	M2	M2	M1	H2

L1: <3% of map unit has a high to extreme risk, L2: 3-10% of map unit has a high to extreme risk, M1: 10-30% of map unit has a high to extreme risk, M2: 30-50% of map unit has a high to extreme risk, H1: 50-70% of map unit has a high to extreme risk, H2: >70% of map unit has a high to extreme risk



## B.6. Contaminated sites recorded within the application area

Site Description	Classification	CSB Comment
Former Landfill, City of Canning Depot Lot 8 on Plan 15245	Contaminated – restricted use	The Site Management Plan titled “Site Management Plan, City of Canning Depot, 51 Fleming Avenue and 18 Fern Road Wilson, Western Australia” (Aurora Environmental, 16 October 2019) should be implemented to address any risks associated with potential exposure to contaminated soil and groundwater, and landfill gas.

## Appendix D. Assessment against the clearing principles

Assessment against the clearing principles	Variance level	Is further consideration required?
<b>Environmental value: biological values</b>		
<p><u>Principle (a):</u> “Native vegetation should not be cleared if it comprises a high level of biodiversity.”</p> <p><u>Assessment:</u></p> <p>The proposed clearing will target stands of <i>Typha orientalis</i>. This species is capable of aggressive invasions that can transform ecosystems unless it is actively managed (Western Australian Herbarium, 2019). Without management, <i>Typha</i> can develop quickly into a monoculture and cover an entire water body. Given the application area comprises predominantly of <i>Typha</i> and its tendency to colonise ecosystems, it is not anticipated that the proposed clearing will significantly impact fauna habitat or conservation significant assemblages of plants. The application area may contain suitable habitat and soils for a number of conservation significant fauna and flora species.</p>	Not likely to be at variance	Yes  Refer to section 3.2.1 and 3.2.2 above
<p><u>Principle (b):</u> “Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna.”</p> <p><u>Assessment:</u> The area proposed to be cleared may contain foraging, and, breeding habitat for conservation significant fauna.</p>	May be at variance	Yes  Refer to section 3.2.2 above
<p><u>Principle (c):</u> “Native vegetation should not be cleared if it includes, or is necessary for the continued existence of, threatened flora.”</p> <p><u>Assessment:</u></p> <p>There are 11 threatened flora species recorded in the local area associated with wetland habitat, although all the records are more than 100 m away from the applied clearing area. It is unlikely that these species will be impacted by the proposed clearing.</p>	Not likely to be at variance	Yes  Refer to section 3.2.1 above
<p><u>Principle (d):</u> “Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community.”</p> <p><u>Assessment:</u></p> <p>According to available spatial data, the area proposed to be cleared contains two TECs, ‘Subtropical and Temperate Coastal Saltmarsh’ and ‘Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region’.</p>	May be at variance	Yes  Refer to section 3.2.3 above
<b>Environmental value: significant remnant vegetation and conservation areas</b>		



Assessment against the clearing principles	Variance level	Is further consideration required?
<p><u>Principle (e):</u> <i>“Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared.”</i></p> <p><u>Assessment:</u></p> <p>Considering the targeted nature of <i>Typha orientalis</i> removal, the proposed clearing is unlikely to further degrade remnants of native vegetation in an area that has been extensively cleared. The application areas are not considered to be significant as a remnant.</p>	Not likely to be at variance	No
<p><u>Principle (h):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area.”</i></p> <p><u>Assessment:</u></p> <p>The application area is within the Swan and Canning Rivers Management Act 2006 area, Bush Forever Area and DBCA Lands of Interest. Given the purpose of the proposed clearing is to improve wetland habitat, it is not likely to have an impact on the environmental values of the river or result in a significant residual impact to conservation areas.</p>	Not likely to be at variance	No
<b>Environmental value: land and water resources</b>		
<p><u>Principle (f):</u> <i>“Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.”</i></p> <p><u>Assessment:</u></p> <p><i>Typha orientalis</i> forms a natural component of native wetland and watercourse vegetation. Noting the nature of the clearing, the proposed clearing is within an environment associated with a wetland. Given the nature of the proposed clearing, it is unlikely to significantly impact the wetland.</p>	At variance	Yes  Refer to section 3.2.4 above
<p><u>Principle (g):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation.”</i></p> <p><u>Assessment:</u></p> <p>The mapped soils are moderately susceptible to wind / water erosion, nutrient export and salinity. EnvGeol Msc1 Phase soil unit was found to have high land degradation risk in subsurface acidification, flood risk, water logging and phosphorus export risk. <i>Typha orientalis</i> control methods proposed by the applicant (City of Canning 2023) will include slashing the plants below the water line and chemical control, which is not likely to have an appreciable impact on land degradation.</p>	May be at variance	Yes  Refer to section 3.2.4 above
<p><u>Principle (i):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water.”</i></p> <p><u>Assessment:</u></p> <p>Given the clearing may include excavation and a large portion of the clearing will occur in water courses and wetlands, the proposed clearing may impact surface or ground water quality.</p>	May be at variance	Yes  Refer to section 3.2.4 above
<p><u>Principle (j):</u> <i>“Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence or intensity of flooding.”</i></p> <p><u>Assessment:</u></p> <p>In addition to improving wetland habitats, the purpose of the proposed clearing is to improve water flow, by monitoring and removing dense stands of <i>Typha orientalis</i>. Therefore, the proposed clearing is unlikely to contribute to flooding.</p>	Not at variance	No



## Appendix D. Vegetation condition rating scale

Vegetation condition is a rating given to a defined area of vegetation to categorise and rank disturbance related to human activities. The rating refers to the degree of change in the vegetation structure, density and species present in relation to undisturbed vegetation of the same type. The degree of disturbance impacts upon the vegetation's ability to regenerate. Disturbance at a site can be a cumulative effect from a number of interacting disturbance types.

Considering its location, the scale below was used to measure the condition of the vegetation proposed to be cleared. This scale has been extracted from Keighery (1994), Keighery, B.J. (1994) *Bushland Plant Survey: A Guide to Plant Community Survey for the Community*. Wildflower Society of WA (Inc). Nedlands, Western Australia.

### Measuring vegetation condition for the South West and Interzone Botanical Province (Keighery, 1994)

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, with disturbance affecting individual species; weeds are non-aggressive species.
Very good	Vegetation structure altered, with obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and/or grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and/or grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and/or grazing.
Completely degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

## Appendix E. Sources of information

### E.1. GIS databases

Publicly available GIS Databases used (sourced from [www.data.wa.gov.au](http://www.data.wa.gov.au)):

- 10 Metre Contours (DPIRD-073)
- Aboriginal Heritage Places (DPLH-001)
- Aboriginal Heritage Places (DPLH-001)
- Cadastre (LGATE-218)
- Cadastre Address (LGATE-002)
- Contours (DPIRD-073)
- DBCA – Lands of Interest (DBCA-012)
- DBCA Legislated Lands and Waters (DBCA-011)
- Directory of Important Wetlands in Australia – Western Australia (DBCA-045)
- Environmentally Sensitive Areas (DWER-046)
- Flood Risk (DPIRD-007)
- Groundwater Salinity Statewide (DWER-026)
- Hydrography – Inland Waters – Waterlines
- Hydrological Zones of Western Australia (DPIRD-069)
- IBRA Vegetation Statistics
- Imagery
- Local Planning Scheme – Zones and Reserves (DPLH-071)
- Native Title (ILUA) (LGATE-067)
- Offsets Register – Offsets (DWER-078)
- Pre-European Vegetation Statistics



- Public Drinking Water Source Areas (DWER-033)
- Ramsar Sites (DBCA-010)
- Regional Parks (DBCA-026)
- Remnant Vegetation, All Areas
- RIWI Act, Groundwater Areas (DWER-034)
- RIWI Act, Surface Water Areas and Irrigation Districts (DWER-037)
- Soil Landscape Land Quality – Flood Risk (DPIRD-007)
- Soil Landscape Land Quality – Phosphorus Export Risk (DPIRD-010)
- Soil Landscape Land Quality – Subsurface Acidification Risk (DPIRD-011)
- Soil Landscape Land Quality – Water Erosion Risk (DPIRD-013)
- Soil Landscape Land Quality – Water Repellence Risk (DPIRD-014)
- Soil Landscape Land Quality – Waterlogging Risk (DPIRD-015)
- Soil Landscape Land Quality – Wind Erosion Risk (DPIRD-016)
- Soil Landscape Mapping – Best Available
- Soil Landscape Mapping – Systems
- Wheatbelt Wetlands Stage 1 (DBCA-021)

Restricted GIS Databases used:

- ICMS (Incident Complaints Management System) – Points and Polygons
- Threatened Flora (TPFL)
- Threatened Flora (WAHerb)
- Threatened Fauna
- Threatened Ecological Communities and Priority Ecological Communities
- Threatened Ecological Communities and Priority Ecological Communities (Buffers)

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