6 Additional assessment

Chapter 7 of the EIS provided an assessment of the key environmental issues for the project as identified in the SEARs. These assessments were carried out on the project as described in Chapter 5 of the EIS.

The amended project, as described in **Chapter 3** and **Chapter 4,** was assessed against each of the key issues and other issues as set out in the SEARs issued for the project on 30 October 2018 by the Secretary of DPIE. A request to amend the project was submitted to DPIE on 20 May 2020. In response, DPIE confirmed on 28 May 2020 that an amendment report is appropriate to address the environmental impacts associated with the amended project. No additional or updated SEARs were issued by DPIE. This amendment report and its appendices have been prepared in accordance with the SEARs issued for the project on 30 October 2018.

This chapter provides a summary of these additional assessments. These additional assessments have been carried out to identify and assess the potential construction, operational and cumulative impacts associated with the amended project, focusing on potential changes to the expected impacts as a result of the proposed changes to the project discussed in **Chapter 3**. Where required, additional or revised environmental management measures are proposed.

These assessments are supported by detailed investigations and have been documented in the updated/supplementary technical assessment memorandums and reports in **Appendix A** to **Appendix L**.

6.1 Biodiversity

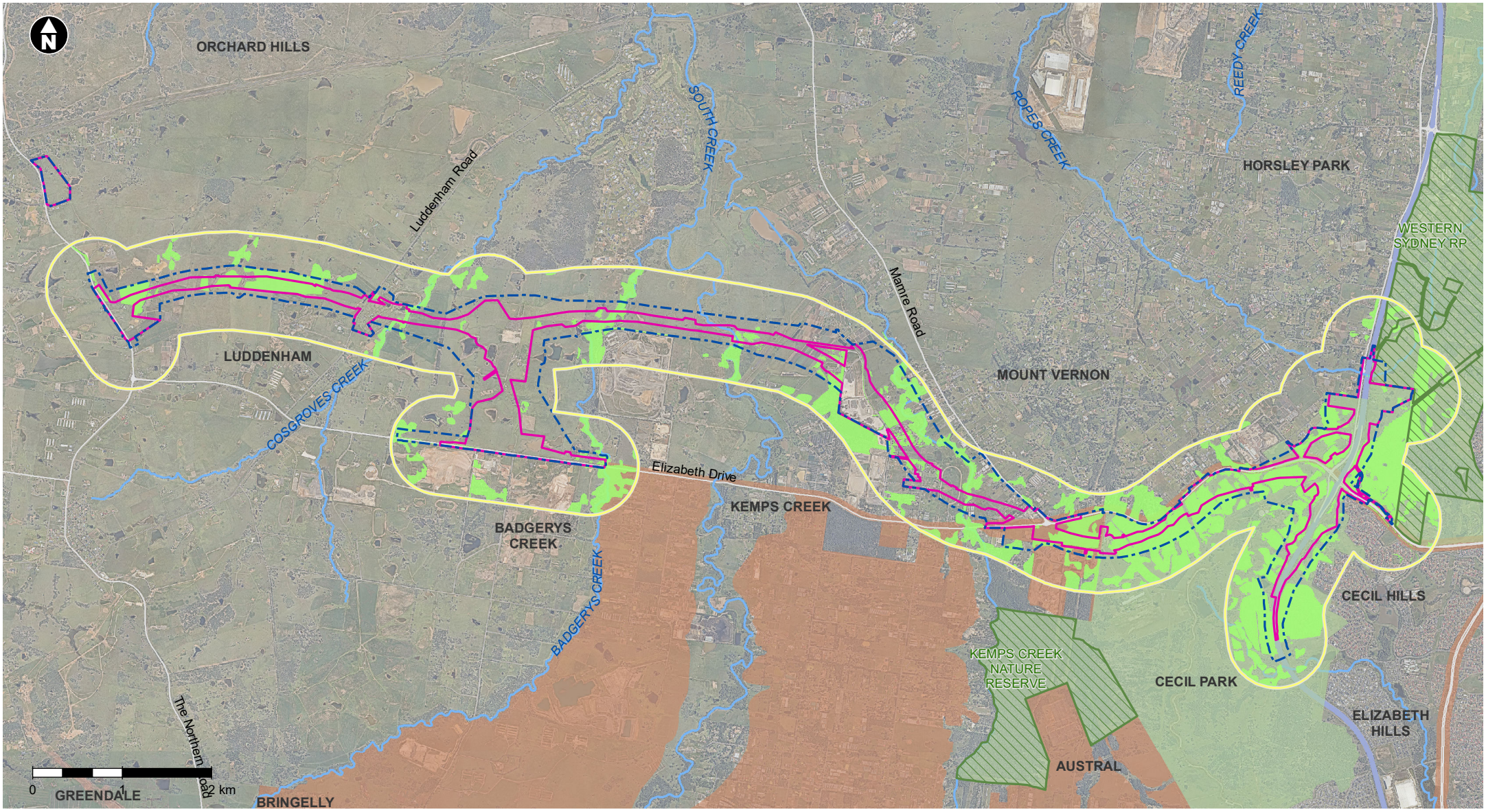
A biodiversity supplementary technical report has been prepared to provide the results of additional field surveys, review of threatened species and ecological communities that occur within the amended construction footprint, assess biodiversity impacts and update calculations for biodiversity offsets for the amended project, in comparison to those of the project as described in the EIS. The biodiversity supplementary technical report is provided in **Appendix A**, and a summary is provided below. This section should be read in conjunction with Section 7.1 of the EIS and the biodiversity assessment report provided in Appendix E of the EIS.

It is noted that TfNSW applied to have the project defined as a 'pending or interim planning application' under Clause 27(1) of the Biodiversity Conservation (Savings and Transitional) Regulation 2017. This was based on having carried out 'substantial environmental assessment' prior to the commencement of the *Biodiversity Conservation Act 2016* (NSW) (BC Act), which came into effect on August 2017. This application was granted by a delegate of the Secretary of the DPIE (Planning and Assessment) on 5 April 2018.

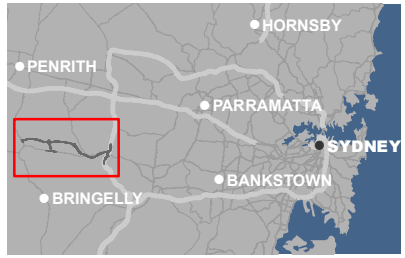
Accordingly, the former planning provisions (being the *Threatened Species Conservation Act 1995* (NSW) (TSC Act)), the NSW Biodiversity Offsets Policy for Major Projects (2014) and the Framework for Biodiversity Assessment 2014 (FBA) continue to apply to the amended project.

6.1.1 Assessment methodology

The study area for the assessment has been updated to accommodate the proposed changes for the amended project. The amended biodiversity study area is shown on **Figure 6-1**. The amended construction footprint includes exclusion zones defined as 'no-go' areas that would be protected for the duration of construction, amounting to about 0.62 hectares. The vegetation calculations for this assessment have therefore been updated to remove areas mapped within the exclusion zones.



The amended project construction footprint
Amended study area corridor
550m landscape assessment buffer
Waterways
Native vegetation
NPWS Reserves
Western Sydney Parklands
Biodiversity certified land



*Entire map extent is covered by the IBRA 7 Region - Sydney Basin,and IBRA 7 Subregion - Cumberland. No SEPP 14 Coastal Wetlands or Ramsar Wetlands are present in the entire map extent.

Figure 6-1 Amended biodiversity study area

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A desktop review and field surveys were carried out for this supplementary assessment in January 2020. The desktop review involved an updated database search to identify State and Commonwealth records of threatened entities and Commonwealth Matters of National Environmental Significance within 10 kilometres of the amended construction footprint.

About seven hectares of additional native vegetation has been added to the construction footprint as a result of the amended project when compared to the area assessed in the EIS. As a result, three additional field surveys were conducted between 16 January and 29 January 2020.

The field surveys were comprised of:

- Three plot-based floristic surveys
- Two Cumberland Plain Land Snail (*Meridolum corneovirens*) surveys
- One terrestrial fauna habitat assessment.

The location of these additional field surveys are shown on **Figure 6-2**.

6.1.2 Existing environment

Section 7.1.3 of the EIS describes the existing environment of the EIS study area in relation to biodiversity. This section has focused on the existing environment of the additional areas that now form part of the amended construction footprint. The aspects of the existing environment that have changed from the EIS are described in this section and are listed below:

- Landscape features
- Terrestrial flora
  - Native vegetation communities
  - TECs listed under the TSC Act
  - TECs listed under the EPBC Act
  - Threatened flora species
- Terrestrial fauna
  - Fauna habitat
  - Threatened fauna species.

Some aspects of the existing environment were determined through desktop review and additional field surveys to be consistent with those discussed in Section 7.1.3 of the EIS. These are described in **Appendix A** and not discussed further in this section.

6.1.2.1 Landscape Features

Two of the 10 landscape features identified in Table 7-6 of the EIS have been revised to reflect the amended biodiversity study area. These are described in **Table 6-1**. The description of the other eight features remain unchanged from the EIS and are not repeated in this report.

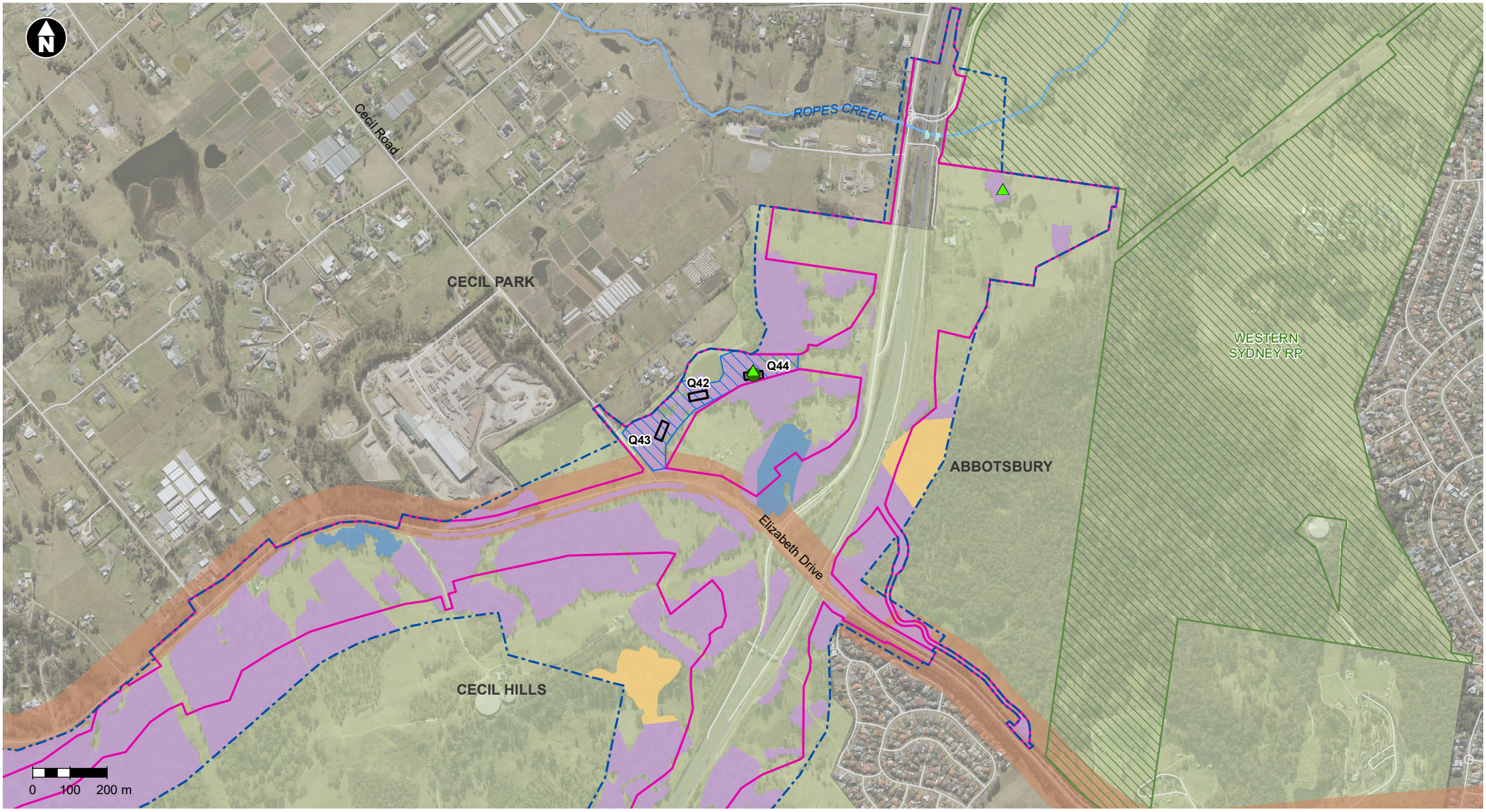

Figure 6-2 Additional field survey locations

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Table 6-1 Updated landscape features for the amended project

Landscape feature	EIS study area	Amended biodiversity study area
Soils and geology	Four soil landscape types are present in the EIS study area: • Luddenham • Blacktown • South Creek • Picton. Disturbed Terrain is also present.	In addition to the four soil landscapes (and disturbed terrain) the amended ancillary facilities between Clifton Avenue and Salisbury Avenue are within the Berkshire Park soil landscape type. This is discussed further in **Section 6.11.2**.
Wetlands	Within the EIS study area: • Artificial wetlands (ie farm dams, detention basins, roadside drains, effluent treatment systems) including 28 dams • Coastal Wetland (ID 117) listed under the State Environmental Planning Policy (Coastal Management SEPP) 2018 • An unnamed tributary of Hinchinbrook Creek passes through the southern extent of the EIS BAR study area and flows into a Coastal Wetland (ID 276) about 1.8 kilometres to the southeast of the EIS BAR study area.	The amended construction footprint (including additional ancillary facilities) are likely to impact additional dams and dam areas including: • One additional small farm dam in the north-western extent of the amended project, east of The Northern Road • One additional small farm dam in the central extent of the amended project, east of Salisbury Avenue • Two additional small farm dams in the north-eastern extent of the amended project, east of the M7 Motorway • A greater impact area for one farm dam in the west of the amended project, between Luddenham Road and Cosgroves Creek.

6.1.2.2 Terrestrial flora

Native vegetation communities

The EIS identified seven Plant Community Types (PCTs) in the construction footprint as described in the EIS. No additional PCTs were identified in the amended construction footprint.

About 74 hectares of native vegetation would be located within the construction footprint as described in the EIS. For the amended project, an additional seven hectares of native vegetation would be located within the amended construction footprint, when compared to the construction footprint as described in the EIS. This would result in a total of about 81 hectares of native vegetation within the amended construction footprint.

All of the native vegetation corresponds with a PCT. The change in area of PCTs between the construction footprint as described in the EIS and the amended construction footprint is shown in **Table 6-2**. The majority of the increase in PCT being removed is located in the area to the north-west of the intersection of the M7 Motorway and Elizabeth Drive (see **Figure 6-3**).

The EIS identified 14 vegetation zones within the construction footprint. One additional vegetation zone has been identified in the amended construction footprint, comprising about 1.34 hectares of the 850 - Moderate/Good_Poor vegetation zone. This vegetation zone is north-west of the intersection of the M7 Motorway and Elizabeth Drive (see **Figure 6-3**) and is associated with Grey Box-Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion.

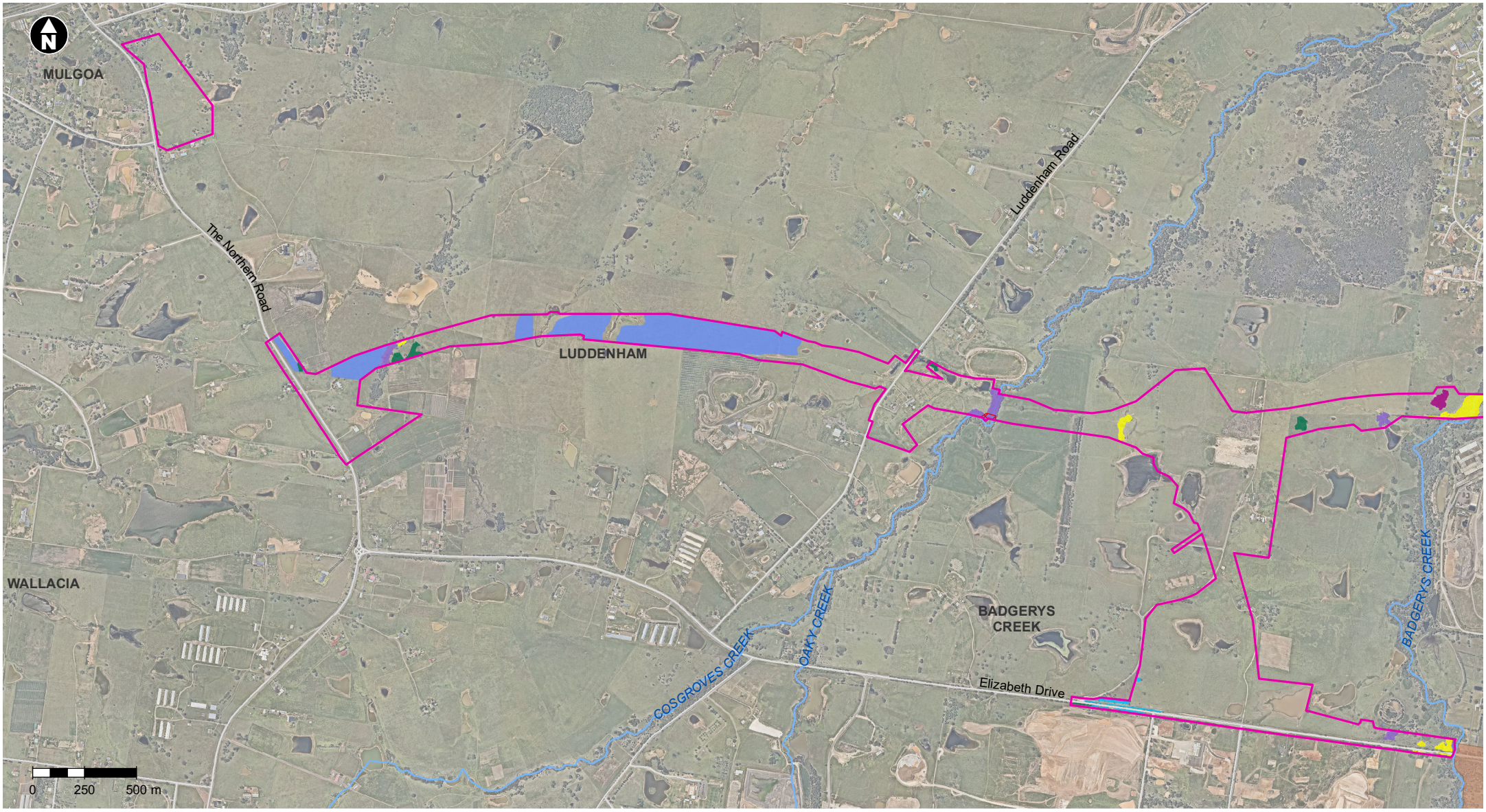

Figure 6-3 PCT and vegetation zones for the amended project

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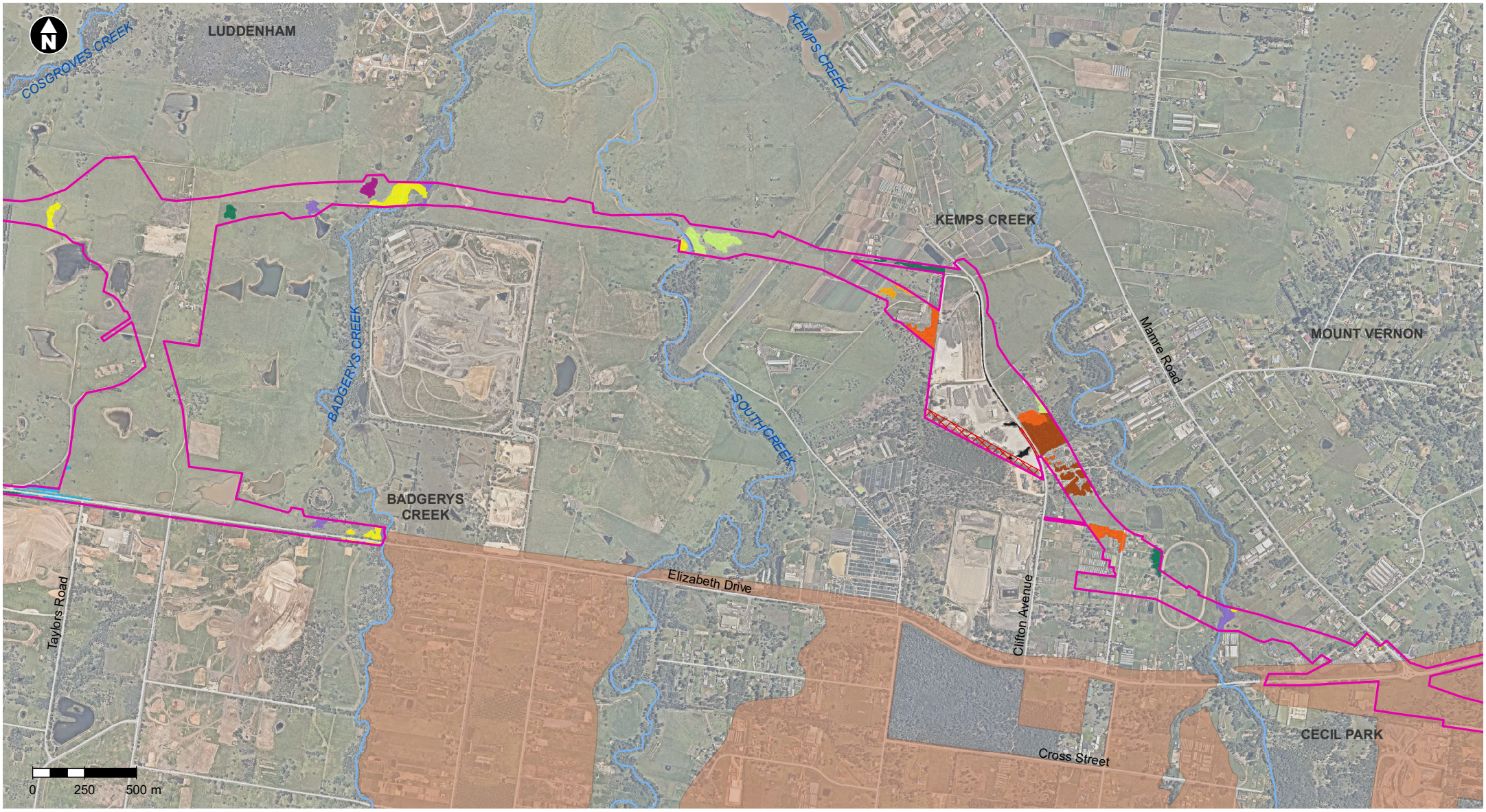

The amended project construction footprint
The amended project exclusion zones
Biodiversity certified land
Waterways

Vegetation zones

724 - Moderate/Good_High
724 - Moderate/Good_Medium
724 - Moderate/Good_Poor
835 - Moderate/Good_Poor
849 - Moderate/Good_Medium
849 - Moderate/Good_Poor
849 - Moderate/Good_Other (Derived Shrubland)
850 - Moderate/Good_Medium
883 - Poor
1800 - Moderate/Good_Poor

Figure 6-3 PCT and vegetation zones for the amended project

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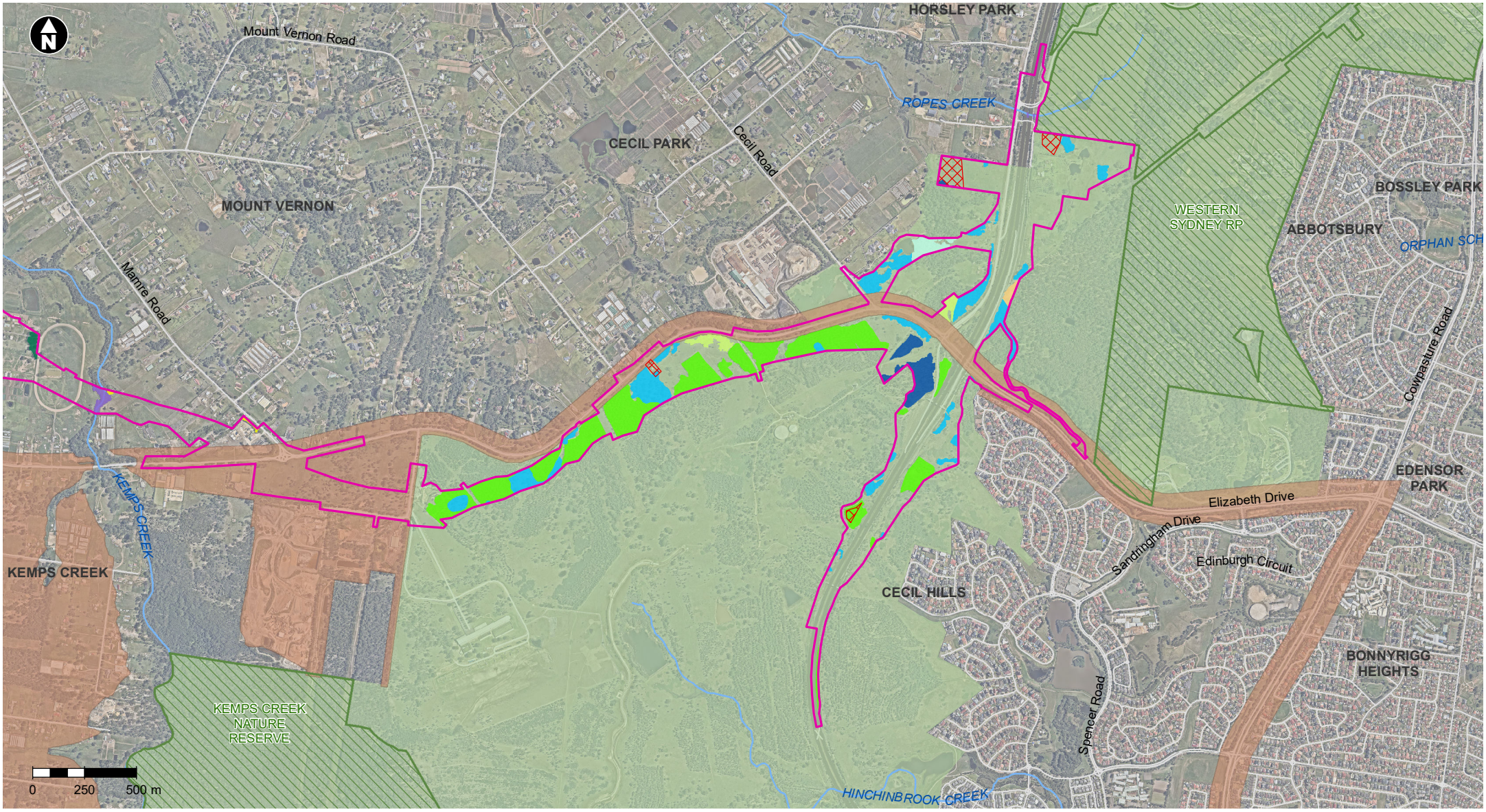

The amended project construction footprint
The amended project exclusion zones
Biodiversity certified land
NPWS Reserves
Western Sydney Parklands
Waterways

Vegetation zones

724 - Moderate/Good_Medium
830 - Moderate/Good_Poor
835 - Moderate/Good_Poor
849 - Moderate/Good_Medium
849 - Moderate/Good_Poor
850 - Moderate/Good_High
850 - Moderate/Good_Medium
850 - Moderate/Good_Other (Revegetation)
850 - Moderate/Good_Poor
1800 - Moderate/Good_Poor

Figure 6-3 PCT and vegetation zones for the amended project

Date: 3/04/2020 Path: M:\GIS\MXDs\Figures\Technical_reports\BAR\Amendment_Report\JAJV_BAR_Amendment_F004-1_VegetationZones_v3.mxd
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In addition to the additional vegetation zone identified, there were a number of minor changes to the areas covered by the other 14 vegetation zones within the amended construction footprint when compared to the EIS. The largest change is associated with an additional 3.61 hectares (ie an increase from 10.14 hectares to 13.75 hectares) of the 850-Moderate/Good_Medium vegetation zone associated with Grey Box-Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion.

Table 6-2 PCTs identified within the amended construction footprint

PCT No	PCT name	Area (ha) within EIS construction footprint[1]	Area (ha) within amended construction footprint[1]	Difference (ha)
724	Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	6.91	6.89	-0.02 (decrease)
830	Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	0.44	0.44	0
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	3.23	3.01	-0.22 (decrease)
849	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	6.09	6.24	0.15
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (includes revegetation within Western Sydney Parklands and derived grasslands in Low condition)	54.07	60.67	6.60
883	Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin Bioregion	0.38	0.57	0.19
1800	Swamp Oak open forest on river flats of the Cumberland Plain and Hunter valley	2.53	2.82	0.29
Total		**73.65**	**80.64**	**6.99**

[1] *excluding certified areas*

These changes, including the additional vegetation zone identified, resulted in a total of about seven additional hectares of vegetation zones in the amended construction footprint when compared to the EIS construction footprint (described in **Table 6-2** above).

However most of this additional seven hectares have a relatively lower site value score. Further detail about the changes to vegetation zones and a description of the additional vegetation zone identified is provided in **Appendix A**.

TECs listed under the TSC Act

Six of the PCTs identified in the EIS construction footprint were found to meet the criteria for five threatened ecological communities (TECs) listed under the TSC Act. No additional TECs were identified in the amended construction footprint however there were minor differences in area of TECs within the amended construction footprint, compared to those within the construction footprint as described in the EIS.

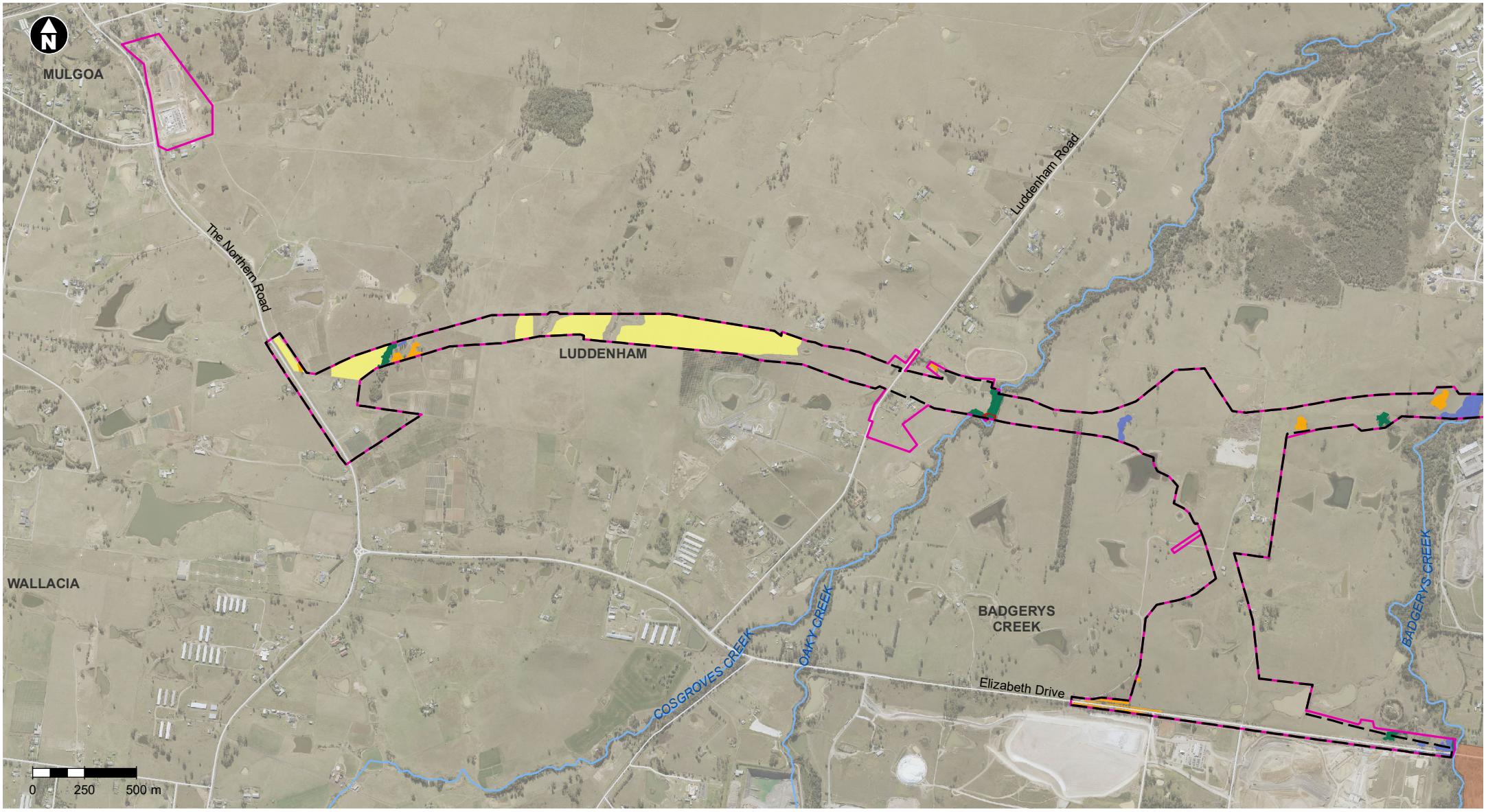
About 73 hectares of TEC would be located within the construction footprint as described in the EIS. For the amended project, an additional 6.80 hectares of TEC would be located within the amended construction footprint, when compared to the project as described in the EIS. This would result in a total of about 80 hectares of TEC within the amended construction footprint.

The majority of the increase is the Cumberland Plain Woodland in the Sydney Basin Bioregion TEC, located in the area to the north-west of the intersection of the M7 Motorway and Elizabeth Drive (see **Figure 6-4**). Anticipated changes in the area covered by TECs as a result of proposed changes to the construction footprint are presented in **Table 6-3**.

Table 6-3 TECs listed under the TSC Act identified within the amended construction footprint

TEC Name	PCT(s)	TSC Act Status	Area (ha) within EIS construction footprint[1]	Area (ha) within amended construction footprint[1]	Difference (ha)
Shale Gravel Transition Forest in the Sydney Basin Bioregion	724	Endangered	6.91	6.89	-0.02 (decrease)
Moist Shale Woodland in the Sydney Basin Bioregion	830	Endangered	0.44	0.44	0
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	835	Endangered	3.23	3.01	-0.22 (decrease)
Cumberland Plain Woodland in the Sydney Basin Bioregion	849 850	Critically Endangered	60.16 (includes about 22.65 ha of revegetation and about 18.07 ha of derived native grassland in Low condition)	66.91 (includes about 24.31 ha of revegetation and about 18.06 ha of derived native grassland in Low condition)	6.75
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	1800	Endangered	2.53	2.82	0.29
Total			**73.27**	**80.07**	**6.80**

[1] *excluding certified areas*



Project construction footprint as per EIS
The amended project construction footprint
The amended project exclusion zones
Biodiversity certified land
Waterways

Threatened ecological communities (TSC Act)

Cumberland Plain Woodland in the Sydney Basin Bioregion
Cumberland Plain Woodland in the Sydney Basin Bioregion (derived grassland form)
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Figure 6-4 TECs listed under the TSC Act for the amended project

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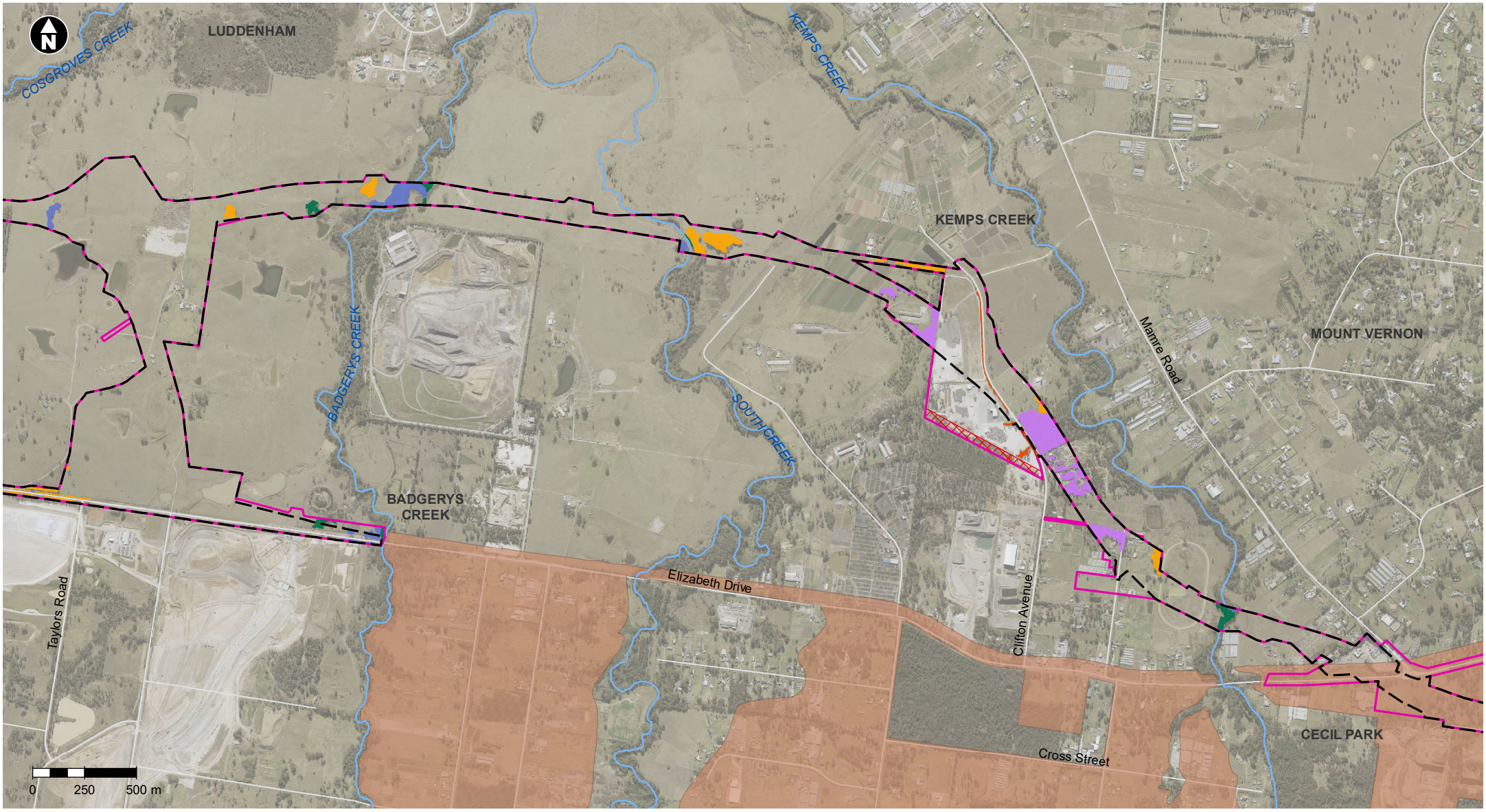

Project construction footprint as per EIS
The amended project construction footprint
The amended project exclusion zones
Biodiversity certified land
Waterways

Threatened ecological communities (TSC Act)

Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion
Cumberland Plain Woodland in the Sydney Basin Bioregion
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
Shale Gravel Transition Forest in the Sydney Basin Bioregion
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Figure 6-4 TECs listed under the TSC Act for the amended project

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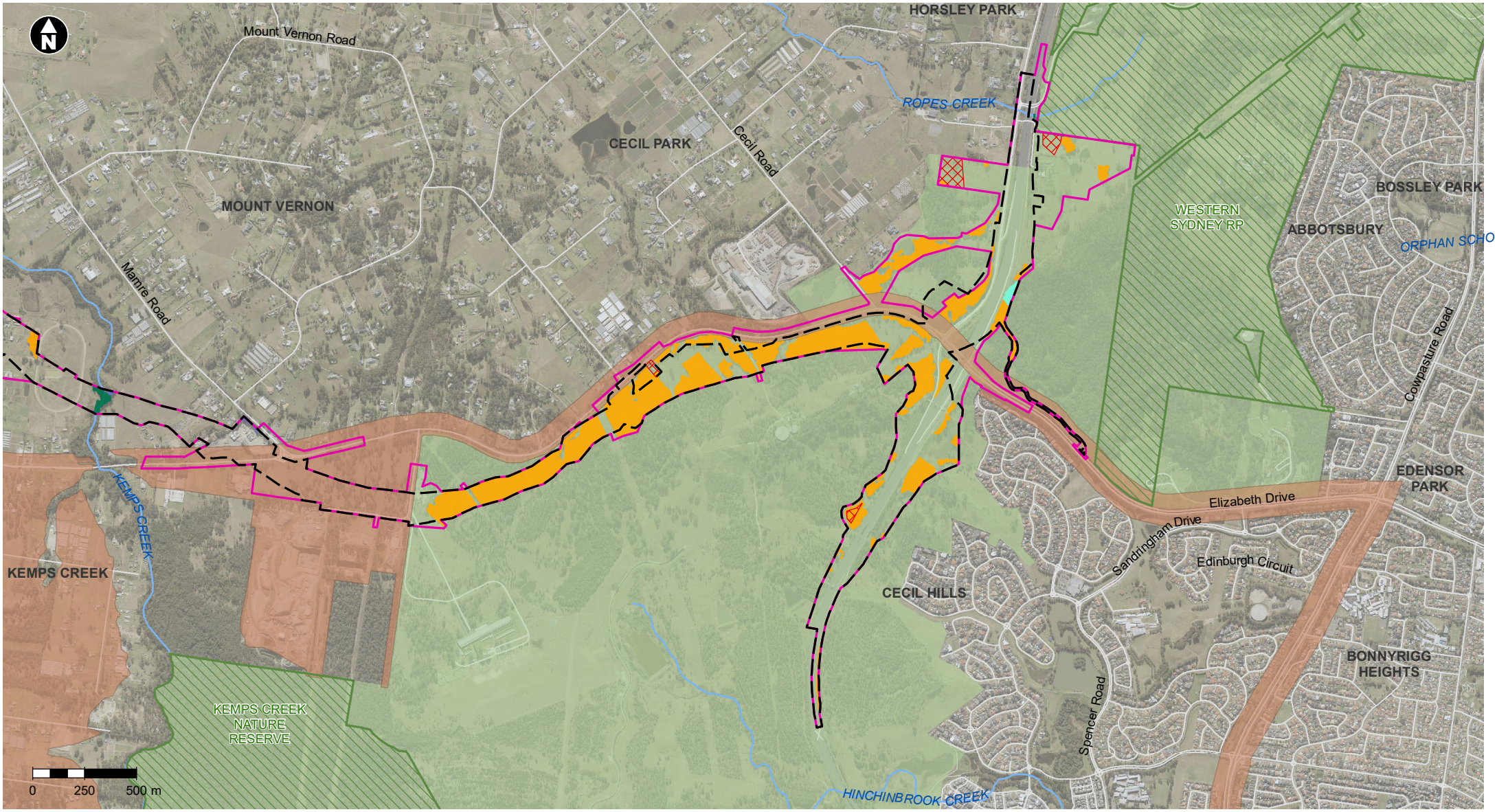

Project construction footprint as per EIS
The amended project construction footprint
The amended project exclusion zones
Biodiversity certified land
NPWS Reserves
Western Sydney Parklands
Waterways

Threatened ecological communities (TSC Act)

Cumberland Plain Woodland in the Sydney Basin Bioregion
Moist Shale Woodland in the Sydney Basin Bioregion
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
Shale Gravel Transition Forest in the Sydney Basin Bioregion
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

Figure 6-4 TECs listed under the TSC Act for the amended project

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TECs listed under EPBC Act

The EIS identified that two TECs within the EIS study area also meet the criteria for listing under the EPBC Act. No additional TECs listed under the EPBC Act were identified in the amended construction footprint.

About 39 hectares of TECs listed under the EPBC Act would be located within the construction footprint as described in the EIS. For the amended project, an additional 3.99 hectares of TECs listed under the EPBC Act would be located within the amended construction footprint, when compared to the project as described in the EIS. This would result in a total of about 43 hectares of TECs listed under the EPBC Act within the amended construction footprint.

The majority of TEC which meets the criteria for listing under the EPBC Act based on diagnostic criteria is located within the Western Sydney Parklands (see **Figure 6-5**). The changes to the areas covered by TECs as a result of proposed changes to the construction footprint are presented in **Table 6-4**.

Table 6-4 TECs listed under the EPBC Act identified within the amended construction footprint

TEC Name	PCT(s)	EPBC Act Status	Area (ha) within EIS construction footprint[1]	Area (ha) within amended construction footprint[1]	Difference (ha)
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	849 850 724	Critically Endangered	38.48 (includes 20.21 ha of revegetation)	42.47 (includes 22.04 ha of revegetation)	3.99
Western Sydney Dry Rainforest and Moist Woodland on Shale	830	Critically Endangered	0.44	0.44	0
Total			**38.92**	**42.91**	**3.99**

[1] *excluding certified areas*

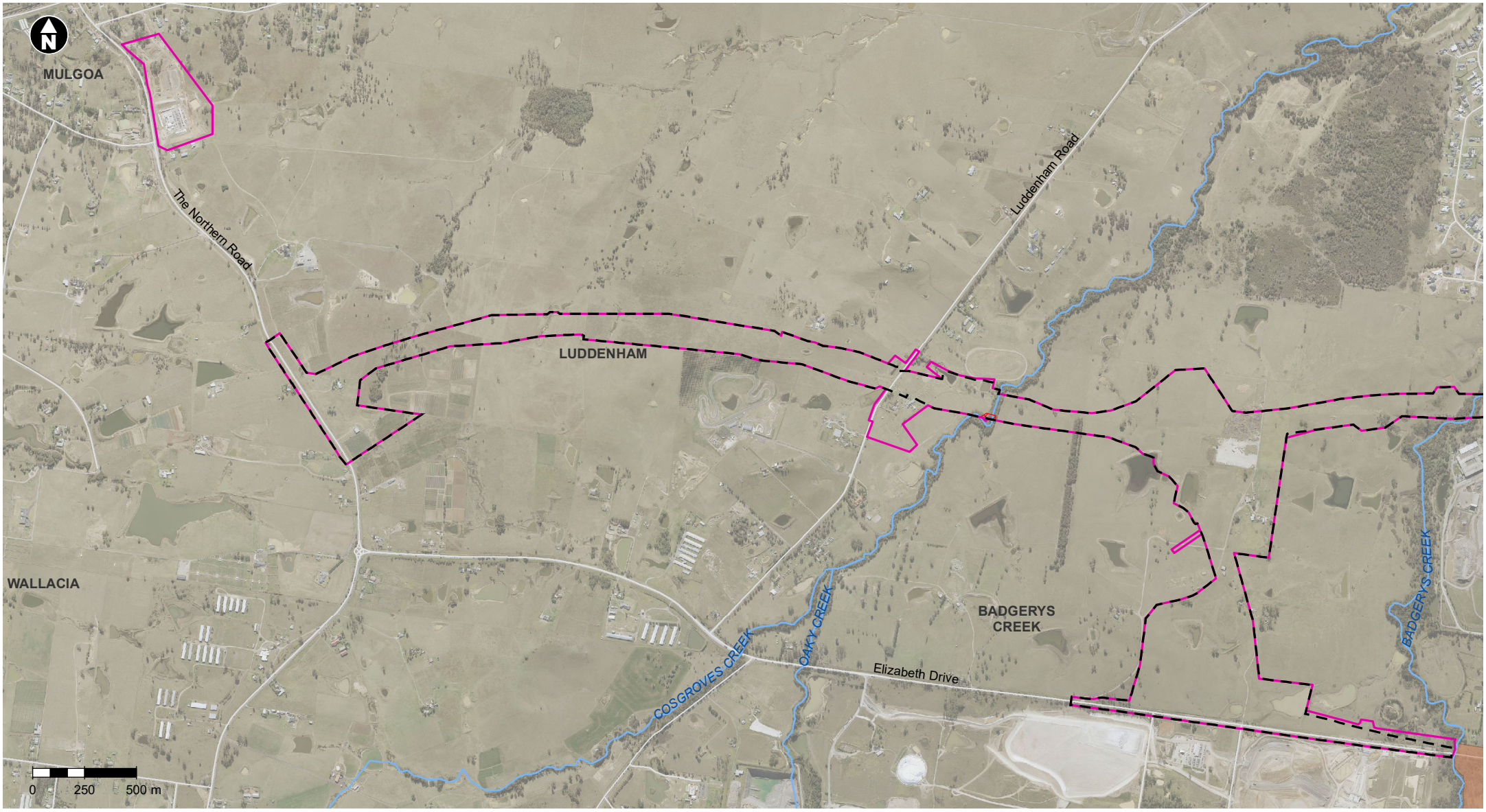
Threatened flora species

The EIS identified two threatened flora species within the construction footprint as per the EIS:

- *Dillwynia tenuifolia* – 244 individuals
- *Pultenaea parviflora* – 90 individuals.

No additional threatened flora species have been recorded within the amended construction footprint. There are, however, additional records of *Dillwynia tenuifolia* (44 individuals) and *Pultenaea parviflora* (139 individuals) within the amended construction footprint. These individuals would be retained and protected, however, within exclusion zones.

A population of 18 *Pultenaea parviflora* individuals that were previously recorded within a certified area in Western Sydney Parklands was reinspected in January 2020. This inspection found only 10 plants of *Pultenaea parviflora* within the certified area. These records are all within five meters of the certification boundary, however. The location of these plants in relation to the certification boundary could be verified by a surveyor to verify that they are within the certified area due to the potential for a GPS error.



The project construction footprint as per the EIS

The amended project construction footprint

The amended project exclusion zones

Biodiversity certified land

Waterways

Figure 6-5 TECs listed under the EPBC Act for the amended project

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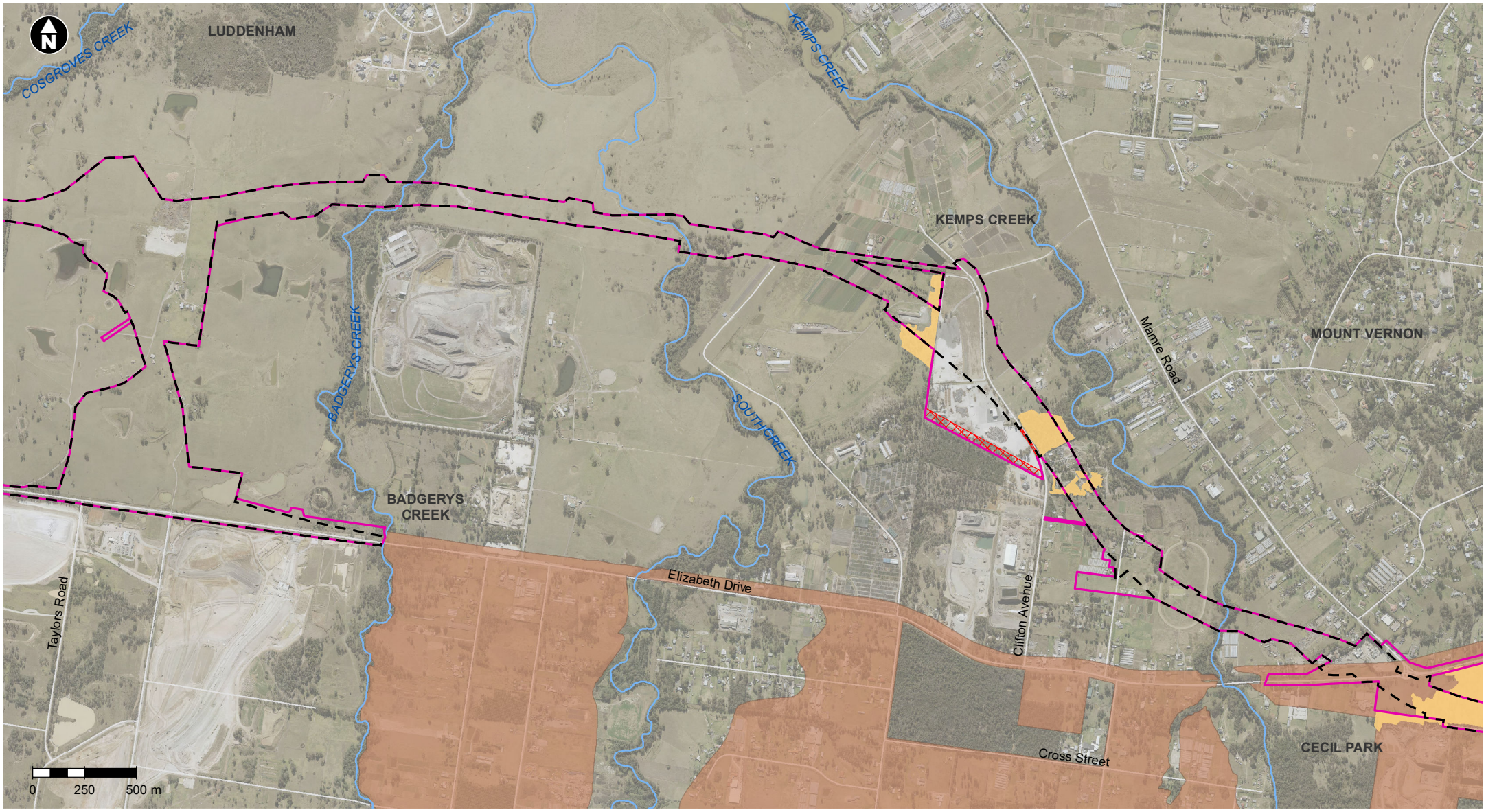

The project construction footprint as per the EIS

The amended project construction footprint

The amended project exclusion zones

Biodiversity certified land

Waterways

Threatened ecological communities (EPBC Act)

Cumberland Plain Shale Woodlands and Shale/Gravel Transition Forest

Figure 6-5 TECs listed under the EPBC Act for the amended project

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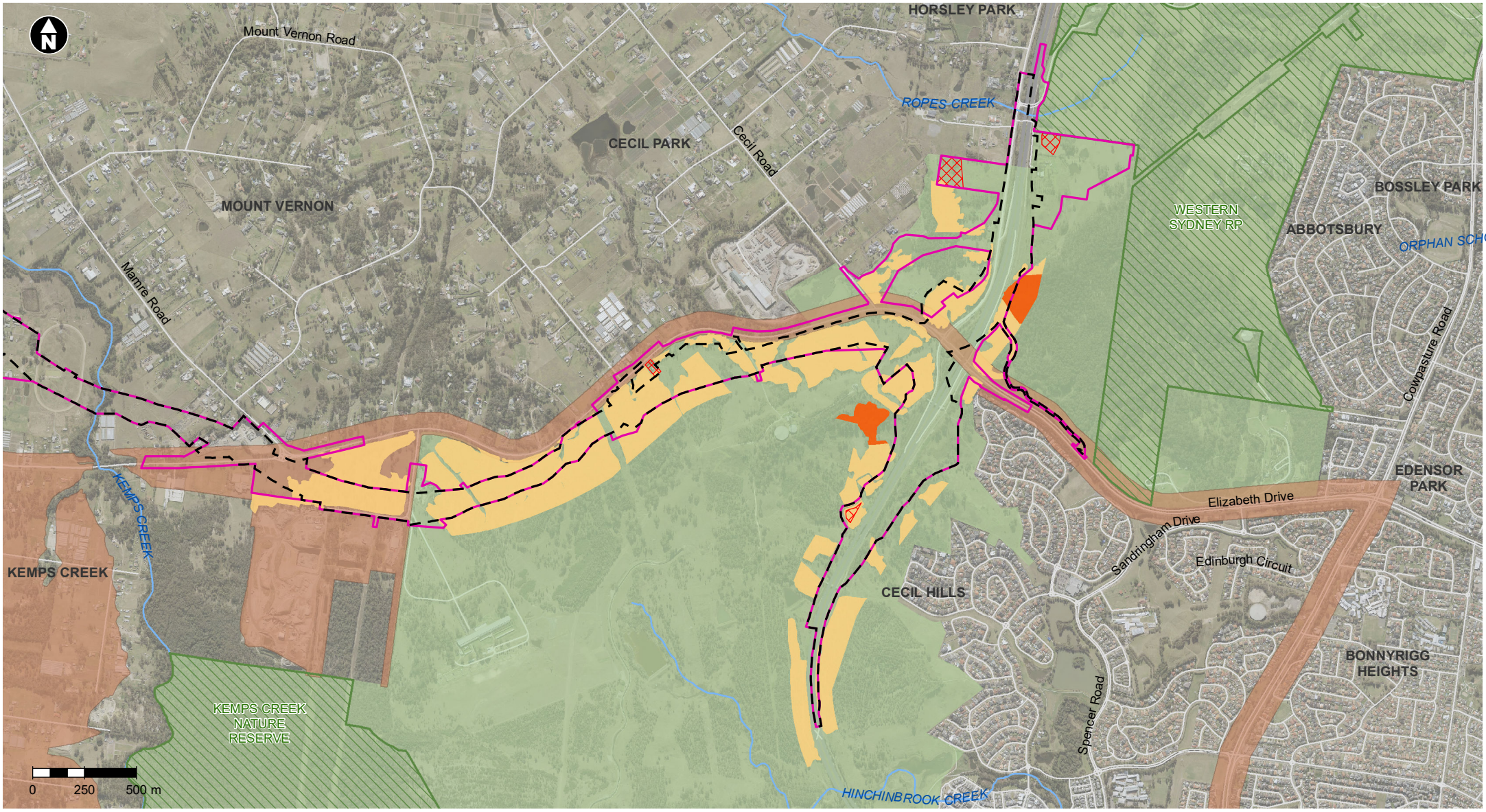

The project construction footprint as per the EIS

The amended project construction footprint

The amended project exclusion zones

NPWS Reserves

Western Sydney Parklands

Biodiversity certified land

Waterways

Threatened ecological communities (EPBC Act)

Cumberland Plain Shale Woodlands and Shale/Gravel Transition Forest

Western Sydney Dry Rainforest and Moist Woodland on Shale

Figure 6-5 TECs listed under the EPBC Act for the amended project

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Therefore, based on a precautionary approach, the total threatened flora species located within the amended construction footprint has assumed:

- *Dillwynia tenuifolia* – 244 individuals
- *Pultenaea parviflora* – up to 100 individuals.

In addition to the two recorded threatened flora species listed above, the additional field survey has identified slight increases in potential habitats for the following threatened flora species within the amended construction footprint:

- *Dillwynia tenuifolia* – additional 0.32 hectares (increase from 13.38 hectares to 13.70 hectares)
- *Pultenaea parviflora* – additional 0.17 hectares (increase from 7.29 hectares to 7.46 hectares)
- *Grevillea juniperina subsp. juniperina* – additional 6.94 hectares (increase from 49.38 hectares to 56.32 hectares)
- *Marsdenia viridiflora subsp. viridiflora* in the Bankstown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith Local Government Areas – additional 7.38 hectares (increase from 55.20 hectares to 62.58 hectares)
- *Pimelea spicata* – additional 6.77 hectares (increase from 42.53 hectares to 49.30 hectares).

6.1.2.3 Terrestrial fauna

Fauna habitat

No additional habitat types were identified within the amended construction footprint. No additional hollow-bearing trees were recorded during surveys for the amended project.

About 334 hectares of fauna habitat would be located within the construction footprint as described in the EIS. For the amended project, an additional 9.83 hectares of fauna habitat would be located within the amended construction footprint, when compared to the project as described in the EIS. This would result in a total of about 344 hectares of fauna habitat is located within the amended construction footprint.

A summary of the changes to the area of each habitat type as a result of the amended construction footprint is provided in **Table 6-5**.

Table 6-5 Summary of fauna habitat types within EIS and amended biodivers6 ity study area

Habitat type	Area (ha) within EIS construction footprint[1]	Area (ha) within amended construction footprint[1]	Difference (ha)
Woodland	49.82	56.75	6.93
Riparian forest	5.76	5.83	0.07
Grassland	275.05	277.04	1.99
Wetlands and watercourses	3.69	4.53	0.84
Total	**334.32**	**344.15**	**9.83**

[1] *excluding certified areas*

Threatened fauna species

The EIS identified 10 threatened fauna species within the EIS study area. This comprised of seven threatened fauna species which were recorded, and three species assumed to be present based on the availability of suitable habitat and recent species records.

During field surveys for this supplementary assessment, one live individual Cumberland Plain Land Snail was recorded within PCT 850, northwest of the M7 Motorway interchange. As a result, the fauna habitat for the Cumberland Plain Land Snail shown in Figure 7-9 in the EIS has been amended and is shown in **Figure 6-6**. Threatened fauna species recorded or assumed to occur within the amended study area and amended construction footprint is shown in **Table 6-6**.

No other threatened fauna species were recorded within the amended construction footprint.

Table 6-6 Threatened fauna species recorded or assumed to occur within the amended study area and amended construction footprint

Threatened fauna species	Scientific name	Status		Recorded or assumed in EIS	Recorded or assumed for amended project
		TSC Act	EPBC Act		
White-bellied Sea-Eagle	*Haliaeetus leucogaster*	V	-	Recorded	Recorded
Yellow-bellied Sheathtail-bat	*Saccolaimus flaviventris*	V	-	Recorded	Recorded
Eastern Freetail-bat	*Mormopterus norfolkensis*	V	-	Recorded	Recorded
Greater Broad-nosed Bat	*Scoteanax rueppellii*	V	-	Recorded	Recorded
Eastern Bentwing-bat	*Miniopterus schreibersii oceanensis*	V	-	Recorded	Recorded
Little Bentwing-bat	*Miniopterus australis*	V	-	Recorded	Recorded
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	V	Recorded	Recorded
Cumberland Plain Land Snail	*Meridolum corneovirens*	E	-	Assumed	Recorded
Southern Myotis	*Myotis macropus*	V	-	Assumed	Assumed
Eastern False Pipistrelle	*Falsistrellus tasmaniensis*	V	-	Assumed	Assumed

Note: Grey cell represents a change from the project as described in the EIS.

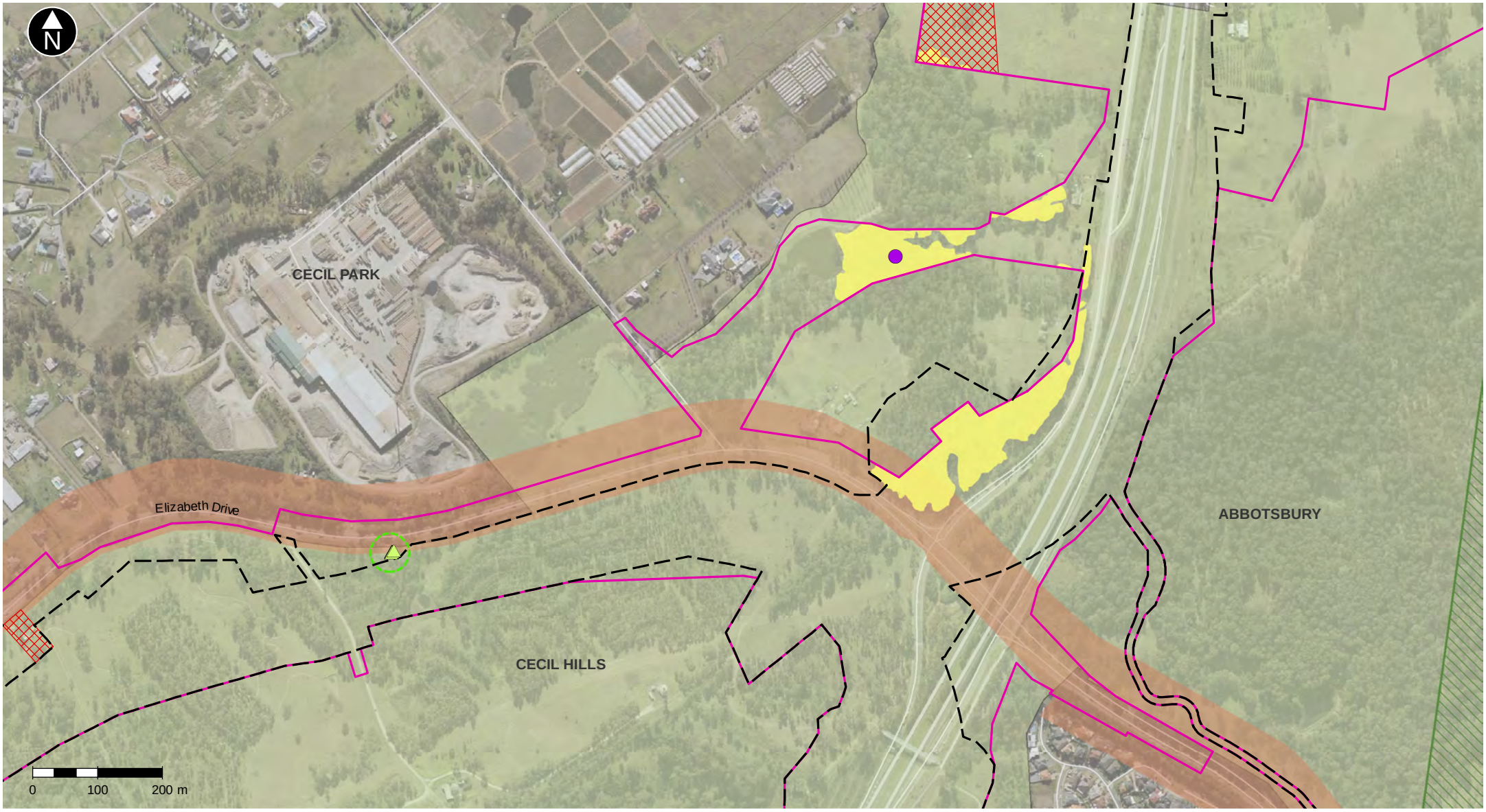

Figure 6-6 Additional recorded threatened species from January 2020 surveys

Date: 8/05/2020 Path: M:\GIS\MXDs\Figures\Technical_reports\BAR\Amendment_Report\JAJV_BAR_Amendment_F006-6_RecordedThreatSpecies2020_v3.mxd
Created by : EM | QA by : RB

6.1.3 Assessment of potential impacts

6.1.3.1 Avoidance and minimisation

Where practicable, biodiversity impacts have been avoided and/or minimised during development of the amended project. However, in some instances, biodiversity impacts could not be avoided or minimised due to the design constraints of the amended project.

Design constraints of the amended project include:

- Realignment of Wallgrove Road to connect to Cecil Road, including a connection between Elizabeth Drive and Wallgrove Road via Cecil Road with a signalised intersection with Elizabeth Drive
  - This change would improve intersection performance at the existing signalised intersection of Wallgrove Road and Elizabeth Drive but would require clearing of existing vegetation.
  - The location of the design change has been determined to minimise impact on existing residential properties and land that is currently the subject of a proposed State Significant Development. The location of the proposed design change has aimed to minimise property and land use impacts. As a result, avoidance of biodiversity impacts for this design change has not been practicable. Consultation with landowners has been undertaken and the design would continue to be refined during detailed design phase to minimise biodiversity impacts.
- Direct connection between the M12 Motorway and Elizabeth Drive at the motorway-to-motorway interchange at the M7 Motorway
  - This change would allow road users to access the M12 Motorway from Elizabeth Drive and provide a toll-free option for motorway access to the Western Sydney International Airport from the east, but would require clearing of vegetation.
  - All additional areas of vegetation to be impacted by this design change are areas that were already subject to fragmentation, or that would have been indirectly impacted by the project as described in the EIS.
- Additional and expanded construction ancillary facilities
  - Where practicable, additional ancillary facilities have been proposed for locations that are more than 50 metres from a waterway and do not require vegetation clearing beyond that already required for the project as described in the EIS.
  - One of the additional ancillary facilities contains a population of threatened flora species *Dillwynia tenuifolia* and *Pultenaea parviflora*. The population at this location would be protected within an exclusion area to minimise impacts to these species.

6.1.3.2 Areas not requiring further assessment

Certain areas and activities do not require assessment, as discussed in Section 7.1.4 of the EIS. This includes activities carried out within certified land, in accordance with the terms of the South West Growth Centre Biodiversity Certification Order.

The amended construction footprint includes about 33.57 hectares of certified land (an increase from 17.38 hectares for the construction footprint as described in the EIS). About eight hectares of PCTs are mapped within certified land located within the construction footprint as described in the EIS. For the amended project, an additional 2.52 hectares of PCTs are mapped within certified land located within the amended construction footprint, when compared to the project as described in the EIS. This would result in a total of about 10.71 hectares of PCTs mapped within certified land located within the amended construction footprint. These areas have been excluded from impact assessment calculations.

6.1.3.3 Construction impacts

Section 7.1.4 of the EIS identified a number of potential biodiversity impacts that may occur during construction of the project. This section focuses on the additional impacts that are likely to occur as a result of the amended project when compared to the project described in the EIS. Potential impacts that have changed from the EIS are described in this section and are listed below:

- Removal of native vegetation, including edge effects
- Removal of threatened fauna habitat
- Removal of threatened flora
- Matter for further consideration
- Matters of National Environmental Significance.

Potential impacts that are considered consistent with the EIS, as there is either no or minor changes which can be managed in accordance with existing management measures are not discussed further in this section. Further detail on these impacts is provided in Section 5.5 of **Appendix A**.

Removal of native vegetation

Direct impacts

As discussed in **Section 6.1.2.2**, seven additional hectares of native vegetation (an increase from 74 hectares to 81 hectares) would be located within the amended construction footprint. All areas of native vegetation correspond with a PCT, and would be directly impacted by the amended project.

All additional areas of PCT to be removed, with the exception of PCT 883, fall within the criteria of TECs listed under the TSC Act, resulting in the removal of an additional 6.80 hectares (an increase from 73.27 hectares to 80.07 hectares) compared to the impacts presented in the EIS. This is inclusive of 3.99 hectares that also falls within the criteria of TECs listed under the EPBC Act, an increase from 38.92 hectares to 42.91 hectares when compared to the EIS (see **Table 6-3** and **Table 6-4**).

Indirect impacts

The project would result in indirect impacts to some areas of native vegetation adjoining the amended construction footprint, mainly due to fragmentation of vegetation and creation of new edges, which may result in edge effects.

The analysis of potential edge effects for the project as described in the EIS found that edge effects would be likely within Western Sydney Parklands and east of Clifton Avenue. This supplementary assessment of the amended project has focussed on these two areas. Edge effects were calculated using a 30 metre buffer from the edge of the amended construction footprint and analysis of mapped native vegetation.

The amended project would increase the area of vegetation subject to indirect impacts by about six per cent when compared to the project described in the EIS. A total of 13.31 hectares (an additional 0.89 hectares compared to the EIS) of native vegetation within Western Sydney Parklands and east of Clifton Avenue would experience increased edge effects as a result of the project due to the creation of one or more new edges within previously unfragmented vegetation.

A total of 0.21 hectares (decrease by 0.10 hectares compared to the EIS) of native vegetation within Western Sydney Parklands would experience increased edge effects to the extent they would become unviable due to the small size of remaining patches.

The native vegetation that would be subject to potential edge effects for both the project as described in the EIS and the amended project is summarised in **Table 6-7**. The amended project

The native vegetation that would be subject to potential edge effects for both the project as described in the EIS and the amended project is summarised in Table 6-7. The amended project would result in an additional 0.79 hectares of potential edge effects (an increase from 12.73 hectares to 13.52 hectares) when compared to the edge effects presented in the EIS.

All areas of indirect impact meet the criteria for the TSC Act listed TECs, and 12.38 hectares of the total 13.52 hectares indirectly impacted meets the criteria for the EPBC Act listed TEC.

It should be noted that while the amended construction footprint overlaps a Biobank site in Western Sydney Parklands, the amended construction footprint has not changed in this area when compared to the EIS construction footprint.

Removal of threatened fauna habitat

As discussed in **Section 6.1.2.3**, the amended construction footprint contains an additional 9.83 hectares of fauna habitat compared to the EIS construction footprint (ie an increase from 334.32 hectares to 344.15 hectares) (see **Table 6-5**). This entire area consisting of woodland, riparian forest, grasslands, wetlands and watercourses would be impacted as a result of the amended project.

Species credit species

The removal of additional woodland and riparian fauna habitat has resulted in a change of impact to two species credit threatened fauna species: Cumberland Plain Land Snail and Southern Myotis.

Table 6-8 lists the potential impacts to species credit threatened fauna for both the project as described in the EIS and the amended project, highlighting the differences.

Table 6-7 Native vegetation subject to indirect impacts (potential edge effects)

Location	PCT	Condition	Area of indirect impacts in EIS (ha)	Area of indirect impacts for amended project (ha)	Difference (ha)
Western Sydney Parklands (excluding certified areas)	Non-viable fragments				
	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 850)	Moderate/ Good_Medium	0.01	0.18	0.17
		Moderate/ Good_Other (Revegetation)	0.30	0.03	-0.27 (decrease)
	New edges				
	Forest Red Gum – Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 830)	Moderate/ Good_Poor	0.54	0.61	0.07

Location	PCT	Condition	Area of indirect impacts in EIS (ha)	Area of indirect impacts for amended project (ha)	Difference (ha)
	Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849)	Moderate/ Good_Medium	0.24	0.57	0.33
	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 850)	Moderate/ Good_High	1.06	1.24	0.18
		Moderate/ Good_Medium	3.33	3.31	-0.02 (decrease)
		Moderate/ Good_Poor	0	1.14	1.14
		Moderate/ Good_Other (Revegetation)	6.73	5.99	-0.74 (decrease)
	Total Western Sydney Parklands		12.21	13.07	0.86
East of Clifton Avenue	Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion (PCT 724)	Moderate/ Good_High	0.52	0.45	-0.07
	Total East of Clifton Avenue		0.52	0.45	-0.07
Grand total			**12.73**	**13.52**	**0.79**

[1] *excluding certified areas*

Table 6-8 Summary of impacts to species credit threatened fauna

Threatened fauna species	Status		Habitat area (ha) within EIS construction footprint[1]	Habitat area (ha) within amended construction footprint[1]	Difference (ha)
	TSC Act	EPBC Act			
Cumberland Plain Land Snail	Endangered	Not listed	1.86	5.22	3.36
Southern Myotis	Vulnerable	Not listed	0.92 (breeding habitat)	0.96 (breeding habitat)	0.04 (breeding habitat)

[1] *excluding certified areas*

Ecosystem credit species

The project as described in the EIS would result in a number of impacts to ecosystem credit species (see Table 7-14 of the EIS). No additional species would be impacted by the amended project compared to the project described in the EIS.

The amended project would remove an additional seven hectares of woodland and riparian habitat for seven bat species identified in the EIS, bringing the total to 62.58 hectares compared to 55.58 hectares to be impacted.

The amended project would still impact on the following, consistent with the project as described in the EIS (see Section 7.1.4 of the EIS):

- Removal of the 54 hollow bearing trees
- Removal of 3.69 hectares of foraging habitat for the Southern Myotis and White-bellied Sea-Eagle
- One White-bellied Sea-Eagle nest.

Removal of threatened flora

As described in in **Section 6.1.2.2**, no additional threatened flora species have been recorded within the amended construction footprint when compared to the EIS construction footprint.

About 850 individuals of *Dillwynia tenuifolia* (an increase of up to 801 individuals compared to the project as described in the EIS) would experience indirect impacts as a result of the amended project, including:

- About 44 individuals located within the amended construction footprint and protected via the implementation of exclusion zones
- About 49 individuals located within 30 metres of the construction footprint
- About 757 individuals located within a conservation zone as recorded by Ecoplanning (2015); the conservation zone would be located entirely within an exclusion zone.

About 142 individuals of *Pultenaea parviflora* (an increase of up to 124 individuals compared to the project as described in the EIS) would experience indirect impacts as a result of the amended project, including:

- About 139 individuals located within the amended construction footprint and protected via the implementation of exclusion zones.
- About three individuals located within a conservation zone as recorded by Ecoplaning (2015). The conservation zone would be located entirely within an exclusion zone.

As discussed in **Section 6.1.2.2**, there is a slight increase in potential habitats for the following threatened flora species:

- *Dillwynia tenuifolia* – additional 0.32 hectares
- *Pultenaea parviflora* – additional 0.17 hectares
- *Grevillea juniperina subsp. juniperina* – additional 6.94 hectares
- *Marsdenia viridiflora subsp. viridiflora* in the Bankstown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith Local Government Areas – additional 7.38 hectares
- *Pimelea spicata* – additional 6.77 hectares.

Matters for further consideration

The amended project would result in a loss of an additional 6.76 hectares of Cumberland Plain Woodland in the Sydney Basin Bioregion critically endangered ecological community (CEEC) under the TSC Act considered to be in moderate to good condition, when compared to the project described in the EIS. This would result in a total 48.85 hectares to be impacted as a result of the amended project. This constitutes an additional 0.02 per cent (total 0.15 per cent) of the total remaining area of Cumberland Plain Woodland identified in the regional vegetation mapping, compared to the project as described in the EIS. This is an additional 0.05 per cent (total 0.45 per cent) of the total remaining area of Cumberland Plain Woodland identified in the Final Determination for this community.

Additional areas of this CEEC identified within the amended construction footprint will be offset in accordance with the FBA, consistent with the management measures described in Section 7.1.6 of the EIS.

An updated assessment of the potential impact to Cumberland Plain Woodland in the Sydney Basin Bioregion CEEC under the TSC Act, based on Framework for Biodiversity Assessment requirements, is included in Section 5.3.2 of **Appendix A**.

Matters of National Environmental Significance

Potential impacts to Matters of National Environmental Significance are described in Section 7.1.4 of the EIS. The assessment of the amended project shows that it would have the following additional impacts on Matters of National Environmental Significance as compared with the project as described in the EIS:

- An additional 3.99 hectares of the TEC Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest would be cleared – an increase from the 38.48 hectares for the project as described in the EIS to 42.47 hectares for the amended project
- Up to 10 additional *Pultenaea parviflora* individuals plants would be cleared – up to 100 individuals total for the amended project compared to 90 individuals for the project as described in the EIS

- An additional 7.38 hectares of foraging habitat for the threatened fauna species Grey-headed Flying-fox would be cleared –an increase from 55.20 hectares for the project as described in the EIS to 62.58 hectares for the amended project
- Additional indirect impact to 124 individual *Pultenaea parviflora* plants – up to 142 individuals in total for the amended project compared to 18 individuals described in the EIS.

However, while there are likely to be these additional impacts to Matters of National Environmental Significance, these impacts have been assessed throughout this section and **Appendix A**.

There is not expected to be any change to the significant impact assessment for any other matters. Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest would continue to be significantly impacted, while the following Matters of National Environmental Significance would not be significantly impacted:

- Western Sydney Dry Rainforest and Moist Woodland on Shale
- *Pimelea spicata*
- Migratory species
- Commonwealth land.

No additional Matters of National Environmental Significance would be impacted as a result of the amended project.

6.1.3.4 Operational impacts

Section 7.1.4 of the EIS identified potential biodiversity impacts during operation of the project including:

- Fauna injury and mortality
- Changes to aquatic habitat and hydrology
- Impacts on riparian corridors
- Noise, light and vibration impacts.

The operation of the amended project would not result in additional impacts to biodiversity compared to the project as described in the EIS. Impacts would be consistent with the operational impacts documented in the EIS. More detail on the above impacts is provided in Section 5.5 of **Appendix A**.

6.1.4 Cumulative impact

The project as described in the EIS would result in substantial cumulative biodiversity impacts with nearby projects, however changes to the cumulative biodiversity impacts as a result of the amended project (when compared to the project described in the EIS) are minor. Amended cumulative biodiversity impacts include an increase in cleared native vegetation of around seven hectares, and corresponding similar increases in fauna habitat impacts. Further detail on the change in impacts associated with other local developments is provided in Chapter 6 of **Appendix A**.

Management measures outlined in Section 7.1.6 of the EIS to minimise cumulative biodiversity impacts, such as the preparation of construction-phase flora and fauna management plans, pre-clearance surveys, revegetation and the purchasing of offsets, are all considered applicable to the amended project.

6.1.5 Environmental management measures

The environmental management measures identified for the project as described in the EIS (see Section 7.1.6 of the EIS) are considered appropriate to manage the biodiversity impacts associated with the amended project. The exception is management measure B24 which has been amended to commit to setting up exclusion zones for all areas of environmental value. The amended environmental management measure for impacts on biodiversity is outlined in **Table 6-9** with additional text shown in **bold** text.

Table 6-9 Revised amended environmental management measures (biodiversity) (bold text shows change from EIS)

Impact	Reference	Environmental management measures	Responsibility	Timing
Edge effects on adjacent native vegetation and habitat	B24	Exclusion zones will be set up at the limit of clearing in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 2: Exclusion zones). **Exclusion zones will be set up to protect potential indirect impacts to threatened flora in accordance with the areas identified in the Environmental Impact Statement and the amendment report (including Figure 1-2 of Appendix A of the amendment report).**	Contractor	During construction

6.1.6 Offsetting required

Section 7.1.7 of the EIS detailed the biodiversity offsets that would be required for the project. In summary, under the FBA, any residual impacts that cannot be avoided, minimised or mitigated, must be offset, with the offset requirements quantified as biodiversity credits.

A total of 2,568 ecosystem credits were identified as being required for the project as described in the EIS, comprising 2,414 credits for direct impacts and 154 for indirect impacts. The amended project would require a total of 2,829 ecosystem credits, comprising 2,674 credits for direct impacts and 155 for indirect impacts of the following PCTs:

- Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion (PCT 724)
- Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 830)
- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 835)
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849)
- Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin (PCT 850)
- Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (PCT 1800).

A total of 5,786 species credits were identified as being required for the project as described in the EIS. The amended project would require an increase of 195 credits, totalling of 5,981 species credits for the following species:

- *Dillwynia tenuifolia*
- *Pultenaea parviflora*
- Cumberland Plain Land Snail
- Southern Myotis.

The total offset requirements have increased slightly from 8,354 credits for the project as described in the EIS to 8,810 credits for the amended project, an increase of 456 credits.

Chapter 8 of Appendix A provides a comparison of the ecosystem and species credits calculated for the amended construction footprint with the credit requirements for the project as described in the EIS presented in the EIS BAR.