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CUMBERLAND PLAIN ASSESSMENT REPORT

SUMMARY REPORT

PREPARED FOR THE NSW GOVERNMENT DEPARTMENT OF PLANNING, INDUSTRY AND ENVIRONMENT

DOCUMENT TRACKING

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VERSION:	Final This version of the report is the version submitted to regulators in 2021 with the application for biodiversity certification under the BC Act and for endorsement under the EPBC Act. Since then, several changes have been made to the Plan and to species listings under the EPBC Act. These changes are addressed in two addendums to this report.
DATE:	2021

Summary Report Contents

The purpose of this report is to provide the community and other stakeholders with a summary of the Cumberland Plain Assessment Report, including the overall impacts and evaluation of the conservation benefits of the Cumberland Plain Conservation Plan on biodiversity values and other protected matters

1 Introduction

The NSW Government has identified four areas for urban growth and other development ('nominated areas') and a series of major transport corridors within and outside the nominated areas to support the future growth of Western Sydney until 2056. These initiatives are identified under two key planning strategies:

- *A Metropolis of Three Cities - The Greater Sydney Region Plan* (GSC, 2017)
- *Future Transport 2056* (Transport for NSW, 2018)

The NSW Department of Planning, Industry and Environment (the Department) has prepared the Cumberland Plain Conservation Plan (the Plan) as part of the environmental approvals for the development.

The Plan supports the delivery of infrastructure, housing and jobs for Western Sydney in a planned and strategic way that also protects and maintains key biodiversity values of the Cumberland Plain.

The Plan describes the proposed urban and other development and sets out a conservation program comprising a range of specific commitments to avoid, mitigate and offset the impacts of the development on biodiversity values and other matters protected under Commonwealth and NSW biodiversity legislation.

1.1 WHAT IS THE CUMBERLAND PLAIN ASSESSMENT REPORT?

The purpose of the Cumberland Plain Assessment Report (Assessment Report) is to evaluate the Plan's acceptability under Commonwealth and NSW biodiversity legislation in terms of the impacts of the development on biodiversity values and other protected matters, and the commitments made to avoid, mitigate and offset these impacts.

The Assessment Report examines the direct, indirect, prescribed and cumulative impacts of the development.

The report comprises both:

- A Biodiversity Certification Assessment Report prepared in accordance with the NSW Biodiversity Assessment Method (BAM) made under the NSW *Biodiversity Conservation Act 2016* (BC Act)
- A Strategic Assessment Report (SAR) prepared in accordance with the Terms of Reference (ToR) made for the project under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

Table 1 shows the approvals being sought for the different developments under the Plan.

Table 1: Development being assessed for approval under the BC Act and EPBC Act#

Development	Biodiversity certification under BC Act	Approval under Part 10 of EPBC Act
The following development within the nominated areas: • Urban and industrial development • Infrastructure, including essential infrastructure* • Intensive plant agriculture • Major transport corridors – certified	✓*	✓
The following development outside the nominated areas: • Major transport corridors – non-certified (strategically assessed)** • Major transport corridors tunnel – non-certified (strategically assessed)^	-	✓

Note that a formal modification to the strategic biodiversity certification will be undertaken to seek NSW biodiversity approvals on behalf of Deerubbin Local Aboriginal Land Council. This is included as an action (Action 6) under Commitment 1 of the Plan

* Essential infrastructure is a subset of the infrastructure class of action, and relates to development of essential infrastructure within avoided lands within the nominated areas. Essential infrastructure is to be assessed for approval under Part 10 of the EPBC Act only, and is not included in the biodiversity certification under the BC Act

** Biodiversity certification may be sought for the transport corridors outside the nominated areas at a later date, and may be included as a modification or series of modifications to this biodiversity certification

^ A small part of the tunnel section of the major transport corridors occurs within a nominated area (GMAC), but this is not subject to biodiversity certification under the BC Act

1.2 WHAT AREA IS COVERED BY THE ASSESSMENT?

The Assessment Report examines the impacts of the development within the Plan Area (see Figure 1).

The Plan Area is primarily within the Interim Biogeographic Regionalisation for Australia (IBRA) Cumberland subregion of the Sydney Basin Bioregion. It also includes some minor areas of the adjacent Sydney Cataract and Wollemi subregions. The Plan Area is approximately 200,000 hectares.

Prior to European settlement, the Cumberland subregion supported diverse native vegetation, including extensive grassy open forests, ironbark and turpentine forests, dry rainforests and floodplain forest, and wetland communities. The subregion has historically been extensively cleared for agricultural development and is now under pressure from urban development. Only approximately 13 per cent of the pre-1970 extent of native vegetation in the subregion remains intact, with an additional 12 per cent occurring as heavily degraded communities (DECCW, 2011).

The remaining vegetation in the Plan Area is often of high conservation value as it typically contains threatened ecological communities (TECs) and habitat for threatened species, as well as species that occur only in the subregion.

Current key threats within the subregion include:

- Habitat loss and fragmentation due to land clearing
- Weed invasion
- Predation and competition from pest animals
- Altered fire regimes
- Altered hydrological regimes and water quality, particularly runoff from urban and agricultural areas
- Spread of disease, including *Phytophthora* and Myrtle rust

1.3 WHAT DEVELOPMENT IS PROPOSED UNDER THE PLAN?

The development under the Plan comprises (see also Table 1):

- Urban and industrial development within urban capable land in four nominated areas:
  - Wilton Growth Area (Wilton)
  - Greater Macarthur Growth Area (GMAC)
  - Western Sydney Aerotropolis (WSA) (excluding overlap with the existing South West Growth Area)
  - Greater Penrith to Eastern Creek Investigation Area (GPEC)
- Intensive plant agriculture within the Agribusiness Precinct on urban capable land in WSA
- Major transport corridors (see Table 2):
  - Within the nominated areas – these are referred to as 'Major transport corridors – certified'
  - Outside the nominated areas (within the broader area covered by the Plan) – these are referred to as:
    - 'Major transport corridors – non-certified (strategically assessed)'
    - 'Major transport corridors tunnel – non-certified (strategically assessed)'

Figure 1 shows the area covered by the Plan and the location of the four nominated areas and major transport corridors.

The major transport corridors are identified in Table 2. Two of the major transport corridors include proposed sections of tunnel, which are located near GMAC (see Table 2).

Table 2: Major transport corridors

Project	Description	Timing for investigation	General location
Metro Rail Future Extension from WSA to Macarthur (except for those areas within the existing South West Growth Area) This includes a section of tunnel near GMAC	Provides for a future extension of the metro rail south from the Aerotropolis (Bringelly) to Macarthur	0 to 10 years	Located between Oran Park and Campbelltown
Western Sydney Freight Line corridor	Provides for a future freight rail line to connect Port Botany and Western Sydney	10 to 20 years	Located between Luddenham and Orchard Hills in the West and Horsley park in the east
Outer Sydney Orbital between Box Hill and the Hume Motorway near Menangle This includes a section of tunnel near GMAC	Provides for a future north-south motorway and freight rail line		Located between Ropes Crossing in the north and Douglas Park in the south
M7/Ropes Crossing Link Road	Provides for a future east-west motorway linking the M7 to the future Outer Sydney Orbital at Ropes Crossing	20 or more years	Located within and outside the north-east boundary of GPEC between Willmot and Dean Park

Not all parts of the nominated areas are proposed for development. The proposed development will occur within specified urban capable land within the nominated areas. Other parts of the nominated areas include:

- Land covered by the major transport corridors
- Land avoided for development because of its biodiversity value
- Land avoided for development for other reasons (e.g. because it is unsuitable for development)
- Land that is already protected or developed, or otherwise not included in the Plan (excluded land)

1.4 WHAT CONSERVATION IS PROPOSED UNDER THE PLAN?

1.4.1 OBJECTIVE AND OUTCOMES

A key part of the Plan's objective is to:

Deliver biodiversity outcomes and support the ecological function of the Cumberland Plain….

The Plan includes a conservation program which aims to achieve the Plan's objective and avoid, mitigate and offset the direct, indirect and prescribed impacts of the development under the Plan on biodiversity values.

The outcomes of the Plan deliver the Plan's objective. The outcomes of the Plan include economic, social and environmental outcomes. The environmental outcomes of the Plan are:

- *The extent and condition of native vegetation and Threatened Ecological Communities increases and improves in the strategic conservation area in the Cumberland subregion*
- *Populations of targeted threatened species persist and the condition of suitable habitat improves in the strategic conservation area in the Cumberland subregion*

- *Condition of important koala habitat is improved, connectivity between koala sub-populations is maintained, threats to koalas are managed and the koala population in South Western Sydney persists and thrives*
- *Areas of high biodiversity value in the nominated areas are protected and threats to species and ecological communities from increased urbanisation is managed*

1.4.2 COMMITMENTS AND ACTIONS

The Plan includes a set of commitments to deliver the outcomes relating to each element of the conservation program and sets of associated actions to deliver the commitments. In summary, the key commitments under the Plan are:

- Avoid and minimising impacts to at least 4,505 hectares of high biodiversity value area (the avoided land) through strategic planning of the nominated areas (Commitment 2)
- Protect at least 5,325 hectares of native vegetation in the Cumberland subregion in perpetuity (Commitment 8)
- As part of Commitment 8, provide specific offsets for TECs (commitments 8.1 and 8.2)
- Provide specific offsets for several species likely to be at risk of residual impacts under the Plan (Commitment 9)
- Establish a reserve to protect the north-south Koala movement corridor along the Georges River between Appin and Long Point (Commitment 10) and at least two other reserves to protect areas of high biodiversity values, including TECs and species habitat that are targeted for protection under the Plan (Commitment 11)
- Protect Koala corridors in the Cumberland subregion, including along the Nepean River, Georges River, Cataract River and Ousedale Creek (Commitment 12)
- Undertake ecological restoration in priority sites (Commitment 13)
- Manage landscape threats across the Cumberland subregion, including through weed, pest animal, fire and disease programs (Commitment 15, Commitment 16, Commitment 17, Commitment 18)
- Implement an evaluation program that sets out requirements for monitoring, evaluation, reporting and adaptive management (Commitment 25)

1.4.3 STRATEGIC CONSERVATION AREA

The commitments relating to the protection of land for conservation under the Plan will be delivered within a Strategic Conservation Area (SCA). The SCA was determined through a prioritisation method and represents the areas in the Cumberland subregion that are considered most likely to be viable in the long-term and to maximise ecological function and connectivity across the landscape. In determining the location of the SCA, priority was given to including the largest, best condition and best-connected areas of native vegetation remaining in the subregion.

1.4.4 INITIAL FUNDING

The NSW Government has committed initial funding of $114 million over the first five years to deliver priority conservation actions. This includes a land purchase program to support the establishment of the Georges River Koala Reserve and to establish and expand other reserves, commencing with the restoration of koala habitat in priority areas including the Georges River Koala Reserve. The upfront funding will also enable:

- Commencement of Koala habitat restoration, including installation of Koala crossings and predator exclusion fences
- Support for the NSW Koala Strategy including the commencement of annual monitoring in the region
- Establishment of partnerships including with the Biodiversity Conservation Trust to facilitate formation of BSAs primarily in the Razorback Area which is dominated by Cumberland Plain Woodland
- Establishment of partnerships with the NSW Aboriginal Land Council to establish a grant program for Western Sydney Local Aboriginal Land Councils to deliver cultural and conservation opportunities

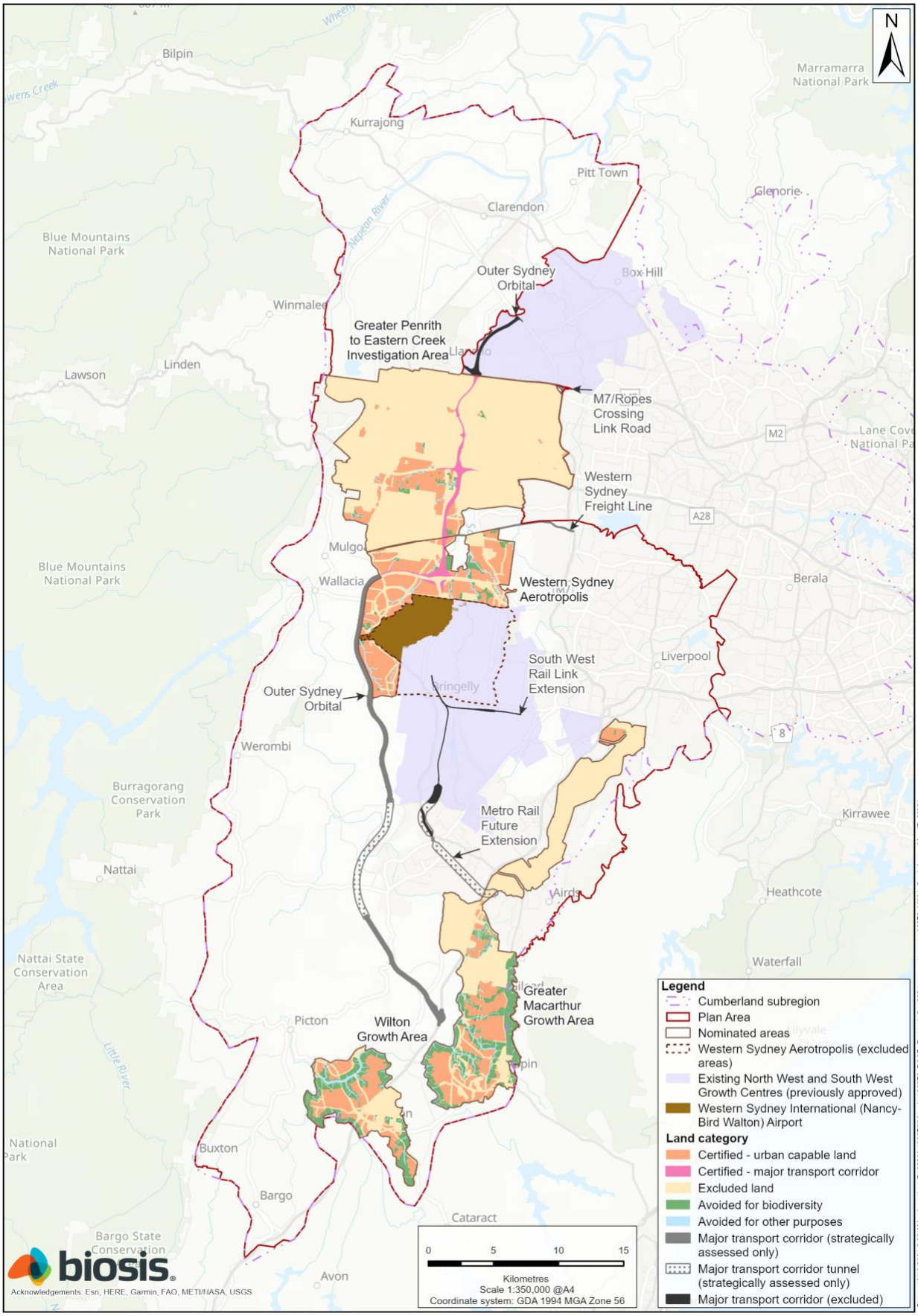

Figure 1: Location of the Plan Area, nominated areas and transport corridors

1.5 PUBLIC EXHIBITION OF THE PLAN AND ASSESSMENT REPORT

Public exhibition of the Plan and Assessment Report occurred over a period of 10 weeks from 26 August to 2 November 2020 to provide an opportunity for the community to provide feedback on the documents through formal submissions.

A total of 508 individual submissions were received from a range of stakeholders. All submissions were reviewed by the Department and consulting team and considered in preparing the final Plan and Assessment Report.

Responses to the feedback received during public exhibition as well as from early engagement on the Plan were compiled into a report (see Assessment Report, Supporting Document H). The report summarises the feedback on key themes that was received and explains how the Department has considered and responded to this feedback.

Key themes or issues raised in submissions during public exhibition that are particularly relevant to the Assessment Report and responses to these issues are summarised in Table 3.

Table 3: Key issues raised in submissions and responses to issues raised

Key theme or issue	Response to issue
E2 environmental conservation zone and the location of avoided land was based on inaccurate native vegetation mapping	Some landholders provided native vegetation mapping or ecological reports to support their submission. The information was reviewed by the accredited assessor and resulted in some minor changes to vegetation communities. This along with all reports and data provided through public exhibition was considered in updating the native vegetation and land category maps
Impacts to Cumberland Plain Woodland are too high and remaining areas of the community should be preserved	The Assessment Report was updated to provide further information on avoidance of impacts and residual direct impacts to Cumberland Plain Woodland. The Department will work with the Biodiversity Conservation Trust encouraging landholders to establish new biodiversity stewardship agreements in areas such as Razorback. The Razorback Area contains significant areas of Cumberland Plain Woodland in addition to other TECs targeted for offsets under the Plan
Major transport corridors will affect existing conservation areas	The Assessment Report has evaluated the impacts of the major transport corridors on TECs and species, and the conservation program includes offsets for impacts within the corridors. A range of mitigation measures has been developed specifically to manage impacts from the construction of transport infrastructure. Transport for NSW are working to minimise impacts to existing reserves such as Wianamatta Regional Park and are proposing an elevated viaduct to pass over the reserve to reduce impacts to biodiversity values
Cumulative and indirect impacts are not adequately considered	The Assessment Report was reviewed and updated to provide further information on cumulative impacts and indirect impacts. This included considering additional major projects that could result in cumulative impacts and providing more information about the risk of indirect impacts to specific species and TECs and the processes to implement mitigation measures
The Plan does not go far enough to protect koala movement corridors as recommended by the Office of the NSW Chief Scientist & Engineer	The Department met with the expert panel that prepared the Advice on the protection of the Campbelltown Koala Population (Office of the NSW Chief Scientist & Engineer, 2020) to gain their insights and ensure the Plan was consistent with their recommendations. The Assessment Report was reviewed and updated to reflect changes to the Plan relating to Koala. The Department is working with NSW National Parks and Wildlife Service to begin gazettal of the first stage of the Koala reserve by the end of 2023 and partnering with Transport for NSW to begin work on the fauna crossing of Appin Road to ensure safe koala movement

2 Assessment approach

The Assessment Report examines the direct, indirect, prescribed and cumulative impacts of the development under the Plan on biodiversity values and other matters protected under NSW and Commonwealth biodiversity legislation. The report was prepared in accordance with two main assessment methods:

- The BAM that applies under the BC Act
- Steps to address the ToR that applies under the EPBC Act

The assessment approach to address both these methods was based on the best available data on biodiversity values of the Plan Area and informed by multiple field investigations, expert reports and peer review. The assessment is complex, which reflects the large geographic scale and long timeframes of the Plan. To help address this complexity, a wide range of detailed, technical analyses informed the assessment. Some examples of these include:

- Detailed analysis of the outcomes under the Plan for Commonwealth-listed TECs and threatened species and NSW-listed TECs and species subject to serious and irreversible impacts against key regulatory documents, such as recovery plans, conservation advices and the requirements of the BAM
- A viability analysis for Commonwealth listed TECs, which mapped the most viable patches across the Plan Area
- A 'trend analysis' undertaken by RMIT University (Gordon & Peterson, 2019) that examined the extent and condition of a component of Cumberland Plain Woodland to understand how it will fare over the life of the Plan (this is provided in the Assessment Report, Supporting Document D)

In accordance with the ToR, the Department commissioned an independent peer reviewer to review the methods used to identify the Commonwealth-listed matters of the Plan Area, including mapping. The report concluded that the methods were sound and appropriate for a large-scale assessment such as this project, and are generally conservative and are unlikely to under-represent the presence or distribution of TECs or species habitat.

2.1 WHAT BIODIVERSITY VALUES OCCUR AND NEED ASSESSMENT?

The BAM and ToR require the Assessment Report to identify the NSW and Commonwealth-listed species, TECs and other protected matters that may occur in the Plan Area and that need assessment. Separate processes were undertaken to identify NSW and Commonwealth matters.

Details of these processes are set out in Part 3, Chapter 11 of the Assessment Report.

2.1.1 NSW MATTERS

NSW-listed species were identified in accordance with a process under the BAM to predict the species that may occur in the nominated areas and consider whether any can be excluded from the assessment based on their likelihood of occurrence. This takes into account habitat suitability and other published information on the species.

NSW-listed TECs were identified on the basis of detailed native vegetation mapping undertaken within the nominated areas for this project, and the relationship between plant community types and TECs.

2.1.2 COMMONWEALTH MATTERS

Commonwealth matters were identified by through searches of the Australian Government's online Protected Matters Search Tool and other relevant databases to establish an initial list of matters that may occur in the Plan Area. A set of criteria was applied to species to further determine their relevance and reliance on the Plan Area.

2.1.3 LIST OF MATTERS THAT NEED ASSESSMENT

The Commonwealth and NSW-listed biodiversity values and other protected matters that occur in the Plan Area and that were assessed in the Assessment Report are summarised in Table 4.

Table 4: Biodiversity values and other protected matters covered in the Assessment Report

Value/protected matter	Plan Area	Nominated areas
Plant community types (PCTs)	39 PCTs (> 1 hectares)	15 PCTs
	Commonwealth matters	**NSW matters**
TECs	9 TECs	9 TECs
Threatened flora species	23 flora	Ecosystem credit species – 0
		Candidate species credit species – 23
Threatened fauna species	20 fauna (including 5 migratory sp.)	Ecosystem credit species – 45
		Candidate species credit species – 18
Migratory species	21 migratory shorebirds 8 other migratory species	N/A
RAMSAR wetlands	1 site	N/A
World and National Heritage	4 places	N/A
Commonwealth land	12 sites	N/A

2.2 WHAT NEW SURVEYS WERE DONE?

A range of new and existing information was used to identify and assess the biodiversity values in the Plan Area.

New surveys were undertaken within the nominated areas in accordance with the BAM and ToR. Surveys were completed between 2017 and 2021 and included two main types:

- Vegetation plots to confirm plant community types and TECs and their condition
- Threatened species surveys to confirm species presence/absence and habitat suitability

Vegetation plots and threatened species surveys were undertaken on land where landholders granted access. Due to the very large size of the assessment area, some parts of the nominated areas were not able to be accessed, which limited the ability to undertake species surveys in accordance with NSW survey guidelines.

Outside the nominated areas, data and mapping of vegetation, TECs and species habitat is based on existing vegetation maps and species records. No surveys were undertaken outside the nominated areas.

A total of 251 vegetation plots were surveyed within the nominated areas.

2.3 HOW WAS NATIVE VEGETATION AND HABITAT MAPPED?

2.3.1 NATIVE VEGETATION MAPPING

Detailed mapping of the extent and condition of native vegetation within the nominated areas was undertaken based on field surveys and data analysis, including interpretation of aerial photo imagery. Mapping of the remaining Plan Area outside the nominated areas was based on existing native vegetation maps (OEH, 2013, 2016).

2.3.2 THREATENED ECOLOGICAL COMMUNITIES MAPPING

Commonwealth and NSW-listed TECs were mapped based on associations between plant community types and TECs identified in NSW BioNet. For the Commonwealth listed TECs, rule-sets were then applied to these associations to refine the maps based on definitions in Commonwealth Conservation Advices.

2.3.3 SPECIES HABITAT MAPPING

Different mapping methods were applied within the nominated areas and outside the nominated areas, as well as to NSW and Commonwealth-listed species, because of the different requirements of the BAM and ToR. Three methods were used to map species habitat:

- Preparing expert reports (reports by recognised experts on a species). These were prepared for 14 species that:
  - Could not be sufficiently surveyed for due to either access restrictions, seasonality or their cryptic nature
  - Had highly specific habitat requirements and restrictions, or highly generalist habitat associations, for which expert advice was required to accurately assess and map
- Identifying potential habitat using a 'knowledge-based' mapping method
- Undertaking Species Distribution Modelling (this was undertaken outside the nominated areas only)

Identifying potential habitat using a 'knowledge-based' mapping method involved:

- Creating initial habitat maps for each species based on the vegetation zones within which each species was predicted to occur in accordance with the steps in the BAM
- Refining initial habitat maps by considering additional information about habitat parameters for each species drawn from information in BioNet or published, peer-reviewed literature
- For maps within the nominated areas, using the results of targeted surveys undertaken for the project to further refine several of the habitat maps where the species or its habitat was, or was not, recorded within the mapped areas

The habitat maps are considered precautionary and are likely to overestimate the extent of habitat for most species.

Specific separate mapping was undertaken for Koala, including:

- Species Distribution Modelling for the species across the Cumberland subregion
- Corridor habitat mapping to identify 'important habitat' required to be mapped under the BAM
- Mapping of habitat critical to the survival of the species

2.4 WHAT ARE THE LIMITATIONS OF THE ASSESSMENT?

Key limitations of the assessment include:

- Native vegetation plots and species surveys were only undertaken within the nominated areas and were restricted to sites where access was granted by landholders. Access was not possible over all areas of land
- Species surveys were not always able to be undertaken in accordance with EES survey guidelines due to the very large scale of the Plan Area and limited access to land at the appropriate survey season
- Only potential habitat for species was able to be mapped due to the very large scale of the Plan Area. The species maps are therefore likely to be precautionary and overestimate the extent of actual habitat for most species

3 Avoidance and minimisation of impacts

Avoiding and minimising impacts to biodiversity values is a critical step in reducing the impacts of the proposed development and the need for commitments and actions to offset those impacts.

3.1 WHAT DOES AVOIDANCE MEAN?

There may be several reasons why land is avoided and not impacted under the Plan, including because:

- Land has high biodiversity value and is avoided for biodiversity purposes
- Land is not suitable for development because it is a riparian corridor or it is too steep
- Land is excluded from the area proposed for development or biodiversity certification (excluded land) including because it is a reserve, is Commonwealth land, or is land that is already developed (e.g. existing urban areas)

Under the BAM, avoidance refers to land that is suitable for development and included in the area proposed for development or biodiversity certification, but has been avoided because of its biodiversity value.

3.2 WHAT WERE THE STEPS TAKEN TO AVOID IMPACTS?

The steps taken and future processes to avoid and minimise impacts for the different types of development under the Plan are summarised in Table 5. The avoidance process involved:

- Strategic planning to determine the broad locations of the nominated areas and major transport corridors
- Detailed design to determine the urban capable land footprint and transport infrastructure footprint within the nominated areas and major transport corridors

For the major transport corridors and essential infrastructure, the avoidance process is not yet complete as detailed design will be undertaken in the future at the time the project is proposed. The Plan includes commitments to ensure this future process leads to acceptable avoidance outcomes for these developments.

Table 5: Steps taken and future processes to avoid and minimise impacts for the different types of development under the Plan

Development type	Avoidance process	Implementation
Urban and industrial development, intensive plant agriculture and infrastructure within urban capable land	Step 1: Strategic planning to determine the locations of the nominated areas	Completed prior to development of Plan
	Step 2: Detailed design of urban capable land footprint within the nominated areas	Completed as part of development of Plan Statistics on biodiversity values avoided within nominated areas are provided in the Assessment Report and summarised below
Major transport corridors	Step 1: Strategic planning to determine the locations of the major transport corridors	Completed prior to development of Plan
	Step 2: Future detailed design to determine the location of the infrastructure within the transport corridor footprints	To be completed in the future at the time the project is proposed in accordance with commitments under the Plan
'Essential infrastructure' within avoided land	Future strategic planning and detailed design to determine the location of infrastructure within avoided land	To be completed in the future at the time the project is proposed in accordance with commitments under the Plan

3.2.1 AVOIDANCE ON URBAN CAPABLE LAND

As part of developing the Plan, the Department designed the urban capable land within the nominated areas (containing the urban and industrial development, infrastructure, and intensive plant agriculture) to avoid and minimise impacts on biodiversity values. This work was guided by the requirements of the BAM and ToR.

STEPS TAKEN TO AVOID IMPACTS

The process to identify the urban capable land and avoided areas within the nominated areas was iterative and began early in the assessment process before the final data on biodiversity values was completed.

The boundaries of the urban capable land were identified in three main phases:

- Strategic planning to locate the nominated areas
- Initial development of footprints through Land Use and Infrastructure Implementation Plans (LUIIP)
- Iterative refinement of the footprints through development of the Plan and assessment of impacts

The third step involved the compilation of data on the biodiversity values of each nominated area and the development and application of criteria to identify priorities for biodiversity avoidance. The avoidance criteria were applied to each nominated area through a series of workshops with precinct planners and ecologists.

The final urban capable land boundaries within each nominated area reflect the priorities for biodiversity avoidance determined through application of the criteria, and, where avoidance of less important biodiversity values was not possible, a balance between biodiversity and urban development priorities.

The avoidance criteria are set out in Chapter 14 of the Assessment Report.

COMMITMENTS FOR AVOIDED LAND

The Plan includes a commitment (Commitment 2) to avoid and minimise impacts to 4,505 hectares of high biodiversity value area through strategic planning of the nominated areas. This area comprises the avoided land. Several actions under this commitment will provide protection to avoided land and ensure the impacts of any future urban development proposed on avoided land is minimised. These include:

- Introduce an environmental planning instrument to apply development controls to protect important biodiversity on avoided land (this is the State Environmental Planning Policy (SEPP) (Strategic Conservation Planning))
- Prepare a Ministerial Direction under section 9.1 of the *Environmental Planning and Assessment Act 1975* (EP&A Act) to restrict rezoning of avoided land from its current zone to a zone that permits a more intensive land use
- Locate asset protection zones wholly within urban capable land. The SEPP (Strategic Conservation Planning) gives this requirement legal effect
- Monitor the impacts of any proposed development on avoided land through a reconciliation accounting process

3.2.2 AVOIDANCE FOR THE MAJOR TRANSPORT CORRIDORS

STEPS TAKEN TO AVOID IMPACTS

Avoidance and minimisation of impacts from the major transport corridors is being undertaken in two stages:

- Strategic planning to determine the locations of the major transport corridors
- Future detailed design to determine the location of the infrastructure within the transport corridor footprint

The strategic planning process to determine the location of the major transport corridors is considered to have resulted in adequate avoidance and minimisation outcomes. The process involved a detailed set of steps that considered environmental constraints, including biodiversity values, alongside other infrastructure, social and economic outcomes to balance overall planning outcomes. In making decisions on corridor selection, infrastructure agencies undertake a constraints analysis and multi-criteria comparison of options. Key factors considered included:

- Proximity to current and planned locations of employment
- The cost of infrastructure provision including roads, water, sewerage, public transport, schools and health facilities
- The economic and social cost to communities of having poor access to employment and services, including transport

- Environmental constraints, including biodiversity values

COMMITMENTS FOR FUTURE AVOIDANCE

Because infrastructure alignments within the major transport corridors are not final, the corridors will be subject to a future process of avoidance and minimisation as part of the detailed design phase of each project to determine the location of the infrastructure within the corridor footprints. Each project will be managed through the NSW planning and approvals framework under the EP&A Act current at the time of the project.

Commitments under the Plan (Commitment 3 and 4) are considered adequate to ensure the major transport corridors avoid and minimise unacceptable impacts on biodiversity values during detailed design. They ensure:

- Avoidance outcomes are achieved consistent with the Plan's avoidance criteria, or, for the major transport corridors outside the nominated areas, are assessed and determined in accordance with the BAM
- Impacts to known key biodiversity values within the corridors are avoided and minimised where possible, including specific species and habitat identified at risk in the Assessment Report
- Avoidance of biodiversity values as well as the costs of offsets is taken into account in the evaluation of the route options (e.g. multi-criteria analysis) during the planning phase of each project
- Governance arrangements are in place to ensure the Department can appropriately monitor the outcomes

3.2.3 ESSENTIAL INFRASTRUCTURE DEVELOPMENT

Planning for essential infrastructure to support the nominated areas, such as water and electricity utilities, is in various stages of development, and this infrastructure may need to be located outside urban capable land. The Plan is seeking approval under the EPBC Act for essential infrastructure to occur in avoided land within the nominated areas.

STEPS TAKEN TO AVOID BIODIVERSITY VALUES

Essential infrastructure will be subject to a future process of avoidance and minimisation as part of the strategic planning and detailed design phase of each project. Each project will be managed through the NSW planning and approvals framework under the EP&A Act as current at the time of the project.

COMMITMENTS FOR FUTURE AVOIDANCE

The Cumberland Plain Conservation Plan Guidelines for Infrastructure Development (outlined in in Appendix A of the Plan) and commitments under the Plan (Commitment 2.1 and 2.2) are considered adequate to ensure essential infrastructure avoids and minimises unacceptable impacts on biodiversity values in avoided land. These requirements will ensure:

- Only a limited amount of essential infrastructure development can occur within avoided land
- Each essential infrastructure project must consider environmental impacts under the EP&A Act, and apply an 'avoid, minimise and mitigate' process to strategic planning and detailed design
- The cumulative direct impacts to TECs identified at risk of impacts in the Assessment Report are capped within each nominated area to levels that are considered acceptable, and the avoidance and minimisation of impacts to populations of species identified at risk of impacts is given high priority
- Governance arrangements are in place to ensure the Department can appropriately monitor the outcomes

Furthermore, the impacts of each project will be assessed under the BC Act and BAM (where triggered under the Act), which requires an avoid, mitigate and offset process to be applied to ensure outcomes are acceptable.

3.3 WHAT WERE THE AVOIDANCE OUTCOMES FOR URBAN CAPABLE LAND?

The process to design the urban and industrial development, intensive plant agriculture and infrastructure within urban capable land has led to substantial avoidance outcomes for biodiversity values.

Avoidance outcomes within the nominated areas are summarised in Table 6.

Table 6: Avoidance outcomes within nominated areas (not including excluded lands)

Biodiversity values	Summary of avoidance outcome in the nominated areas*
Native vegetation	67.2% avoided
High (intact) condition native vegetation	95.2% avoided
Commonwealth listed TECs (critically endangered/endangered)	83.3% avoided
NSW listed TECs (critically endangered/endangered)	62.1% avoided
Potential habitat for the four NSW listed species with a very high biodiversity risk weighting (>3) under BAM	69.9% avoided
Potential habitat for the 31 NSW listed species with a high biodiversity risk weighting (>/=2) under BAM	77.1% avoided
Commonwealth-listed species with important populations in the nominated areas	11 of the 19 species have important populations represented on avoided land (either wholly or partially)
Habitat connectivity (Bio Map areas)	88.7% of Bio Map core areas
	83.7% of Bio Map corridors

*Note that these figures include the amount of land 'avoided' for other purposes (e.g. riparian corridors and steep land) and not just biodiversity purposes. The figures do not include excluded land (land not covered by the Plan)

4 Impacts and benefits of the Plan

The Assessment Report examines the direct, indirect, prescribed, and cumulative impacts of the urban and industrial development, infrastructure, intensive plant agriculture and major transport corridors on biodiversity values and other protected matters.

The assessment of impacts, particularly direct impacts, is done differently for Commonwealth and NSW-listed matters to meet the requirements of the BAM and ToR. In particular, direct impacts for native vegetation and NSW matters are assessed quantitatively to determine the number of credits to offset the impacts of the development, while impacts on Commonwealth matters are assessed through a combination of quantitative and qualitative analysis.

As described in Chapter 1, the Plan includes a conservation program and a set of commitments and associated actions to achieve its objective and environmental outcomes, and to offset and mitigate the impacts of the development under the Plan. This includes a commitment to protecting a minimum of 5,325 hectares of native vegetation in the Cumberland subregion to conserve biodiversity values in perpetuity. As part of this commitment, offset targets are established for:

- Each impacted Commonwealth and NSW-listed TEC
- Those Commonwealth and NSW-listed species considered at risk of residual adverse impacts

4.1 WHAT ARE THE OVERALL IMPACTS?

4.1.1 NATIVE VEGETATION

The development in the nominated areas will directly impact 1,753.6 hectares of native vegetation. An additional 89.5 hectares of Commonwealth-listed TECs will be impacted by the major transport corridors outside the nominated areas.

Of the native vegetation impacted by the development under the Plan, all the vegetation comprises NSW-listed TECs and 469.6 hectares of the vegetation comprises Commonwealth-listed TECs.

The vast majority of direct impacts to native vegetation in the nominated areas occurs to vegetation in low condition. Of the total impacts, only about 7 per cent (115 hectares) occur to vegetation in high (intact) condition. About 50 per cent of the impacts occur to vegetation in low condition (scattered trees or derived native grassland).

4.1.2 THREATENED ECOLOGICAL COMMUNITIES

The development within the nominated areas will directly impact eight NSW-listed TECs (comprising nine plant community types) and five Commonwealth-listed TECs.

Two Commonwealth-listed TECs will be impacted by the major transport corridors outside the nominated areas.

4.1.3 THREATENED SPECIES

The development within and outside the nominated areas will directly impact potential habitat of 50 Commonwealth and/or NSW listed flora and fauna species. Of these, 17 species are identified as being at risk of residual adverse impacts from the development and considered to need specific offset targets under the Plan (see Appendix A).

4.2 WHAT ARE THE BIODIVERSITY VALUES MOST AT RISK OF IMPACTS?

The TECs and species most likely to be at risk of residual adverse impacts due to the development are identified Appendix A in Table 9 (Commonwealth listed TECs), Table 10 (NSW listed TECs), and Table 11 (Commonwealth and NSW listed species). The tables in Appendix A summarise the key direct impacts of the development and identify the offset targets that will be implemented under the Plan to manage impacts to each of these matters.

Commitments and specific mitigation measures under the Plan to manage indirect and prescribed impacts are expected to adequately address the risks to each of the TECs and species in Table 9, Table 10 and Table 11. These commitments and mitigation measures and the processes to implement them are discussed further in Section 4.3.

4.3 WHAT ARE THE INDIRECT AND PRESCRIBED IMPACTS?

The development under the Plan has the potential to result in a range of indirect and prescribed[1] impacts on biodiversity values and other protected matters. The indirect impact types are summarised in Appendix B (see Table 12) and include potential issues such as the spread of weeds and pest animals, inappropriate fire regimes, and habitat disturbance.

Prescribed impacts include impacts on, or associated with:

- Karst, caves, crevices, cliffs
- Rocky habitat
- Human-made structures
- Non-native vegetation
- Habitat connectivity/movement of species
- Water bodies/hydrological processes
- Vehicle strikes

4.3.1 COMMITMENTS AND MITIGATION MEASURES TO ADDRESS INDIRECT AND PRESCRIBED IMPACTS

The Plan includes commitments to mitigate the indirect and prescribed impacts of development under the Plan.

The processes to implement these commitments are different for the types of development.

For the urban and industrial development and intensive plant agriculture, mitigation measures will be implemented through the precinct planning and development application process under the NSW planning system. For infrastructure development and the major transport corridors, mitigation measures will be implemented through future environmental assessment and approval processes under the EP&A Act and/or BC Act applied at the time of the development.

These commitments and the processes to implement them are considered adequate to manage the risk of indirect and prescribed impacts on biodiversity values from the development under the Plan.

URBAN AND INDUSTRIAL DEVELOPMENT, AND INTENSIVE PLANT AGRICULTURE

The Plan includes a commitment (Commitment 5) to mitigate indirect and prescribed impacts from urban and industrial development and intensive plant agriculture on TECs, threatened species and their habitat within the nominated areas, including meeting specific mitigation requirements in accordance with Appendix E of the Plan.

The mitigation requirements in Appendix E of the Plan were identified through the Assessment Report to manage indirect and prescribed impacts on specific TECs or species identified as being at risk of impacts.

Development Control Plans (DCPs) will be prepared for each nominated area that will include development controls to address indirect and prescribed impacts. DCPs are made under Division 3.6 of the EP&A Act and provide detailed guidelines and environmental standards for new development. DCPs are used by councils in the assessment of development applications. The development controls in DCPs will be implemented through the standard development application process under the EP&A Act that occurs prior to development proceeding.

[1] Prescribed impacts are a specific list of impacts that are required to be assessed under the BAM. They are defined generally as impacts on biodiversity values that do not comprise direct clearing of native vegetation that are assessed through credits. Prescribed impacts can be direct impacts (e.g. impacts on species' habitat of a type that is not native vegetation, such as rocks) or indirect impacts (e.g. impacts on species associated with the severing of a habitat corridor)

The Department has prepared a DCP template that provides model provisions to help ensure mitigation measures identified in the Plan to address prescribed impacts are incorporated into DCPs as development controls and are applied consistently across the nominated areas. The DCP template includes both:

- A common set of controls that apply across the nominated areas and inform general biodiversity protection
- The specific set of controls that apply to species and TECs in certain locations identified in Appendix E of the Plan

The Plan puts in place several assurance measures under Commitment 5 to ensure implementation of mitigation measures occurs consistent with the Plan and to address any uncertainty or risks of failure. These measures include auditing of DCPs to ensure the development controls in the DCP template are incorporated in each DCP and monitoring the implementation of development controls to ensure they are implemented effectively.

INFRASTRUCTURE DEVELOPMENT

The Plan includes a commitment to mitigate indirect impacts from infrastructure on TECs and species and their habitat, including meeting specific mitigation requirements in accordance with Appendix E of the Plan (Commitment 5).

This commitment will be delivered through future environmental assessment and approval processes that will apply to each infrastructure project under the EP&A Act current at the time the project is brought forward.

The Department will prepare a guideline under clause 228 of the EP&A Regulation – the *Cumberland Plain Conservation Plan Guidelines for Infrastructure Development*. The guideline must be taken into account when public authorities consider the likely impact of infrastructure on the environment under the EP&A Act. The guideline ensures infrastructure development within avoided land, the SCA and urban capable land avoids and minimises impacts to biodiversity values and mitigates indirect impacts in accordance with the requirements of the Plan.

TRANSPORT CORRIDORS

The Plan includes a commitment to mitigate indirect impacts on TECs, species and their habitat within major transport corridors, including the Outer Sydney Orbital and Metro Rail Future Extension tunnel sections (Commitment 6), in accordance with the NSW State Significant Infrastructure (SSI) (or equivalent) assessment and approval process and, for the transport corridors outside the nominated areas, the BC Act and BAM.

The key actions under the Plan to implement the commitment are set out in Table 7.

Table 7: Actions taken under the Plan to mitigate indirect impacts from the transport corridors

Legislative mechanism	Actions under the Plan to address indirect impacts
NSW environmental assessment and approval process for each project current at the time the project is brought forward (this is currently the State Significant Infrastructure approval process under the EPA Act)	Transport for NSW will undertake the following: • Assess indirect impacts on biodiversity (for transport corridors outside the nominated areas) and other environmental values based on detailed design • Implement the specific mitigation measures prescribed in Appendix E of the Plan and based on the outcomes of the assessment of detailed designs of the transport infrastructure in accordance with published, best practice guidelines • Apply further mitigation measures according to the BAM (for the major transport corridors outside the nominated areas) • Establish baseline data and undertake ongoing monitoring of high-value environmental areas, and review and adjust mitigation measures (where practical) in response to monitoring outcomes • Report to the Department on mitigation measures proposed to manage impacts of each infrastructure project, including proposed techniques, timing, frequency and responsibility for implementing each measure

4.4 WHAT ARE THE CUMULATIVE IMPACTS?

Cumulative impacts are required to be assessed under the EPBC Act. The purpose of the cumulative impact assessment was to identify the protected matters most impacted under the Plan and by other major projects in the Cumberland subregion, and determine whether the commitments are adequate to in the context of those impacts.

The protected matters that are most likely at risk from cumulative impacts were:

- Downy Wattle
- White-flowered Wax Plant
- *Micromyrtus minutiflora*
- Spiked Rice-flower
- *Pultenaea parviflora*
- Regent Honeyeater
- Swift Parrot
- Dural Land Snail
- Grey-headed Flying-fox
- Cumberland Plain Shale Woodland and Shale-Gravel Transition Forest
- River-flat Eucalypt Forest on Coastal Floodplains of southern New South Wales and eastern Victoria

The Assessment Report concluded that the Plan adequately addresses the potential cumulative impacts (from the Plan together with other major projects) on these species and TECs in the context of the risks to these matters from the Plan and the contribution the Plan makes through offsets to conserve these matters in the Cumberland subregion.

4.5 WHAT ARE THE IMPACTS ON OTHER VALUES?

Direct and indirect impacts on other values, including migratory species, Ramsar wetlands, World and National Heritage, and Commonwealth land, are required to be assessed under the EPBC Act.

4.5.1 MIGRATORY SPECIES

MIGRATORY BIRDS

Nine bird species listed in the *Draft Referral guideline for 14 migratory birds listed under the EPBC Act* (DoE, 2015) have been observed within the Plan Area. These species have large areas of important habitat across Australia.

Potential impacts of the development on these species are considered to be negligible.

Only one of the species (White-throated Needletail) has been observed in ecologically significant numbers in the Cumberland subregion. This species is found over a wide range of habitats including extensively modified and urban areas. Development under the Plan is considered unlikely to disrupt this species' use of the Plan Area.

MIGRATORY SHOREBIRDS

Thirty-seven species of migratory shorebirds regularly visit Australia during their non-breeding season. Twenty-one of these species have been recorded within the Cumberland subregion. Two of those have been recorded at a site level in important numbers, including the Sharp-tailed Sandpiper and Latham's Snipe.

Potential impacts of the development on these species are considered to be negligible. No important habitat will be lost, and the risk of indirect impacts such as degradation of habitat and disturbance of birds is considered to be low.

4.5.2 RAMSAR WETLANDS

There will be no direct impacts to any Ramsar sites due to development under the Plan. The closest Ramsar site to the development is Towra Point Nature Reserve, which is approximately 23 km from the northern part of GMAC.

A small part of the Plan Area – 170 hectares of urban development in GMAC and 9 hectares of major transport corridors – is located within the Georges River sub-catchment, which is one of four major sub-catchments connected to the Ramsar

site. Development under the Plan has the potential to cause reduction in surface water quality and changes to surface water flows due to run-off from the development, and potential impacts increased recreational use of the reserve associated with larger populations in Western Sydney facilitated by the urban development

The Plan includes a commitment to mitigate the indirect impacts of the development under the Plan. The development controls within DCPs that will be prepared for each nominated area, along with existing measures in place to manage increased human visitation to the Ramsar site, are considered adequate to address any risk of indirect impacts.

4.5.3 WORLD AND NATIONAL HERITAGE

Three World and/or National Heritage sites occur within or near the Plan Area.

There will be no direct impacts to these sites. The closest site to the development is the Greater Blue Mountains World Heritage Area, which is located approximately 1 km from the western edge of GPEC.

The indirect and facilitated impacts to these sites from the Plan are negligible. There is the possibility of facilitated impacts from increased human visitation, but visitor impacts are already managed at each site and the existing management arrangements for these sites are considered sufficient to manage this risk.

4.5.4 COMMONWEALTH LAND

Under the EPBC Act, an assessment of impacts to Commonwealth land needs to consider the whole of the environment, which is broader than biodiversity values and includes the qualities and characteristics of places, and heritage values.

There are 12 Commonwealth land sites within the Plan Area. Potentially only one site (Site 10) will be directly impacted by development under the Plan (by the major transport corridors outside the nominated areas).

However, three other sites – Site 4 (Western Sydney University – Campbelltown Campus), Site 6 (Camden Airport) and Site 7 (a small site at Grassmere) – may also be directly impacted by the tunnels associated with the major transport corridors. The tunnels extend under these sites and some disturbance to the land surface may be necessary for construction activities and permanent infrastructure.

Many of the Commonwealth land sites are located a large distance and/or upstream from the nearest development under the Plan, meaning they very unlikely to be affected by impacts typically associated with construction, such as air quality, noise, construction traffic, or impacts to hydrology or water quality.

The Plan includes commitments to avoid and minimise impacts from the development on specific Commonwealth-listed matters and existing services and infrastructure identified at potential risk of direct impacts from the tunnels. The development controls within DCPs that will be prepared for each nominated area are considered adequate to address the risk of indirect impacts of the development under the Plan on Commonwealth land.

5 Evaluation of the Plan

The purpose of the Assessment Report is to evaluate the Plan's acceptability under Commonwealth and NSW biodiversity legislation in terms of the impacts of the development under the Plan on biodiversity values and other protected matters and the commitments made to avoid, mitigate and offset these impacts.

Strategic assessments represent large, complex programs that will run over long timeframes. Lessons learnt from previous projects around Australia of a similar nature highlight the importance of ensuring these programs are well designed, supported by robust governance arrangements, and implemented adaptively.

5.1 WHAT WAS THE APPROACH TO EVALUATING THE PLAN?

The Assessment Report sets out the approach used to evaluate the acceptability of the Plan. The approach was based on:

- Guidance provided in the *Conservation measures in strategic applications for biodiversity certification: Guidance for planning authorities* (Strategic Certification Guidelines) (DPIE, 2020)
- Requirements of the ToR, which requires the report to evaluate the commitments and outcomes for protected matters, and specifies several factors to consider

The evaluation was undertaken at two levels:

- In relation to the principles of Ecological Sustainable Development (ESD)
- In relation to the overall adequacy of the Plan in accordance with the Strategic Certification Guidelines and requirements of the ToR

The requirements of the Strategic Certification Guidelines and ToR are similar or overlap in some cases, and so they were grouped and addressed together in themes. The themes are:

- Theme 1: Are serious and irreversible impacts avoided and minimised?
- Theme 2: Do the commitments address the values being impacted?
- Theme 3: Do the commitments address the most important values?
- Theme 4: Do the commitments improve values and ecological function in the long-term?
- Theme 5: Are the commitments additional to existing requirements?
- Theme 6: Do development controls proposed as commitments conserve the environment?
- Theme 7: Are proposed new national parks consistent with the CAR reserve framework?
- Theme 8: Will the Plan be effectively implemented and will outcomes be certain?
- Theme 9: Does the Plan facilitate adaptation to climate change?

5.2 WHAT WERE THE CONCLUSIONS OF THE EVALUATION?

5.2.1 THEME 1: ARE SERIOUS AND IRREVERSIBLE IMPACTS AVOIDED AND MINIMISED?

The planning and avoidance process to identify the location of urban and industrial development, intensive plant agriculture and infrastructure within urban capable land in the nominated areas was an iterative one that began early in the assessment process before the final data on biodiversity values was completed.

The avoidance process gave highest priority to serious and irreversible impact (SAII) entities. Avoidance effort for SAII entities has generally focused on TECs and potential habitat in higher condition and/or of higher long-term viability. In many cases, impacts to larger patches are avoided. Where these impacts do occur, they are often on the edges of larger, contiguous patches associated with waterways and gullies and gorges, which minimises fragmentation and impacts on habitat connectivity, particularly in Wilton and GMAC.

Despite this overall conclusion, for some SAII entities, about half or less of the TEC or potential species habitat was avoided and residual impacts remain. This includes:

- Cumberland Plain Woodland

- Cooks River/ Castlereagh Ironbark Forest
- *Allocasuarina glareicola* and *Micromyrtus minutiflora*
- Green and Golden Bell Frog
- Swift Parrot

For these TECs, the scale of impacts is not substantial when considering the extent of these TECs across the Plan Area, and the majority of intact condition and/or higher long-term viability TECs has generally been avoided. The offsets proposed by the Plan for these TECs will substantially increase the level of protection of these TECs in the Plan Area and address key threats identified in BioNet profiles and Conservation Advices.

For *Allocasuarina glareicola* and *Micromyrtus minutiflora* there are no impacts to records or important populations of the species (for each species, one important population occurs on excluded lands and will not be impacted). While there will be direct impacts to small areas of Green and Golden Bell Frog habitat in GPEC, recent surveys along Ropes Creek indicate a population does not exist in that locality. For the Swift Parrot, the Plan provides a commitment to secure offsets of 100 ha of important habitat for the species to address residual impacts. The Plan also includes a range of other measures to mitigate risks to the species and increase its protection within the Plan area.

5.2.2 THEME 2: DO THE COMMITMENTS ADDRESS THE VALUES BEING IMPACTED?

The analysis of Theme 2 involved an assessment of the adequacy of the offset targets for each impacted NSW-listed TEC and Commonwealth-listed TEC. For the NSW-listed TECs, the analysis examined three questions:

- Do all impacted TECs have offset targets?
- Are offset targets equivalent to the biodiversity values being impacted?
- Can the SCA – the Strategic Conservation Area (see Chapter 2) deliver the offset targets?

The analysis for the Commonwealth-listed TECs considered the extent to which the offset targets for each TEC meets the principles of the EPBC Act Environmental Offsets Policy (DSEWPC, 2012).

The analysis demonstrates that the commitments broadly address the values being impacted because:

NSW REQUIREMENTS

- Each impacted NSW TEC has an associated offset target
- The total offset target for NSW TEC (5,325 ha) is estimated to be broadly within the range required to satisfy the BAM credit requirements (between 4,124 ha and 8,573 ha)
- The offset targets are estimated to generally satisfy the minimum credit requirements of the BAM for the majority (7 of 9) of the impacted NSW TECs
- The majority of NSW TECs (5 of 9) have enough available within the SCA to meet the offset targets. For 4 of those 5 TECs, there is significantly more TEC available in the SCA than needed to meet the targets
- For the 5 NSW TECs with enough available in the SCA, the SCA contains an average of almost four times the amount of TEC needed to meet the offset targets for these TECs
- For the four NSW TECs with a shortfall in the SCA:
    - Two of the TECs – Plant Community Type (PCT) 725 and 1800 – have only small shortfalls (less than 65 ha)
    - An initial estimate of restoration potential in the SCA indicates restoration has the potential to reduce the shortfall for both PCT 725 and PCT 724 to about 22 ha and 189 ha respectively
    - The offset for PCT 1800 is likely to be met as shortfall is generally a result of a lack of available mapping outside of the nominated areas
- While PCT 724 has a large shortfall, offsets may be sourced outside of the SCA for this PCT. This is allowed for by the selection steps in the conservation program
- While PCT 849 has a large shortfall:
    - An initial estimate of restoration potential in the SCA indicates restoration can negate this shortfall
    - The SCA contains over 2,950 ha of surplus PCT 850, which may be secured instead of PCT 849 to meet the shortfall, consistent with the offset rules under the BC Regulation

COMMONWEALTH REQUIREMENTS

- Each Commonwealth-listed TEC has an offset target
- The Commonwealth-listed TEC offset targets meet the requirements of the EPBC Act Environmental Offsets Policy when assessed based on the requirements of the offsets assessment guide
- The SCA contains enough Commonwealth-listed TECs to broadly satisfy the offset target for four of the six TECs. The shortfall for Cooks River/Castlereagh Ironbark Forest (73 ha) could be partially negated through the restoration of PCT 725 within the SCA, which is estimated to equate to 26 ha of restoration potential
- Coastal Swamp Oak (Casuarina glauca) Forest has a relatively small shortfall of 18.1 ha, and is not broadly mapped outside the nominated areas. It is expected that this community has a wider distribution outside of the nominated areas and should therefore be available in the SCA

5.2.3 THEME 3: DO THE COMMITMENTS ADDRESS THE MOST IMPORTANT VALUES?

The analysis of Theme 3 involved determining the extent to which the SCA contains these categories of matters:

- Habitat for critically endangered TECs and species within the SCA was analysed using GIS based on TEC, PCT and/or species habitat maps developed for this Assessment Report
- Biodiversity values poorly represented in existing reserves were analysed using GIS based on data on the distribution of PCTs in the Cumberland subregion and the boundaries of existing reserves (including reserves under the *National Parks and Wildlife Act 1974* (NP&W Act), BioBank sites and Biodiversity Stewardship Agreements)
- Areas identified as high priority by governments for conservation were analysed using GIS on the basis of BIO Map core and corridors (OEH, 2015) and the EES biodiversity values map (OEH, 2019)

The analysis suggests that the commitments generally prioritise the protection of important biodiversity values. This is because the SCA:

- Contains each impacted Commonwealth and NSW-listed TEC, including critically endangered and endangered TECs
- Contains potential habitat for the majority of Commonwealth and NSW-listed species, including critically endangered and endangered species
- Significantly contributes to increasing representation of PCTs in protected lands in the Cumberland subregion
- Includes substantial areas of land identified by the NSW Government as priorities for conservation

Furthermore, it is likely that offset sites for most species with specific offsets under the Plan are currently available (or are soon to be available) on Biobank or Stewardship sites and/or are represented within the SCA. The data indicates that sourcing offsets for these species should be achievable under the Plan.

5.2.4 THEME 4: DO THE COMMITMENTS IMPROVE VALUES AND ECOLOGICAL FUNCTION IN THE LONG-TERM?

The Strategic Certification Guidelines (DPIE, 2020) requires that commitments should ensure biodiversity values and landscape function are improved in the long term and set out a range of matters that commitments should protect.

The analysis of Theme 4 involved analysing:

- The size, shape and location of habitat in the SCA by determining the extent to which large patches make up the total amount of native vegetation contained within the SCA
- Habitat connectivity within the SCA based on Biodiversity Investment Opportunities Map (BIO Map) core areas and corridors (BIO Map is a key deliverable of the NSW Government's $40 million Green Corridors program and identifies priority areas where the protection and management of native vegetation is likely to maximise benefits to biodiversity within the Cumberland subregion and other connected habitat elements)
- Commitments in the Plan to manage threats and implement restoration
- The results of the trend analysis undertaken as part of the Assessment Report to investigate long-term trends in vegetation extent and condition in the Cumberland subregion

The analysis suggests that the commitments broadly ensure biodiversity values and ecological function are improved in the long term as the SCA:

- Includes many large patches > 50 ha that comprise approximately 93 per cent of the total native vegetation in the SCA and contains 36 per cent of the total area of patches > 50 ha in the Plan Area
- Contains substantial amounts of BioMap core and corridors

Furthermore, the Plan has also committed to managing key landscape threats, including weeds, pest animals and fire as part of the conservation program, and includes a commitment to restore substantial areas of land in the SCA. This includes restoring up to 1,330 hectares of the following TECs:

- Cooks River Castlereagh Ironbark Forest
- Cumberland Plain Woodland
- River-flat Eucalypt Forest
- Shale Gravel Transition Forest
- Swamp Oak Forest

The emphasis on restoration under the Plan is also supported by the results of the trend analysis. The expert elicitation process (involving experts on the management of Cumberland Plain Woodland) undertaken for the trend analysis indicates that high intensity management on conservation lands provides significant potential to provide restoration gains for this community (PCT 849), even when starting from a low initial condition.

5.2.5 THEME 5: ARE THE COMMITMENTS ADDITIONAL TO EXISTING REQUIREMENTS?

The Strategic Certification Guidelines requires that commitments are additional to existing conservation obligations. Existing conservation obligations are actions that are legally required to be carried out on land. The Plan ensures that commitments are additional to existing conservation obligations through:

- Accounting for existing conservation obligations in the process to identify the SCA
- Securing land in the SCA in accordance with the rules and processes under the BC Act and BAM, which account for existing conservation obligations
- Establishing an accounting process to track progress in meeting commitments and actions, including offset targets. This process will include a method to reduce the number of hectares that are counted towards an offset target where existing conservation obligations apply to a site

5.2.6 THEME 6: DO DEVELOPMENT CONTROLS PROPOSED AS COMMITMENTS CONSERVE THE ENVIRONMENT?

The Strategic Certification Guidelines requires that commitments involving the use of development controls that conserve or enhance the natural environment are new or represent a significant upgrade.

The Department is proposing a new State Environmental Planning Policy (SEPP) to implement the Plan's strategic conservation planning requirements. The proposed SEPP and will apply development controls to avoided land and the SCA to limit the impact of future development and subdivisions under Part 4 of the EP&A Act and ensure biodiversity values are protected if development is proposed on these lands.

The development controls identify key biodiversity values that are the focus of the Plan, such as TECs, threatened species and their habitats, Koala habitat and corridors, and MNES, and requires the consent authority to ensure any future development avoids and minimises impacts on these values.

The Department also proposes to introduce:

- A Ministerial Direction under section 9.1 of the EP&A Act
- The Cumberland Plain Conservation Plan Guideline for Infrastructure Development which applies to infrastructure development, including activities under Part 5 of the EP&A Act and 'essential infrastructure' as defined in the Plan
- Amendment to the EP&A Regulation 2000

The Ministerial Direction will apply to planning proposals by planning authorities in avoided land and the SCA. The direction requires planning proposals to protect or enhance and/or minimise impacts to native vegetation, riparian

corridors, TECs and species, Koala habitat and corridors, and habitat connectivity and several other biodiversity value. It also prevents planning authorities from rezoning land inconsistent with the objectives of avoided land or the SCA.

The Cumberland Plain Conservation Plan Guideline for Infrastructure Development ensures infrastructure development within avoided land, the SCA and urban capable land avoids and minimises impacts to biodiversity values and mitigates indirect impacts in accordance with the requirements of the Plan.

The amendment to the EP&A regulation introduces requirements for public authorities to notify the Department about activities under Part 5 of the EP&A Act proposed on avoided land. Public authorities must:

- Notify the Department of the proposed activity
- Include a statement of consistency of the proposed activity with the Cumberland Plain Conservation Plan Guidelines for Infrastructure Development
- Consider any response from the Department about the activity

The planning mechanisms represent a significant upgrade to existing levels of protection in the avoided land and the SCA. The SEPP is legally binding and requires the consent authority to be satisfied certain conditions relating to the avoidance and minimisation of impacts are met before granting consent. The Ministerial Direction restricts the ability of planning authorities to rezone avoided land, increase development or intensify land uses in the SCA.

5.2.7 THEME 7: ARE PROPOSED NEW NATIONAL PARKS CONSISTENT WITH THE CAR RESERVE FRAMEWORK?

The Department has identified initial locations for land that will be potentially reserved under the NP&W Act within the SCA. This includes three new reserves proposed to be established within the first five years of the Plan's implementation to deliver upfront strategic offsets. The Georges River Koala Reserve has been announced as a priority, with the first stage (Stage 1A) to be gazetted as a reserve under the NP&W Act within three years.

Two additional reserves are under investigation for feasibility:

- The Gulguer Reserve Investigation Area
- The Confluence Reserve Investigation Area

The analysis of Theme 7 involved analysing data on the initial locations of land that will be potentially reserved under the NP&W Act within the SCA based on PCTs (Plant Community Types) impacted by the development, as follows:

- Comprehensiveness: the extent to which the potential reserve locations contain each impacted PCT
- Adequate: the extent to which the potential reserve locations contain large patches of native vegetation more likely to be viable in the long-term and more likely to support persistence of species and communities
- Representative: the extent to which the potential reserve locations contribute to the existing levels of protection of each impacted PCT in the Cumberland subregion

It is important to note that the reserve locations are not final and are likely to be refined. The final location of reserves will be determined during implementation of the Plan based on consultation with key stakeholders and guided by the Conservation Lands Implementation Strategy.

The analysis suggests that the potential reserves are broadly consistent with the CAR reserve system scientific framework as the reserves:

- Include the majority of PCTs impacted by the development (are comprehensive)
- Are almost completely comprised of very large patches (> 50 ha) (are likely to be adequate)
- Contribute greater than 15 per cent to existing levels of representation for several PCTs (are representative), including substantial contributions to protection levels for three critically endangered TECs

It is important to note that further consideration of the CAR reserve system scientific framework will be made in finalising the locations of the potential reserves during implementation of the Plan.

5.2.8 THEME 8: WILL THE PLAN BE EFFECTIVELY IMPLEMENTED AND WILL OUTCOMES BE CERTAIN?

Effective implementation is particularly important with strategic assessments such as the Plan because of the size and complexity of the programs, the long timeframes over which they are implemented, the number of stakeholders and the diversity of their interests, the amount of money the programs cost, and the complexity of the legal frameworks they operate within.

The analysis of Theme 8 involved addressing each of the key risks associated with the implementation of strategic assessments identified in Table 8, in relation to the following questions:

- What is the risk and why may it affect implementation of the Plan?
- What is required to address the risk?
- How does the Plan address the risk and are these measures effective to ensure that Plan outcomes are still achieved?

Table 8: Key implementation risks and measures to address the risks

Key risks	Measures to address risk
Outcomes are not clear or feasible	Frame outcomes within a program logic
	Ensure outcomes are clear, measurable and achievable
A plan that does not allow for changing circumstances	Build processes into the Plan that enable changes to development locations in appropriate circumstances
	Include mechanisms under the Plan for changing how outcomes are delivered where appropriate
	Ensure appropriate flexibility around how the conservation program is delivered
Delivery framework is unclear or unsuitable	Clearly set out how the Plan is intended to be delivered
	Ensure the delivery framework is legally robust
	Ensure delivery partners act consistently with the Plan
	Enable action to be taken to ensure compliance
	Establish assurance mechanisms for delivery of the conservation program to ensure the program keeps pace with impacts to biodiversity values
Poor governance arrangements and insufficient funding	Establish an organisational structure and define roles and responsibilities
	Ensure sufficient funding to deliver the conservation program
Ineffective monitoring, evaluation, reporting and adaptive management processes	Include a clear commitment to monitoring, evaluation, reporting and improvement through adaptive management (MERI) to ensure that: • Changes to the environment and legislation are accounted for in the implementation of the conservation program • Impacts to avoided land and unforeseen loss of biodiversity values can be identified and rectified • Failure of conservation measures (e.g. ecological restoration, fauna overpasses) can be evaluated and the measures updated • New scientific information which suggests alternative conservation actions are required is considered and implemented
	A MERI framework underpinned by a program logic
	Clarity on scope and timing of monitoring, reporting and evaluations
	Evaluation of outcomes not just delivery of actions
	Clarity on when and how adaptive management will be implemented

The analysis suggests that the Plan includes the key elements important for effective implementation and to achieve its intended outcomes. In particular, the Plan provides:

- Clear and feasible outcomes
- Clarity about the delivery framework and mechanisms to implement the Plan
- Appropriate flexibility to ensure it remains relevant over time
- Clear governance arrangements, including certain funding
- Comprehensive processes to monitor and report on implementation, and adapt implementation as needed

It is important to note that the Plan and subplans are high level documents providing an overarching framework and assurance processes for implementing the Plan, and that successful implementation relies on considerable further work being done during the early stages of implementation to sort out more specific details. This is appropriate because it allows detailed consideration of complex issues, seeking of expert advice, and comprehensive engagement with stakeholders. The Plan provides a clear framework for this future implementation work by identifying a set of actions that will be undertaken to deliver each commitment within a program logic framework.

5.2.9 THEME 9: DOES THE PLAN FACILITATE ADAPTATION TO CLIMATE CHANGE?

The extent and nature of the impacts of climate change on specific biodiversity values is difficult to predict. There is a lack of information about how specific matters are likely to respond to climate change, and there is debate and uncertainty over how to best facilitate adaptation. Given this, the analysis was undertaken in two main ways:

- A qualitative evaluation using a set of broad principles derived from the scientific literature on how to best manage the impacts and facilitate adaptation of biodiversity to climate change
- A quantitative evaluation using recent modelling by Macquarie University on changes to future habitat suitability on the Cumberland Plain for some Commonwealth listed species under several climate change scenarios

The analysis concluded that the Plan has taken adequate steps to consider climate change. In particular, the SCA has been designed consistent with key principles commonly recommended by scientists and practitioners to facilitate adaptation of biodiversity to climate change, including:

- Ensuring representativeness and replication
- Protecting the largest and most viable patches
- Maintaining and improving habitat connectivity
- Reducing the impacts of other threats
- Managing uncertainty through adaptive management

5.3 OVERALL CONCLUSION

The Plan will deliver substantial conservation outcomes for the Cumberland subregion and adequately addresses the likely impacts of the urban and industrial development, infrastructure, intensive plant agriculture and major transport corridors on biodiversity values and other protected matters under the BC Act and EPBC Act.

The Plan is considered to be consistent with the Strategic Certification Guidelines (DPIE, 2020) and the requirements in the Commonwealth ToR relating to evaluating the commitments. In particular, the Plan:

- Is broadly consistent with the principles of ESD
- Has achieved substantial avoidance outcomes for biodiversity values
- Includes commitments that:
    - Adequately address the biodiversity values being impacted
    - Prioritise the most important biodiversity values, particularly the most threatened matters
    - Are considered likely to improve biodiversity values and landscape function in the long-term
    - Are additional to existing conservation obligations
    - Establish development controls that conserve the environment and represent a new or significant upgrade
    - Will deliver new reserves generally consistent with the CAR reserve framework

- Are likely to be effectively implemented and lead to timely and certain outcomes
- Are consistent with key principles for facilitating adaptation of biodiversity to climate change
- Meet the Commonwealth's endorsement criteria under the Agreement for the strategic assessment

In concluding that the Plan adequately addresses the impacts of the development, it is important to note that the Plan's commitments are not driven solely by meeting the biodiversity credit requirements of the BAM, which is a key part of the definition of 'no net loss' under the BAM. This is consistent with the BC Act.

For strategic biodiversity certifications such as the Plan, the BC Act does not require the value of commitments be calculated in terms of credits. This recognises that strategic certification provides significant opportunities to maximise benefits to biodiversity and address landscape scale conservation challenges that are not provided by site-by-site assessment processes.

The key commitments under the Plan have been developed in recognition of these potential benefits, including:

- Focusing the conservation program, including offsets, on the areas of the landscape considered most likely to be viable in the long-term and maximise ecological function and connectivity across the landscape
- Addressing ecological function and landscape-scale ecological processes through improving habitat connectivity and undertaking ecological restoration in priority parts of the landscape
- Implementing programs to manage threats at a landscape scale that can benefit multiple species and TECs
- Consolidating offsets into larger patches that are likely to be more viable in the long term

Furthermore, modelling work undertaken as part of the Assessment Report that looked at trends in native vegetation extent and condition in the subregion (see Assessment Report, Supporting Document D) demonstrated that the existing level of landscape threats is significant and is likely to lead to substantial declines in native vegetation over time unless action is taken. The trend analysis indicated the commitments will contribute to addressing this ongoing decline by securing and managing large parts of the landscape in perpetuity. The Plan also commits to deliver programs that are expected to lead to improved management of landscape scale threats, including weeds, pests, fire and disease.

A key implication of the high level of existing landscape threats in the Cumberland subregion is that there is a substantial risk that biodiversity values will degrade before land is secured under the conservation program, which may reduce the effectiveness or increase the costs of the conservation program.

The NSW Government has recognised this risk and is committing substantial initial funding of $114 million over the first five years to deliver priority conservation actions. This includes a land purchase program to support the establishment of the Georges River Koala Reserve and to establish and expand other reserves, commencing with the restoration of koala habitat in priority areas including the Georges River Koala Reserve. Importantly, the upfront funding will also enable:

- Commencement of Koala habitat restoration, including installation of Koala crossings and predator exclusion fences
- Support for the *NSW Koala Strategy* including the commencement of annual monitoring in the region
- Establishment of partnerships including with the Biodiversity Conservation Trust to facilitate formation of BSAs primarily in the Razorback Area which is dominated by Cumberland Plain Woodland
- Establishment of partnerships with the NSW Aboriginal Land Council to establish a grant program for Western Sydney Local Aboriginal Land Councils to deliver cultural and conservation opportunities

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Appendix A: Biodiversity values most at risk

Table 9: Commonwealth listed threatened ecological communities most at risk under the Plan

Name	Status	SAII entity*	Description of key impacts	Offset target

Shale Sandstone Transition Forest	CE	Yes	The Plan may lead to the loss of 180.7 hectares of the TEC in the urban capable lands within the nominated areas, and potentially an additional 40.3 hectares within avoided lands due to essential infrastructure. It is not considered likely that this will threaten the long-term viability of the TEC because:
			• The majority of the remaining areas of higher viability TEC in the nominated areas have been avoided and are not impacted by the Plan, including:
			  ○ 1,769.1 hectares avoided for biodiversity purposes
			  ○ 247.6 hectares avoided for other purposes
			• The majority of impacts are to lower viability areas of the TEC:
			  ○ 0.5 per cent of higher viability TEC in the Plan Area
			  ○ 1.9 per cent of higher viability TEC in the nominated areas
			• The impacts are unlikely to increase the level of fragmentation
			The offset for this TEC will provide a substantial addition to the level of protection of the TEC and will support a key high priority action in the Conservation Advice to increase the area of larger, high quality patches of TEC that is secured and managed for conservation
				675 hectares

Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	CE	Yes	The Plan may lead to the loss of 180.3 hectares of the TEC. It is not considered likely that this will threaten the long-term viability of the TEC because:
			• The scale of impacts are relatively minor when considering the mapped extent across the Plan Area (less than 1.8 per cent)
			• The majority of impacts are to lower viability areas of the TEC:
			  ○ Less than 0.3 per cent of higher viability TEC in the Plan Area
			  ○ About 4 per cent of higher viability TEC in the nominated areas
			• The impacts are unlikely to increase the level of fragmentation
			• The offset for this TEC will provide a substantial addition to its level of protection and address a key threat identified in the Conservation Advice around its current low level of protection
				665 hectares

Name	Status	SAII entity*	Description of key impacts	Offset target

River-flat Eucalypt Forest of Eastern Australia	CE	No	The Plan may lead to the loss of 159.2 hectares of the TEC. It is not considered likely that this will threaten the long-term viability of the TEC because:
			• The scale of impacts are relatively minor when considering the mapped extent across the Plan Area (2.4 per cent)
			• The majority of impacts are to lower viability areas of the TEC:
			  ○ 1.4 per cent of higher viability TEC in the Plan Area
			  ○ About 7.2 per cent of higher viability TEC in the nominated areas
			• The impacts are unlikely to increase the level of fragmentation
			• The offset for this TEC will provide a substantial addition to its level of protection and address a priority action in the Conservation Advice to protect and conserve remaining areas of the ecological community
				570 hectares

Cooks River Castlereagh Ironbark Forest	CE	Yes	The Plan may lead to the loss of 30.9 hectares of the TEC. The impacts in WSA are not expected to threaten the long-term viability of the TEC because: • Impacts are to a number of smaller already fragmented patches • Of the 7.8 hectares impacted, only 0.6 hectares is in intact condition and none is mapped as higher viability • The impacts are unlikely to increase the level of fragmentation of the TEC The impacts in GPEC are more complex because: • Impacts from the Outer Sydney Orbital fragment the TEC in the Wianamatta Regional Park • Of the 23.1 hectares to be impacted, 10.8 hectares is mapped as higher viability. This represents 1.8 per cent of the higher viability TEC in the Strategic Assessment Area (592 hectares) It is noted that the Plan commits (Commitment 3) to avoid and minimise impacts to the TEC due to the construction of the Outer Sydney Orbital in GPEC. It will be critical that this process avoids and minimise impacts as far as possible to reduce the scale of impacts The offset for this TEC will provide a substantial contribution to the area of the TEC that is protected within the Strategic Assessment Area (an additional 15.7 per cent) and supports a number of high priority actions in the Conservation Advice. As part of this commitment, the Plan is also prioritising restoration of up to 29.6 per cent of the offset target for the TEC. Restoration provides the potential for substantial improvements in the long-term viability of the TEC	125 hectares

Name	Status	SAII entity*	Description of key impacts	Offset target
			The timing of offsetting will be critical for the TEC. Offsets should be provided early during the implementation of the Plan and ideally be in place before construction of the Outer Sydney Orbital	

* 'SAII entities' are TECs or species that may be subject to serious and irreversible impacts. SAII entities are identified in the basis of a set of principles under the Biodiversity Conservation Regulation 2017. The Assessment Report identifies the NSW and Commonwealth listed SAII entities that may be subject to serious and irreversible impacts and that are potentially impacted by the development under the Plan. NSW listed SAII entities are assessed in Chapter 25 and Commonwealth listed SAII entities are assessed in Chapters 29 to 31

Table 10: NSW listed threatened ecological communities most at risk under the Plan

Name	Status	SAII entity*	Description of key impacts		Offset target
			Area impacted	No. of ecosystem credits needed to offset impacts	
Cumberland Plain Woodland	CE	Yes	931.5 hectares	18,389 credits	2,885 hectares
Shale Sandstone Transition Forest	CE	Yes	459.8 hectares	12,700 credits	1,455 hectares
River-Flat Eucalypt Forest	E	No	185.9 hectares	5,576 credits	505 hectares
Shale Gravel Transition Forest	E	No	108.3 hectares	2,852 credits	285 hectares
Cooks River Castlereagh Ironbark Forest	E	Yes	37.6 hectares	827 credits	115 hectares

* 'SAII entities' are TECs or species that may be subject to serious and irreversible impacts. SAII entities are identified in the basis of a set of principles under the Biodiversity Conservation Regulation 2017. The Assessment Report identifies the NSW and Commonwealth listed SAII entities that may be subject to serious and irreversible impacts and that are potentially impacted by the development under the Plan. NSW listed SAII entities are assessed in Chapter 25 and Commonwealth listed SAII entities are assessed in Chapters 29 to 31

Table 11: Commonwealth and NSW listed threatened species most at risk under the Plan

Name	Status		SAII entity*	Description of key impacts	Offset target
	Cth	NSW			
Cynanchum elegans	E	E	No	**EPBC Act assessment for Plan Area** The Plan will lead to: • Loss of 19.6 hectares of potential habitat within the transport corridors • Potential fragmentation of population 14 due to the development of the Outer Sydney Orbital at Cobbitty The risk of residual adverse impacts to this species is medium It is considered likely that the Outer Sydney Orbital will result in internal fragmentation of a population of the species near Cobbitty, which is the key driver for this risk rating. While there is some uncertainty about the accuracy of the records, the population is of moderate size comprising up to 19 plants. It is likely that this population is important to the ongoing viability and recovery of the species, as this species is endangered The offsets for this species will add to the existing level of protection for this species in NSW and contribute to its long-term preservation The Plan also includes a broader set of commitments and actions which are likely to benefit the species. The SCA contains approximately 1,569.3 hectares of mapped potential habitat for *Cynanchum elegans*. It is very likely that areas of potential habitat in addition to the 2 offset locations will be protected within the SCA as part of offset commitments for other matters under the Plan Overall, the direct and indirect impacts to this species are not expected to threaten the long-term viability of the species	2 offset locations
Dillwynia tenuifolia	-	V	No	**BC Act assessment for nominated areas** Area of habitat directly impacted: 173.9 hectares No. of species credits needed to offset impacts: 2,905 credits	3 offset locations
Grevillea juniperina subsp. *juniperina*	-	V	No	**BC Act assessment for nominated areas** Area of habitat directly impacted: 467.5 hectares No. of species credits needed to offset impacts: 6,769 credits	3 offset locations
Haliaeetus leucogaster	-	V	Yes	**BC Act assessment for nominated areas** Area of habitat directly impacted: 17.7 hectares No. of species credits needed to offset impacts: 640 credits	1 offset location

Name	Status		SAII entity*	Description of key impacts	Offset target
	Cth	NSW			
Hibbertia fumana	-	CE	Yes	**BC Act assessment for nominated areas** Area of habitat directly impacted: 73.7 hectares No. of species credits needed to offset impacts: 2,565 credits	1 offset location
Hibbertia puberula	-	E	No	**BC Act assessment for nominated areas** Area of habitat directly impacted: 77.8 hectares No. of species credits needed to offset impacts: 1,760 credits	1 offset locations
Hieraaetus morphnoides	-	V	Yes	**BC Act assessment for nominated areas** Area of habitat directly impacted: 28.2 hectares No. of species credits needed to offset impacts: 663 credits	1 offset location
Koala	V; FPAL	V	No	**EPBC Act assessment for Plan Area** ***Impacts to habitat*** The Plan will lead to the loss of 242 hectares of important habitat for Koalas within GMAC and Wilton. This equates to 1.6 per cent of the mapped important habitat for the Southern Sydney population The Plan commits to: • Protecting and managing a minimum of 570 hectares of important Koala habitat (Commitment 9) • Establishing the Georges River Koala Reserve (Commitment 10), which incorporates over 1,800 ha of Koala habitat, and includes restoration of up to 80 ha of cleared land to increase available Koala habitat • Protecting habitat within Koala corridors, including through undertaking habitat restoration in key areas such Georges River, Ouesdale Creek and around Appin (Commitment 12 and Commitment 13) The action to restore land is consistent with Principle 3 of Conserving Koalas in Wollondilly and Campbelltown LGAs (DPIE, 2019). These commitments also support several priority actions in the Conservation Advice ***Impacts to habitat connectivity*** The Plan will not result in the loss of primary or secondary habitat corridors in Wilton or GMAC due to clearing. However, habitat connectivity has the potential to be impacted by the development	570 hectares of important habitat

Name	Status		SAII entity*	Description of key impacts	Offset target
	Cth	NSW			
				The NSW Chief Scientist (2020, 2021), EES (DPIE, 2019)and Biolink (Biolink, 2018) discuss the importance of habitat associated with the Georges River as a north-south primary corridor to the east of Appin Road. This will be protected (as a new reserve) and improved (through restoration) under the Plan (Commitment 10) The habitat associated with the Nepean River is also an important north-south primary corridor through Wilton and GMAC (Biolink, 2018; DPIE, 2019; Office of the NSW Chief Scientist & Engineer, 2021). This corridor will be protected under the Plan through the application of development controls to avoided land and the SCA. The Plan also identifies potential restoration opportunities to widen the Nepean corridor to meet width recommendations of the NSW Chief Scientist East-west connectivity through Douglas Park (between the Wilton and GMAC nominated area boundaries) is also recognised for its importance to connectivity. This area will not be impacted by the Plan and parts of it are included in the SCA which are targeted for offsets under the Plan The main risk to connectivity occurs to the east-west connections through GMAC. These are all secondary corridors and are currently compromised in various ways Consistent with advice from the NSW Chief Scientist, Corridor C and Corridor D will be fenced to exclude Koalas from these areas, to protect Koalas from threats. Koala access to Corridor E and Corridor F will be maintained under the Plan. Management of Corridor A and Corridor B are outside the scope of the Plan The NSW Chief Scientist requires that east-west connectivity is maintain for a minimum of two corridors through GMAC, and identifies Corridor E (Ousedale) as the preferred corridor to provide east-west connectivity function through southern GMAC (Office of the NSW Chief Scientist & Engineer, 2020). The Plan will protect Ouesdale corridor and ensure connectivity through: • Installing exclusion fencing to protect Koalas from urban threats (Commitment 7) • Installing connectivity structures where necessary to facilitate Koala movement (including an underpass under Appin Road) (Commitment 7) • Prioritising habitat restoration to widen Ouesdale corridor (Commitment 12 and Commitment 13) In addition to Ousedale Corridor, the NSW Chief Scientist recommends that east-west connectivity is also delivered via either Corridor A or Corridor B. These corridors are outside the scope of the Plan, and the Plan is designed on the assumption that at least one northern corridor	

Name	Status		SAII entity*	Description of key impacts	Offset target
	Cth	NSW			
				will be delivered via external processes in a manner which is consistent with the NSW Chief Scientist's recommendations As a requirement of the NSW Chief Scientist, the acceptability of the Plan depends on the delivery of the northern corridor ***Indirect impacts*** The Plan includes a range of general and species-specific measures to mitigate the risk of indirect impacts to Koalas. These measures are considered adequate to protect Koalas ***Monitoring, evaluation and adaptive management*** To support implementation of the Koala commitments and actions under the Plan, the Plan includes a commitment to establish a Koala working group (Commitment 7) The Plan provides a strong framework for addressing risks to Koala. Given the long timeframes associated with implementation of the Plan, there is uncertainty about the ultimate effectiveness of these measures. It will be critical that the Plan's monitoring, evaluation and adaptive management measures are effective in addressing this uncertainty	
				BC Act assessment for nominated areas Area of habitat directly impacted: 242.1 hectares No. of species credits needed to offset impacts: 7,307 credits	
Lophoictinia isura	-	V	Yes	**BC Act assessment for nominated areas** Area of habitat directly impacted: 44.6 hectares No. of species credits needed to offset impacts: 1,076 credits	1 offset location
Marsdenia viridiflora subsp. *viridiflora*	-	E	No	**BC Act assessment for nominated areas** Area of habitat directly impacted: 425.3 hectares No. of species credits needed to offset impacts: 9,805 credits	2 offset locations
Meridolum corneovirens	-	E	No	**BC Act assessment for nominated areas** Area of habitat directly impacted: 720.1 hectares No. of species credits needed to offset impacts: 18,299 credits	3 offset locations
Persoonia nutans	E	E	No	**EPBC Act assessment for Plan Area** The Plan will lead to:	2 offset locations

Name	Status		SAII entity*	Description of key impacts	Offset target
	Cth	NSW			
				• Direct impacts to a known population (population 63) • Loss of approximately 142.5 hectares of potential habitat • Potential fragmentation of habitat in one location The risk of residual adverse impacts to this species is <u>medium</u> The likelihood of potential impacts to population 63 due to the development of the Outer Sydney Orbital within Wianamatta Regional Park, in addition to potential impacts to habitat, is the key driver for this risk rating. There is a high level of confidence that the population is extant, as the population was detected on site during surveys. It is likely that this population is important to the ongoing viability and recovery of the species as the species is endangered The Plan commits (Commitment 3) to avoid and minimise impacts to *Persoonia nutans* due to the construction of the Outer Sydney Orbital in GPEC. It will be critical that this process avoids and minimise impacts as far as possible to reduce the scale of impacts The offsets for this species will add to the existing level of protection for this species in NSW and contribute to its long-term preservation, and is consistent with a performance criterion in the species' recovery plan, which aims to increase the level of protection for this species through conservation planning and land use decisions The Plan also includes a broader set of commitments and actions which are likely to benefit the species. The SCA contains approximately 1,365 hectares of mapped potential habitat for *Persoonia nutans*. It is very likely that areas of potential habitat in addition to the 2 offset locations will be protected within the SCA as part of offset commitments for other matters under the Plan Overall, the direct and indirect impacts to this species are not expected to threaten the long-term viability of the species	
				<u>BC Act assessment for nominated areas</u> Area of habitat directly impacted: 142.0 hectares No. of species credits needed to offset impacts: 2,601 credits	
Pimelea spicata	E	E	No	**<u>EPBC Act assessment for Plan Area</u>** The Plan will lead to: • Direct impacts to a known population (population 532) • Loss of approximately 974 hectares of mapped habitat within the nominated areas and transport corridors • Potential fragmentation of habitat in two locations	3 offset locations

Name	Status		SAII entity*	Description of key impacts	Offset target
	Cth	NSW			
				The risk of residual adverse impacts to this species is <u>high</u> The likelihood of potential impacts to population 532 within the urban capable lands in GMAC is the key driver for this risk rating. There is a high level of confidence the population is extant given the locational accuracy, reputable observer and date of observation. The population is of a moderate size comprising up to 160 plants. It is likely that this population is important to the ongoing viability and recovery of the species It is considered likely that some or all or population 532 would occur within the APZ of any developed land at this site. Appendix E of the Plan contains a measure to undertake fire hazard management within the APZ at this location in a manner which protects *P. spicata* individuals from impacts. This measure will provide a level of protection for individuals of population 532. However, it is still likely that some individuals of population 532 may be lost as a result of development under the Plan. The offsets for this species will provide a substantial addition to the level of protection for the species which is currently under-represented in protected areas. Furthermore, in situ protection of *Pimelea spicata* is a fundamental component of the species' recovery plan The Plan also includes a broader set of commitments and actions which are likely to benefit the species. The SCA contains approximately 2,031.1 hectares of mapped potential habitat for *Pimelea spicata*. It is very likely that areas of potential habitat in addition to the 3 offset locations will be protected within the SCA as part of offset commitments for other matters under the Plan Overall, the direct and indirect impacts to this species are not expected to threaten the long-term viability of the species	
				<u>BC Act assessment for nominated areas</u> Area of habitat directly impacted: 870.4 hectares (note that 862.36 hectares of this impact is associated with native vegetation removal and this determines the resultant species credit requirement. The remaining 8.1 hectares of impact associated with non native vegetation and has been assessed in the Assessment Report as a prescribed impact) No. of species credits needed to offset impacts: 10,471 credits	
Pultenaea parviflora	V	E	No	**<u>EPBC Act assessment for Plan Area</u>** The Plan will lead to: • Direct impacts to 6 populations, including the loss of one important population (population 127) and impacts to records to two important populations (population 118 and 119)	2 offset locations

Name	Status		SAII entity*	Description of key impacts	Offset target
	Cth	NSW			
				• Loss of approximately 218.7 hectares of potential habitat within the nominated areas and transport corridors • Potential fragmentation of habitat in one location The risk of residual adverse impacts to this species is <u>high</u> The likelihood of the loss of population 127 as a result of the development of the Outer Sydney Orbital in Wianamatta Regional Park in GPEC is the key driver for this risk rating. There is a high level of confidence that the population is extant as it was detected during species surveys. The population is of a moderate size comprising 83 plants. The Plan commits (Commitment 3) to avoid and minimise impacts to *Pultenaea parviflora* due to the construction of the Outer Sydney Orbital in GPEC. It will be critical that this process avoids and minimise impacts as far as possible The offsets for this species will add to the existing level of protection for this species in NSW and contribute to its long-term preservation, and supports a priority action in the Conservation Advice The Plan also includes a broader set of commitments and actions which are likely to benefit the species. The SCA contains approximately 1,302.7 hectares of mapped potential habitat for *Pultenaea parviflora*. It is very likely that areas of potential habitat in addition to the 2 offset locations will be protected within the SCA as part of offset commitments for other matters under the Plan. For example, three of the proposed reserves in the Plan contain mapped habitat for the species (including 107.2 ha in the Georges River Koala Reserve) Overall, the direct and indirect impacts to this species are not expected to threaten the long-term viability of the species	
				<u>BC Act assessment for nominated areas</u> Area of habitat directly impacted: 105.5 hectares No. of species credits needed to offset impacts: 2,157 credits	
Pultenaea pedunculata	-	E	No	**<u>BC Act assessment for nominated areas</u>** Area of habitat directly impacted: 208.5 hectares No. of species credits needed to offset impacts: 4,045 credits	2 offset locations
Southern Myotis	-	V	No	**<u>BC Act assessment for nominated areas</u>** Area of habitat (hectares) directly impacted: 759.2 hectares No. of species credits needed to offset impacts: 17,175 credits	1 offset location

Name	Status		SAII entity*	Description of key impacts	Offset target
	Cth	NSW			
Swift Parrot	CE	E	Yes	**<u>EPBC Act assessment for Plan Area</u>** Development under the Plan will lead to the clearing of: • 1,270.5 ha of Swift Parrot potential foraging habitat • 101.1 ha of Swift Parrot important areas (noting some areas of this mapped habitat are unlikely to constitute real habitat for the species) • 3.1 ha of Swift Parrot potential important areas Some of this clearing will be mitigated by the retention of large trees (≥50cm DBH) during precinct planning. Despite this, the scale of clearing presents a <u>medium risk</u> of residual adverse impacts to the species Clearing of habitat is unlikely to lead to fragmentation of connectivity for the species given it is highly mobile and the availability of potential foraging resources throughout the landscape Impacts to the species will be addressed through protection of offsets for the species. Offsets support a management priority included in the species conservation advice to *increase the area of habitat for the species that is secured and managed for conservation* The Plan also includes a broader set of commitments and actions which are likely to benefit the species. The SCA contains 17,178 ha of potential foraging habitat for the species. It is very likely that areas of suitable foraging habitat for this species in addition to the offsets will be protected within the SCA. For example, it is noted that 2,847.2 ha of potential foraging habitat for the Swift Parrot is located within the three conservation reserves proposed by the Plan, including 1,536.8 ha within the Georges River Koala Reserve Overall, the direct and indirect impacts to this species are not expected to threaten the long-term viability of the species **<u>BC Act assessment for nominated areas</u>** Area of habitat directly impacted: 43.3 hectares (note that 26.0 hectares of impact to Swift Parrot important habitat is associated with vegetation removal and hence has been entered into the BAM Calculator to determine the resultant credit requirement. The remaining 17.3 hectares of impact is associated with waterbodies and Non-Native Vegetation and has been assessed under Prescribed Impact in Section 16.3 of the BCAR) No. of species credits needed to offset impacts: 534 credits	4,410 hectares of potential foraging habitat (including 100 ha of important habitat as defined under the BAM)

* 'SAII entities' are TECs or species that may be subject to serious and irreversible impacts. SAII entities are identified in the basis of a set of principles under the Biodiversity Conservation Regulation 2017. The Assessment Report identifies the NSW and Commonwealth listed SAII entities that may be subject to serious and irreversible impacts and that are potentially impacted by the development under the Plan. NSW listed SAII entities are assessed in Chapter 25 and Commonwealth listed SAII entities are assessed in Chapters 29 to 31

Appendix B: Types of indirect impacts

Table 12: Indirect impact types and nature, extent and duration of indirect impacts associated with the Plan

Indirect impact type	Development types relevant to the indirect impact				Nature of indirect impact	Extent/general location of indirect impact and/or high-risk areas	Duration of indirect impact
	Urban and industrial	Infrastructure	Intensive plant agriculture	Transport corridors			
Hydrological/ soil disturbance	✓	✓	✓	✓	Changes to surface water and groundwater flows and water quality due to: development and infrastructure disrupting natural flows; the introduction of pollutants particularly associated with urban/agriculture; and soil erosion/disturbance associated with all development types	Waterways, wetlands, flood-prone areas within or downstream of development	Short term to long-term
Ground settling or subsidence				✓	Settlement/subsidence of ground in the vicinity of transport tunnels due to the tunnel void or groundwater removal, which may cause disturbance to the land surface	Land within or in vicinity of the transport tunnels	Long-term
Spread of infection/disease	✓	✓	✓	✓	Spread of pathogens from contaminated clothing and equipment or surface water runoff	Native vegetation and habitat retained within or adjacent to development	Likely long-term
Spread of weeds	✓	✓	✓	✓	Spread of invasive species due to edge effects, surface water run-off, or changed fire regimes	Native vegetation and habitat retained within or adjacent to development	Likely long-term
Predation/ competition by pest/domestic fauna	✓	✓	✓	✓	Increased predation and competition of species by pest/domestic fauna	Habitat retained within or adjacent to development including well-connected habitat corridors	Likely long-term

Indirect impact type	Development types relevant to the indirect impact				Nature of indirect impact	Extent/general location of indirect impact and/or high-risk areas	Duration of indirect impact
	Urban and industrial	Infrastructure	Intensive plant agriculture	Transport corridors			
Altered fire regimes	✓	✓	✓	✓	Altered fire regimes as a result of increased burns for asset protection, reduced ability to burn due to risk to surrounding urban areas or increased risk of unmanaged fires or accidental fires	Native vegetation and habitat retained within or immediately adjacent to development, particularly asset protection zones	Long-term
Disturbance from increased public access to natural areas	✓	✓			Trampling of species or habitat, removal of wood or bush rock, damage from mountain-biking and four-wheel driving	Publicly accessible natural areas retained within or immediately adjacent to development	Short term to permanent
Fauna mortality, displacement and barriers to movement	✓	✓	✓	✓	Potential for mortality of threatened fauna species by vehicle strike and reduced movement and connectivity between habitat areas due to the introduction of new barriers	Habitat intersected by development that poses a barrier to movement or accessibility	Long-term
Fauna disturbance due to noise, dust or light	✓	✓	✓	✓	Noise, dust or light created by equipment during construction or by new structures or activities during operation	Habitat retained within or adjacent to development	Short-term to long-term
Inadvertent impacts on adjacent habitat or vegetation	✓	✓	✓	✓	Damage to adjacent habitat during construction activities or during ongoing management and use	Native vegetation and habitat immediately adjacent to development	Short-term to long-term