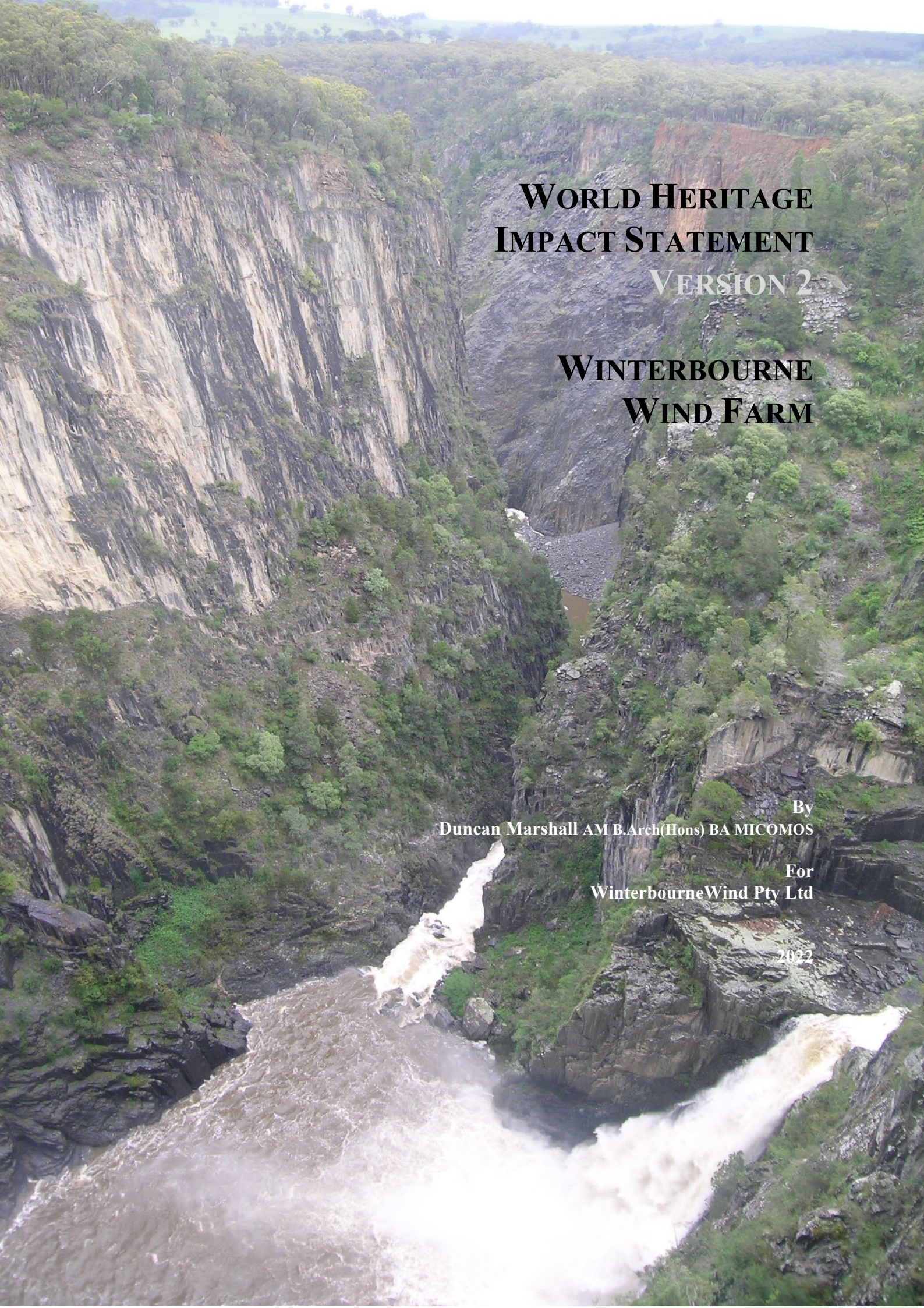

WORLD HERITAGE IMPACT STATEMENT

VERSION 2

WINTERBOURNE WIND FARM

By

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For

WinterbourneWind Pty Ltd

2022

Cover Image: The second drop of the Apsley Falls, Walcha, NSW, Cgoodwin, Wikimedia Commons

EXECUTIVE SUMMARY

WinterbourneWind Pty Ltd is proposing to construct a wind farm to the north and east of Walcha in NSW, on rural land to the west of the Oxley Wild Rivers National Park. Part of the National Park is a component part of the Gondwana Rainforests of Australia, which is on the World Heritage List established under the *World Heritage Convention*. The World Heritage property is protected under the *Environment Protection and Biodiversity Conservation Act 1999*.

The proposed wind farm is outside the National Park and World Heritage area. The closest proposed turbine location is approximately 1.2 km north of the World Heritage area boundary in the southern part of the project area, and the furthest turbine is located over 23 km from the World Heritage area.

This report has been prepared to assist WinterbourneWind Pty Ltd understand and summarise any potential World Heritage impacts arising from the proposed wind farm.

In this case, impacts have been primarily assessed in two separate studies:

- biodiversity development assessment report (NGH Pty Ltd 2022); and
- landscape and visual impact assessment (Moir Landscape Architecture 2022).

There are broadly two categories of potential impact to consider which relate to geomorphology, ecological and biological processes, and biodiversity:

- actions arising from the project area but which have the potential to impact on World Heritage values and attributes inside the World Heritage area (eg. bushfires) or the appreciation of these values (eg. through visual impacts); and
- actions arising from the Project Area which have the potential to impact on World Heritage values and attributes which extend outside the World Heritage Area (eg. wildlife which forage, sometimes inhabit/nest or traverse in the vicinity of the project area). (adapted from NGH Pty Ltd 2022, Section 7.5.3)

The biodiversity study for the project reaches the following conclusion about the potential impacts on World Heritage,

> With regard to potential impacts inside the World Heritage area, **significant impacts are unlikely**. There are a range of potential impacts (e.g., pollution, weed, pest species etc) which will be managed to ensure that they have minimal effect on World Heritage values. In the case of bushfire, there may be a net positive benefit to the World Heritage Area through improved access and facilities for fire-fighting.
>
> Potential impacts outside the World Heritage area are also considered **unlikely to be significant**. There are a range of potential impacts (e.g., some habitat loss for species relevant to the World Heritage values, and the possibility of aerial species mortality during turbine operation). Mitigation and management will address such impacts. (NGH Pty Ltd 2022, Section 7.5.3, emphasis added)

The visual impact assessment concludes,

> [The] Project will **not negatively impact or diminish**… [the Outstanding Universal Value] as the accessible experiences of the WHA [World Heritage area] either do not have views to the proposal due to topography or are so distant and densely vegetated that the presence of the turbines in any views would be insignificant in the context of the location and broader views. (Moir Landscape Architecture 2022, Section 15.5, emphasis added)

Based on these studies, the Winterbourne Wind Farm is unlikely to result in significant

impacts on the World Heritage area. There are a range of potential impacts but these will be managed and mitigation measures adopted to ensure minimal effects.

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1. INTRODUCTION

WinterbourneWind Pty Ltd is proposing to construct a large wind farm to the north and east of Walcha in NSW, on rural land to the west of the Oxley Wild Rivers National Park. Part of the National Park is a component part of the Gondwana Rainforests of Australia, which is on the World Heritage List established under the *World Heritage Convention*. The World Heritage property is protected under the *Environment Protection and Biodiversity Conservation Act 1999*. The proposed wind farm is outside the National Park and World Heritage area.

This report has been prepared to assist WinterbourneWind Pty Ltd understand and summarise any potential World Heritage impacts arising from the proposed wind farm.

This summary assessment is based on:

- the Outstanding Universal Value of the Gondwana Rainforests of Australia (UNESCO WHC 2022);
- references providing more detailed information about the specific contribution of the Oxley Wild Rivers National Park to the World Heritage property (Hunter 2005 and NSW NPWS 2005);
- Secretary's Environmental Assessment Requirements (2020);
- Environmental Impact Statement (ERM 2022);
- Biodiversity Development Assessment Report (NGH Pty Ltd 2022); and
- Landscape and Visual Impact Assessment (Moir Landscape Architecture 2022).

It is important to stress that this report does not present new research or a new assessment of impacts. The report draws on the findings of other expert assessments, especially those relating to biodiversity and visual impacts.

The project site is in an area with a range of natural and cultural heritage values, and it is adjacent to but outside of an overlapping series of protected areas, including the World Heritage area. This report only considers the World Heritage issues, and no other values or issues.

This report has been prepared with reference to the:

- Matters of National Environmental Significance, Significant impact guidelines 1.1, *Environment Protection and Biodiversity Conservation Act 1999* (Australian Government, Department of the Environment 2013); and
- Guidance and Toolkit for Impact Assessments in a World Heritage Context (UNESCO, ICCROM, ICOMOS and IUCN 2022).

This report has been prepared by Duncan Marshall AM B.Arch(Hons) BA MICOMOS.

2. SUMMARY OF PROPOSAL

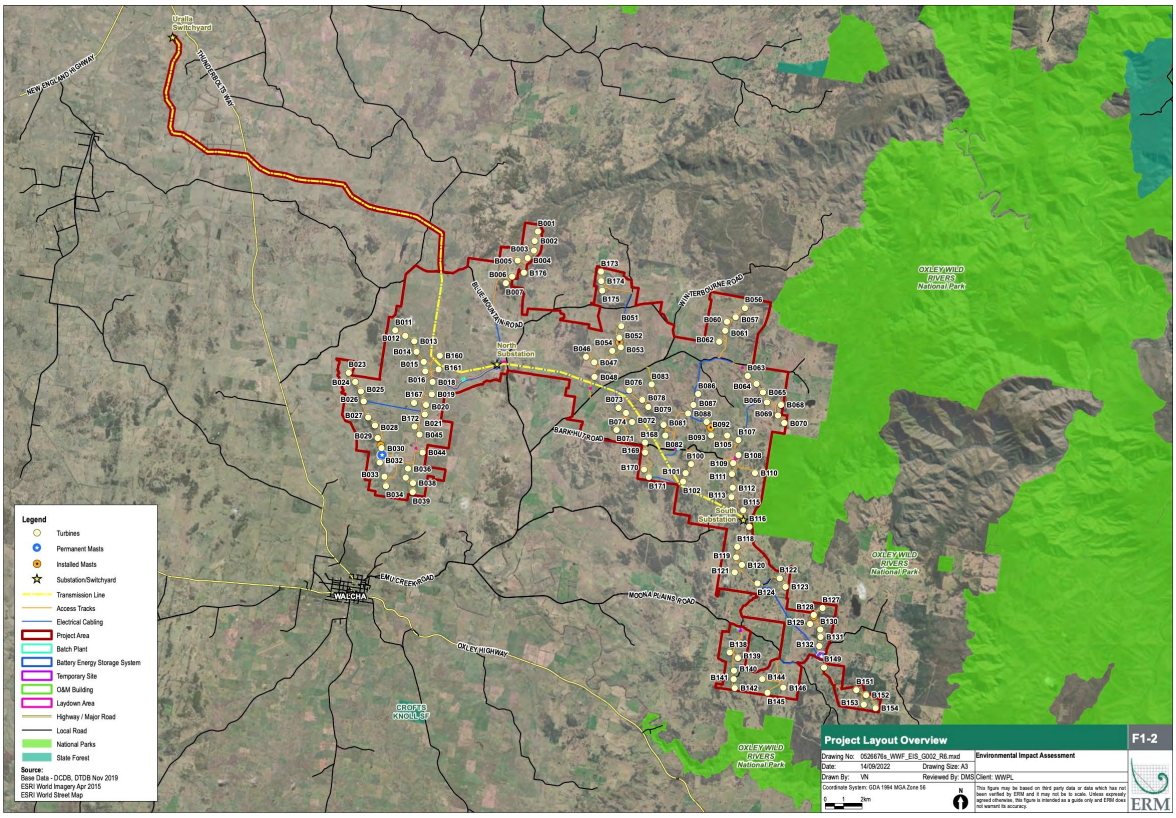
The proposed works cover an area of about 22,285 hectares and involve:

- the construction, operation and decommissioning of a wind farm with up to 119 wind turbine generators (WTG), together with associated and ancillary infrastructure;
- the maximum height of the wind turbine generators will be 230 metres above ground level to the tip of the blades;
- infrastructure would include substations, battery storage, underground and/or overhead cabling, a switchyard, internal road network, an operations and maintenance facility and meteorological monitoring masts;
- upgrades to existing roads; and
- temporary elements required during construction.

The closest proposed turbine location is approximately 1.2 km north of the World Heritage area boundary in the southern part of project area, and the furthest proposed turbine location is over 23 km from the World Heritage area.

The following figure provides an overview of the project site in relation to the National Park which includes the World Heritage area. Note that this figure does not include the full boundary of the National Park area, which is not exactly the same as the World Heritage area.

Figure 1: Project Site and Wind Turbine Generators in relation to the National Park
Source: ERM 2022



3. CONSIDERATION OF ALTERNATIVES AND MITIGATION MEASURES

The proposed works have been revised and refined over time in response to design and constructability requirements, in response to environmental constraints and the outcomes of community consultation. This section draws upon information provided in Section 2.2 of the environmental impact statement (ERM 2022).

Of particular note, the following summarises the alternatives and mitigation measures which were considered and in some cases adopted.

Do Nothing Option

The "do nothing" option has been considered. In this context, the EIS notes,

> with appropriate mitigation and management measures, the Project will not have a substantial negative impact on environmental aspects. (ERM 2022, Section 2.2.1)

An Evolved Design which Minimises Impacts

The design of the project has evolved over time. The EIS notes,

> The Proponent has completed environmental assessment of the Project Area in accordance with the SEARs, and has modified the project layout based on the outcomes of these assessments, consideration of technical, environmental, and constructability issues, and community feedback…
>
> The Project originally consisted of up to 130 WTGs (refer Scoping Report Addendum (ERM, 2021)) and has since been refined to up to 119 WTGs to avoid highly sensitive ecological areas and reduce visual impacts from the Oxley Highway and Apsley Falls. While this alleviated some of the potential impacts, additional design refinements were required to further reduce visual and construction impacts. These included a reduction in the proposed maximum blade tip height from 250 m to 230 m. (ERM 2022, Section 2.2.2)

The EIS goes on to detail the range of changes made to the project design, including removals, relocations and additions affecting 126 components, in response to a range of issues, including heritage and environment (ERM 2022, Table 2-6).

Transport Routes

Alternative transport routes for oversized and overmass vehicles have been identified to minimise impacts relating to traffic management and biodiversity (ERM 2022, Section 2.2.3).

4. WORLD HERITAGE VALUES

The source of information about World Heritage values is the UNESCO World Heritage List documentation for the Gondwana Rainforests of Australia (UNESCO WHC 2022). The brief synthesis in the Statement of Outstanding Universal Value provides a summary of the values, as follows.

> The Gondwana Rainforests of Australia is a serial property comprising the major remaining areas of rainforest in southeast Queensland and northeast New South Wales. It represents outstanding examples of major stages of the Earth's evolutionary history, ongoing geological and biological processes, and exceptional biological diversity. A wide range of plant and animal lineages and communities with ancient origins in Gondwana, many of which are restricted largely or entirely to the Gondwana Rainforests, survive in this collection of reserves. The Gondwana Rainforests also provides the principal habitat for many threatened species of plants and animals. (UNESCO WHC 2022)

The full Statement of Outstanding Universal Value is provided at Appendix A.

The Gondwana Rainforests of Australia is a serial property covering 41 reserves, including a part of the Oxley Wild Rivers National Park. The National Park makes a contribution to the World Heritage values of the overall property. There are several references which appear to provide the best current understanding of the specific contribution of the Oxley Wild Rivers National Park to the World Heritage property. The plan of management for the National Park is one of those references, and includes the following summary of values.

> The natural values of the area, many of which form part of its World Heritage value, are summarised below, along with… other values.
>
> Key **natural values:**
> - diverse plant communities including rainforests, eucalypt forests and woodlands, heath and swamps, some of which are rare and/or restricted;
> - examples of dry, subtropical, warm temperate and cool temperate rainforest types, including an unparalleled sample of the transition of dry rainforest along gradients of moisture, exposure and soil depth;
> - significant areas of old growth including well developed moist forests that contain some of the tallest trees in NSW;
> - areas of tall moist tablelands forest, most of which has been cleared in surrounding lands;
> - a large number of threatened fauna species and rare and threatened plant species, the centre of distribution of several restricted and threatened species and limits of distribution of several species;
> - endemic invertebrate species in the Kunderang Brook Karst System (and probably in the rainforest areas).
>
> Significant **landscape values:**
> - spectacular gorges, cliff lines and deep, steep sided valleys illustrating on-going geomorphological processes associated with the Great Escarpment;
> - numerous high waterfalls;
> - panoramic views from locations along the escarpment edge;
> - attractive tall moist forests and rainforests and diverse vegetation types across the landscape. (NSW NPWS 2005)

Extracts from both references are also included at Appendix A (Hunter 2005, NSW NPWS 2005).

In addition, it is noted the National Heritage values of the Gondwana Rainforests of Australia are simply defined by reference to the World Heritage values (DCCEEW 2022).

5. ASSESSMENT OF POTENTIAL IMPACTS

The central task of this assessment is to address the question: do the proposed works have, will they have or are they likely to have a significant or an adverse impact on World Heritage values? This question can be addressed by considering the impact on the identified heritage values.

In the case of World Heritage, impacts have been primarily assessed in two studies:

- Biodiversity Development Assessment Report (NGH Pty Ltd 2022); and
- Landscape and Visual Impact Assessment (Moir Landscape Architecture 2022).

Key extracts from these studies are presented below as a basis for a summary assessment of impact on specific World Heritage values which follows after the extracts.

Extracts from the Biodiversity Development Assessment Report

The Biodiversity Development Assessment Report includes a section which addresses World Heritage. This is quoted at length below because of its relevance to an overall consideration of World Heritage impacts.

> In the World Heritage context there are broadly two categories of potential impact to consider which relate to geomorphology, ecological and biological processes, and biodiversity:
>
> - actions arising from the Project Area but which have the potential to impact on World Heritage values and attributes inside the World Heritage Area (eg. Bushfires); and
> - actions arising from the Project Area which have the potential to impact on World Heritage values and attributes which extend outside the World Heritage Area (e.g., wildlife which forage, sometimes inhabit/nest or traverse in the vicinity of the project area).
>
> Such potential impacts are discussed in earlier chapters of this report, as well as in other studies.
>
> The following table presents an overview of the potential impacts, information about where the impacts are considered in this report and other studies supporting the EIS, and a summary statement about impact in each case.

Table 1: Overview of impacts on World Heritage (source: NGH Pty Ltd 2022)

Potential Impacts	Section of the BDAR and Other Studies where the Impacts are Considered	Summary Impact Comment
Actions arising from the Project Area but which have the potential to impact on World Heritage values and attributes inside the World Heritage Area		
Bushfire spreading into the World Heritage Area	NGH (2022)	**Potential for a positive impact**. It is considered unlikely that a fire would spread from the wind farm to adjacent properties. The Project will establish new access tracks, significantly improving access for emergency services. Static water sources will also be provided and available for fire-fighting in the adjacent Oxley Wild Rivers National Park, potentially benefitting the World Heritage Area.
Chemical pollution flowing into the World Heritage Area	Section 5.1.4	**No impact.** All potential pollutants stored on-site during construction and operation would be stored in accordance with HAZMAT requirements (i.e., bunded).

Potential Impacts	Section of the BDAR and Other Studies where the Impacts are Considered	Summary Impact Comment
Increased water runoff/ flooding/sediment flow into the World Heritage Area	Section 5.1.4	**Very low risk of impact arising from the project.** In the flood study prepared for the project, Footprint (NSW) Pty Ltd (2020) confirmed the risks are very low. However, natural flood events do occur in the region, and these have the potential to be exacerbated by climate change. Maintaining grass cover across the site as far as practicable during construction and operation, particularly within the existing waterways, would help maintain soil stability during floods.
Change to groundwater quality which might flow into the World Heritage Area	Section 5.1.4	**No impact.** The project would have negligible impact on groundwater quality given the low pollution potential. The proposed WTGs are located on higher elevation and ridgelines, and therefore interception and impacts from the project to shallow groundwater is considered unlikely.
Weed species and pathogens spreading into the World Heritage Area	Section 7.5.3 (below)	**No impact.** The adoption of hygiene protocols will prevent the spread of weeds and pathogens from the project site to the World Heritage Area.
Actions arising from the project area which have the potential to impact on World Heritage values and attributes which extend outside the World Heritage Area		
Bird and bat mortality due to collision with wind turbines and barotrauma	Sections 5.1.5, 6.4.3, 7.3.3, 7.3.4	**Low risk of impact for the majority of bird and bat species.** The likely minimum height of the wind turbine blade sweep area for the project of 70m is above the typical flight height for the majority of bird and bat species at the project site. 95.7% of species observed were had a typical flight height under 40m. Bat activity across cleared agricultural land drops off considerably at 120m from forested areas. All turbines are located a minimum of 1.2km from the World Heritage Area, and a minimum of 150m from the National Park. However, **three species have been assessed as having a moderate risk of impact** associated with collisions with turbine blades during the operation of the project: • Glossy Black-cockatoo • White-throated Needletail • Wedge-tailed Eagle. Barotrauma is considered a **low risk** at worst. Studies have concluded that the majority of deaths of bats at wind farms are likely to be through collisions with turbines rather than from barotrauma.
Bird and bat avoidance of suitable habitat near wind turbines	Section 5.1.5	**Low risk of impact.** The particular habitat types found within the project site are abundant and widely distributed in the locality, within and surrounding the site.

Potential Impacts	Section of the BDAR and Other Studies where the Impacts are Considered	Summary Impact Comment
Biodiversity mortality due to collision with vehicles	Section 5.1.6	**Low risk of impact.** Activities are unlikely to present significant biodiversity risks. Site management to enforce and reduce site speed limits and the introduction of fauna fencing are standard measures that have been recommended to further minimise impacts of vehicle strikes during construction and operation.
Loss of habitat connectivity for gliding mammals	Sections 6.4.3, 7.31	**Low risk of impact.** Clearing widths for tracks and transmission have been kept under 40m. In the unlikely instance that clearing widths exceed 50m within areas of Greater Glider habitat as a result of the detailed design process, crossing infrastructure (i.e., glide poles, potential for rope bridges) will be installed.
Loss of relevant habitat connectivity for other wildlife	Section 7.3.1	**Low risk of impact.** Connectivity within and across the development site is currently provided for those species which do not require a consistent (or closed) canopy for traversal. The project has largely avoided dense tracts of native vegetation and the development footprint is typically limited to sparse woodland or scattered trees. Existing movement opportunities for the majority of species on this project site will not be reduced by the linear and discrete nature of a wind farm development.
Loss of hollow-bearing trees	Section 7.1.3, Section 8.2.2	**Low risk of impact**. Twenty-nine HBTs are known to be likely removed as a result of the Project. Of these, it is possible that some provide roosting, denning or breeding habitat for wildlife which are part of the World Heritage biodiversity.
Noise and vibration impacts on birds and mammals	Sections 5.1.6, 7.2	**Low risk of impact.** The noise and vibration associated with construction may cause short-term and geographically discrete changes to wildlife behaviour. During the operational phase, noise and vibration are anticipated to be relatively minimal and unlikely to impact on wildlife associated with the World Heritage Area.

As noted in Table 1, there are a range of potential impacts on the World Heritage Area that might arise from actions inside the project area. These include bushfire, chemical pollution, flooding and sediment flow, changes to groundwater and the spread of weeds and pathogens.

In most cases, it has been assessed that no impacts will arise because of measures taken on site to prevent impacts occurring within the World Heritage Area. For example, chemicals will be stored according to requirements for hazardous materials, including the use of bunding to contain any spills on the site.

In the case of flood impacts, the risk has been assessed as being very low, and site management will help maintain soil stability to prevent sediment flows. However, it is recognised that natural flooding has previously occurred in the region, and will no doubt arise in the future, especially under the influence of climate change.

…

Summary discussion of potential impacts on World Heritage biodiversity values and attributes which extend outside the World Heritage Area

Given the proximity of the project site to the World Heritage Area, a number of wildlife species are known to move between the two areas. Some of these species are important for the biodiversity values of the World Heritage Area. In this way, it is possible that the project could impact such values, depending on actions and activities on the project site.

Potential impacts include bird and bat mortality or the avoidance of habitat, and loss of habitat connectivity. In most cases, there is a low risk of impact arising. For example, the majority of bird and bat species do not fly at the height of the wind turbine blades, and they are therefore not likely to collide with blades. In another example, the cleared width for tracks and transmission lines will be kept to a distance which still allow gliding mammals to move between habitat.

None the less, in the case of three bird species there is a moderate risk of collision and mortality because they do fly at the height of the wind turbine blades (BDAR Section 7.3.3), however only one of these species, the Glossy Black-cockatoo, is known to occupy the World Heritage Area. This will be appropriately managed during Project operation (BDAR Section 8.3.1).

…

Summary conclusion about impacts on World Heritage

With regard to potential impacts inside the World Heritage area, significant impacts are unlikely. There are a range of potential impacts (e.g., pollution, weed, pest species etc) which will be managed to ensure that they have minimal effect on World Heritage values. In the case of bushfire, there may be a net positive benefit to the World Heritage Area through improved access and facilities for fire-fighting.

Potential impacts outside the World Heritage area are also considered unlikely to be significant. There are a range of potential impacts (e.g., some habitat loss for species relevant to the World Heritage values, and the possibility of aerial species mortality during turbine operation). Mitigation and management (BDAR Section 8) will address such impacts.

(NGH Pty Ltd 2022, Section 7.5.3)

Extract from the Landscape and Visual Impact Assessment

The Landscape and Visual Impact Assessment Report includes several sections which address World Heritage. These are also quoted at length below because of their relevance to an overall consideration of World Heritage impacts.

15.4 Overview of Visual Impacts on Gondwana Rainforest of Australia World Heritage Area

The SEARS specifically requests for a detailed assessment of the visual impacts of the Project for the Gondwana Rainforest of Australia World Heritage Area (WHA).

The main publically accessible location within the Gondwana Rainforest is the Green Gully Track. The Green Gully Track is an isolated and challenging 65km hike that generally takes 4-5 days to complete and is recommended for experiences bushwalkers. The walking track explores the Apsley-Macleay gorges and includes both high elevation forests, ridgelines, fern lines gullies and streams. A number of partially cleared, informal look out areas, including the Rocks Lookout, provide views to the surrounding dramatic gorges and rocky outcrops. A number of small huts located along the trail provide visitors an area to rest along the way. The trail itself is heavily wooded, with the exception of the surroundings to the huts and lookout areas.

A desktop assessment was undertaken using wireframes at both the Green Gully and 'Rocks' Lookout. These can be found within Appendix D of the report.

From these locations the turbines are located in excess of 20km of the viewpoints with the majority of the hike generally featuring dense vegetation. It was determined using the desktop assessment that due to a combination of distance and existing vegetation it will be unlikely to view the Project from either the Green Gully Lookout or 'Rocks' Lookout or from within the Gondwana Rainforest Area.

15.5 Potential Visual Impacts on Gondwana Rainforest of Australia World Heritage Area

In addition to what was requested in the SEARs, assessment was undertaken on the potential for impact on the entire WHA, in particular the areas directly to the east and south of the Project where, in some instances, the boundary of the WHA is within 2 km of the turbines…

In relation to the Project, the concept of OUV [Outstanding Universal Value] is a relevant consideration in that the experience of the WHA, beyond the biodiversity values, should not be diminished or modified by change either inside or outside of the WHA boundary.

As part of the desktop assessment a ZVI was produced with a focus on theoretical visibility from the World Heritage Area and Oxley Wild Rivers National Park (Refer Figure 34). That ZVI demonstrated that the turbines would not be visible from the majority of the WHA however there is the potential for views from the eastern edge and from the southern edge. There is also the potential for views from high points within the WHA.

Considering the dense bushland character of the WHA it is likely that views from theoretically exposed locations would be either completely screened or fragmented by vegetation or, on potentially open ridgeline areas, be relatively brief and distant views in the context of the journey in and out of these locations. It is unlikely that the presence of the turbines in these views would impact on the existing landscape character or immersive experience of hiking to these locations.

From the identified walking trails assessed the ZVI demonstrated that views to the turbines from the walking trails within the WHA were either largely screened by topography or most likely to be significantly fragmented and diminished by vegetation and distance. Theoretical opportunities for views were also only identified in a few brief locations in the context of the broader journey of each trail (Refer to Figures 35-40).

The majority of the eastern and southern edge of the WHA is bounded by either National Park or private rural land. There are currently no identified walking trails in these areas and public access is also limited, excluding the Oxley Walking trail and the Aspley Falls Bridge assessed in VP29 and Photomontage 18A.

Due to distance and nature of the development, the construction of the Project will not have any physical impact on the values of the WHA as this is substantially tied to the relict Gondwana Rainforest that is an ancient natural environment. In regards to the Overall Outstanding Value of the WHA it is the conclusion that the Project will not negatively impact or diminish these values as the accessible experiences of the WHA either do not have views to the proposal due to topography or are so distant and densely vegetated that the presence of the turbines in any views would be insignificant in the context of the location and broader views.

(Moir Landscape Architecture 2022, Sections 15.4 and 15.5)

Summary Assessment of Potential Impact on Specific World Heritage Values

In the following overall assessment, information about potential impacts has been drawn from the expert studies related to biodiversity and visual impact noted above.

Formal World Heritage Values	Potential Impact/Comments
Criterion (viii): The Gondwana Rainforests provides outstanding examples of significant ongoing geological processes. When Australia separated from Antarctica following the breakup of Gondwana, new continental margins developed. The margin which formed along Australia's eastern edge is characterised by an asymmetrical marginal swell that runs parallel to the coastline, the erosion of which has resulted in the Great Divide and the Great Escarpment. This eastern continental margin experienced volcanicity during the Cenozoic Era as the Australian continental plate moved over one of the planet's hot spots. Volcanoes erupted in sequence along the east coast resulting in the Tweed, Focal Peak, Ebor and Barrington volcanic shields. This sequence of volcanos is significant as it enables the dating of the geomorphic evolution of eastern Australia through the study of the interaction of these volcanic remnants with the eastern highlands. The Tweed Shield erosion caldera is possibly the best preserved erosion caldera in the world, notable for its size and age, for the presence of a prominent central mountain mass (Wollumbin/Mt Warning), and for the erosion of the caldera floor to basement rock. All three stages relating to the erosion of shield volcanoes (the planeze, residual and skeletal stages) are readily distinguishable. Further south, the remnants of the Ebor Volcano also provides an outstanding example of the ongoing erosion of a shield volcano.	**Very low risk of impact arising from the project or no impact**. The specific contribution of the Oxley Wild Rivers National Park World Heritage area under this criterion relates to spectacular gorges, cliff lines and deep, steep sided valleys illustrating on-going geomorphological processes associated with the Great Escarpment. The two potential impacts considered relate to: • increased water runoff/flooding/sediment flow into the World Heritage area; and • change to groundwater quality which might flow into the World Heritage area. A flood study prepared for the project confirmed the **risks are very low** (Footprint (NSW) Pty Ltd (2020)). However, natural flood events do occur in the region, and these have the potential to be exacerbated by climate change. Measures will be undertaken to maintain soil stability, particularly within the existing waterways, which will help avoid sediment flows during floods. In addition, the project would have **negligible impact** on groundwater quality given the low pollution potential. The proposed wind turbine generators are located on higher elevation and ridgelines, and therefore interception and impacts from the project to shallow groundwater is considered unlikely. With regard to visual impacts, the project will **not negatively impact or diminish** the experience of the World Heritage area and its values either because there are no views to the proposal due to topography, or views are so distant and screened by dense vegetation that the presence of the turbines in any views would be **insignificant** in the context of the location and broader views.
Criterion (ix): The Gondwana Rainforests contains outstanding examples of major stages in the Earth's evolutionary history as well as ongoing evolutionary processes. Major stages represented include the 'Age of the Pteridophytes' from the Carboniferous Period with some of the oldest elements of the world's ferns represented, and the 'Age of Conifers' in the Jurassic Period with one of the most significant centres of survival for Araucarians (the most ancient and phylogenetically primitive of the world's conifers).	**Variable impacts – moderate risk, very low/low risk, positive impact, no impact.** The specific contribution of the Oxley Wild Rivers National Park World Heritage area under this criterion relates on-going ecological and biological processes reflected in diverse plant communities including rainforests, examples of rainforest types, areas of old growth forest, threatened fauna species, rare and threatened

Formal World Heritage Values	Potential Impact/Comments
Likewise the property provides an outstanding record of the 'Age of the Angiosperms'. This includes a secondary centre of endemism for primitive flowering plants originating in the Early Cretaceous, the most diverse assemblage of relict angiosperm taxa representing the primary radiation of dicotyledons in the mid-Late Cretaceous, a unique record of the evolutionary history of Australian rainforests representing the 'golden age' of the Early Tertiary, and a unique record of Miocene vegetation that was the antecedent of modern temperate rainforests in Australia. The property also contains an outstanding number of songbird species, including lyrebirds (Menuridae), scrub-birds (Atrichornithidae), treecreepers (Climacteridae) and bowerbirds and catbirds (Ptilonorhynchidae), belonging to some of the oldest lineages of passerines that evolved in the Late Cretaceous. Outstanding examples of other relict vertebrate and invertebrate fauna from ancient lineages linked to the break-up of Gondwana also occur in the property. The flora and fauna of the Gondwana Rainforests provides outstanding examples of ongoing evolution including plant and animal taxa which show evidence of relatively recent evolution. The rainforests have been described as 'an archipelago of refugia, a series of distinctive habitats that characterise a temporary endpoint in climatic and geomorphological evolution'. The distances between these 'islands' of rainforest represent barriers to the flow of genetic material for those taxa which have low dispersal ability, and this pressure has created the potential for continued speciation.	plant species and endemic invertebrate species. Potential impacts inside the World Heritage area arising from the project include: • bushfires; • chemical pollution; • increased water runoff/flooding/sediment flow; • change to groundwater quality; and • weeds and pathogens. It is **unlikely** that bushfire would spread from the project area, and there is the potential for a **positive impact** for firefighting from improved access and sources of water. As discussed above, the risks from flooding are **very low**. **No impacts** will arise from the other factors. Potential impacts outside the World Heritage area arising from the project include: • fauna mortality from collision with turbines or vehicles; • fauna avoidance of habitat; • loss of habitat connectivity; • loss of hollow-bearing trees; and • noise and vibration impacts on fauna. There is a **moderate risk of impact** related to bird mortality arising from collisions with turbines in the case of three species. The species are: • Glossy Black-cockatoo; • White-throated Needletail; and • Wedge-tailed Eagle. In all other cases, there is a **low risk of impact**. For example: • the likely minimum height of the wind turbine blade sweep area of 70 metres is above the typical flight height for the majority of bird and bat species at the project site; • in the case of habitat avoidance, the particular habitat types found within the project site are abundant and widely distributed in the locality, within and surrounding the site; • clearing widths for tracks and transmission lines will allow for gliding mammals to move between areas of habitat; • in other cases, existing movement opportunities for the majority of species on the project site will not be reduced by the linear and discrete nature of the development; • while some hollow-bearing trees will be

Formal World Heritage Values	Potential Impact/Comments
	removed, this will be mitigated by the provision of new hollows; and • noise and vibration are anticipated to be relatively minimal and unlikely to impact on wildlife. With regard to visual impacts, the project will **not negatively impact or diminish** the experience of the World Heritage area and its values either because there are no views to the proposal due to topography, or views are so distant and screened by dense vegetation that the presence of the turbines in any views would be **insignificant** in the context of the location and broader views.
Criterion (x): The ecosystems of the Gondwana Rainforests contain significant and important natural habitats for species of conservation significance, particularly those associated with the rainforests which once covered much of the continent of Australia and are now restricted to archipelagos of small areas of rainforest isolated by sclerophyll vegetation and cleared land. The Gondwana Rainforests provides the principal habitat for many species of plants and animals of outstanding universal value, including more than 270 threatened species as well as relict and primitive taxa. Rainforests covered most of Australia for much of the 40 million years after its separation from Gondwana. However, these rainforests contracted as climatic conditions changed and the continent drifted northwards. By the time of European settlement rainforests covered only 1% of the landmass and were restricted to refugia with suitable climatic conditions and protection from fire. Following European settlement, clearing for agriculture saw further loss of rainforests and only a quarter of the rainforest present in Australia at the time of European settlement remains. The Gondwana Rainforests protects the largest and best stands of rainforest habitat remaining in this region. Many of the rare and threatened flora and fauna species are rainforest specialists, and their vulnerability to extinction is due to a variety of factors including the rarity of their rainforest habitat. The Gondwana Rainforests also protects large areas of other vegetation including a diverse range of heaths, rocky outcrop communities, forests and woodlands. These communities have a high diversity of plants and animals that add greatly to the value of the Gondwana Rainforests as habitat for rare, threatened and endemic species. The complex dynamics between rainforests and tall open forest particularly demonstrates the close evolutionary and ecological links between these communities. Species continue to be discovered in the property including the re-discovery of two mammal species	**Variable impacts – moderate risk, very low/low risk, positive impact, no impact.** The specific contribution of the Oxley Wild Rivers National Park World Heritage area under this criterion relates to habitats for in-situ conservation of biological diversity reflected in diverse plant communities including rainforests, examples of rainforest types, areas of old growth forest, threatened fauna species, rare and threatened plant species and endemic invertebrate species. The range of potential impacts and the risks associated with them are the same as for Criterion (ix).

Formal World Heritage Values	Potential Impact/Comments
previously thought to have been extinct: the Hastings River Mouse (Pseudomys oralis) and Parma Wallaby (Macropus parma).	

6. CONCLUSIONS

The proposed Winterbourne Wind Farm is located outside but in the vicinity of the Oxley Wild Rivers National Park component part of the Gondwana Rainforests of Australia World Heritage property. The closest proposed turbine location is approximately 1.2 km north of the World Heritage area boundary in the southern part of project area, and the furthest turbine is located over 23 km from the World Heritage area.

There are broadly two categories of potential impact to consider which relate to geomorphology, ecological and biological processes, and biodiversity:

- actions arising from the project area but which have the potential to impact on World Heritage values and attributes inside the World Heritage area (eg. bushfires) or the appreciation of these values (eg. through visual impacts); and
- actions arising from the Project Area which have the potential to impact on World Heritage values and attributes which extend outside the World Heritage Area (eg. wildlife which forage, sometimes inhabit/nest or traverse in the vicinity of the project area). (adapted from NGH Pty Ltd 2022, Section 7.5.3)

The biodiversity study for the project reaches the following conclusion about the potential impacts on World Heritage,

> With regard to potential impacts inside the World Heritage area, **significant impacts are unlikely**. There are a range of potential impacts (e.g., pollution, weed, pest species etc) which will be managed to ensure that they have minimal effect on World Heritage values. In the case of bushfire, there may be a net positive benefit to the World Heritage Area through improved access and facilities for fire-fighting.
>
> Potential impacts outside the World Heritage area are also considered **unlikely to be significant**. There are a range of potential impacts (e.g., some habitat loss for species relevant to the World Heritage values, and the possibility of aerial species mortality during turbine operation). Mitigation and management (BDAR Section 8) will address such impacts. (NGH Pty Ltd 2022, Section 7.5.3, emphasis added)

The visual impact assessment concludes,

> [The] Project will **not negatively impact or diminish**… [the Outstanding Universal Value] as the accessible experiences of the WHA [World Heritage area] either do not have views to the proposal due to topography or are so distant and densely vegetated that the presence of the turbines in any views would be insignificant in the context of the location and broader views. (Moir Landscape Architecture 2022, Section 15.5, emphasis added)

Based on these studies, the Winterbourne Wind Farm is unlikely to result in significant impacts on the World Heritage area. There are a range of potential impacts but these will be managed and mitigation measures adopted to ensure minimal effects.

7. REFERENCES

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APPENDIX A: WORLD HERITAGE VALUES

A.1 Statement of Outstanding Universal Value

The following World Heritage values are drawn from the UNESCO World Heritage Centre webpage for the Gondwana Rainforests of Australia (UNESCO WHC 2022).

❖

Outstanding Universal Value

Brief synthesis

The Gondwana Rainforests of Australia is a serial property comprising the major remaining areas of rainforest in southeast Queensland and northeast New South Wales. It represents outstanding examples of major stages of the Earth's evolutionary history, ongoing geological and biological processes, and exceptional biological diversity. A wide range of plant and animal lineages and communities with ancient origins in Gondwana, many of which are restricted largely or entirely to the Gondwana Rainforests, survive in this collection of reserves. The Gondwana Rainforests also provides the principal habitat for many threatened species of plants and animals.

Criterion (viii): The Gondwana Rainforests provides outstanding examples of significant ongoing geological processes. When Australia separated from Antarctica following the breakup of Gondwana, new continental margins developed. The margin which formed along Australia's eastern edge is characterised by an asymmetrical marginal swell that runs parallel to the coastline, the erosion of which has resulted in the Great Divide and the Great Escarpment. This eastern continental margin experienced volcanicity during the Cenozoic Era as the Australian continental plate moved over one of the planet's hot spots. Volcanoes erupted in sequence along the east coast resulting in the Tweed, Focal Peak, Ebor and Barrington volcanic shields. This sequence of volcanos is significant as it enables the dating of the geomorphic evolution of eastern Australia through the study of the interaction of these volcanic remnants with the eastern highlands.

The Tweed Shield erosion caldera is possibly the best preserved erosion caldera in the world, notable for its size and age, for the presence of a prominent central mountain mass (Wollumbin/Mt Warning), and for the erosion of the caldera floor to basement rock. All three stages relating to the erosion of shield volcanoes (the planeze, residual and skeletal stages) are readily distinguishable. Further south, the remnants of the Ebor Volcano also provides an outstanding example of the ongoing erosion of a shield volcano.

Criterion (ix): The Gondwana Rainforests contains outstanding examples of major stages in the Earth's evolutionary history as well as ongoing evolutionary processes. Major stages represented include the 'Age of the Pteridophytes' from the Carboniferous Period with some of the oldest elements of the world's ferns represented, and the 'Age of Conifers' in the Jurassic Period with one of the most significant centres of survival for Araucarians (the most ancient and phylogenetically primitive of the world's conifers). Likewise the property provides an outstanding record of the 'Age of the Angiosperms'. This includes a secondary centre of endemism for primitive flowering plants originating in the Early Cretaceous, the most diverse assemblage of relict angiosperm taxa representing the primary radiation of dicotyledons in the mid-Late Cretaceous, a unique record of the evolutionary history of Australian rainforests representing the 'golden age' of the Early Tertiary, and a unique record of Miocene vegetation that was the antecedent of modern temperate rainforests in Australia. The property also contains an outstanding number of songbird species, including lyrebirds (Menuridae), scrub-birds (Atrichornithidae), treecreepers (Climacteridae) and bowerbirds and catbirds (Ptilonorhynchidae), belonging to some of the oldest lineages of passerines that evolved in the Late Cretaceous. Outstanding examples of other relict vertebrate and invertebrate fauna from ancient lineages linked to the break-up of Gondwana also occur in the property.

The flora and fauna of the Gondwana Rainforests provides outstanding examples of ongoing evolution including plant and animal taxa which show evidence of relatively recent evolution. The rainforests have been described as 'an archipelago of refugia, a series of distinctive habitats that characterise a temporary endpoint in climatic and geomorphological evolution'. The distances between these 'islands' of rainforest represent barriers to the flow of genetic material for those taxa which have low dispersal ability, and this pressure has created the potential for continued speciation.

Criterion (x): The ecosystems of the Gondwana Rainforests contain significant and important natural habitats for species of conservation significance, particularly those associated with the rainforests which once covered much of the continent of Australia and are now restricted to archipelagos of small areas of rainforest isolated by sclerophyll vegetation and cleared land. The Gondwana Rainforests provides the principal habitat for many species of plants and animals of outstanding universal value, including more than 270 threatened species as well as relict and primitive taxa.

Rainforests covered most of Australia for much of the 40 million years after its separation from Gondwana. However, these rainforests contracted as climatic conditions changed and the continent drifted northwards. By the time of European settlement rainforests covered only 1% of the landmass and were restricted to refugia with suitable climatic conditions and protection from fire. Following European settlement, clearing for agriculture saw further loss of rainforests and only a quarter of the rainforest present in Australia at the time of European settlement remains.

The Gondwana Rainforests protects the largest and best stands of rainforest habitat remaining in this region. Many of the rare and threatened flora and fauna species are rainforest specialists, and their vulnerability to extinction is due to a variety of factors including the rarity of their rainforest habitat. The Gondwana Rainforests also protects large areas of other vegetation including a diverse range of heaths, rocky outcrop communities, forests and woodlands. These communities have a high diversity of plants and animals that add greatly to the value of the Gondwana Rainforests as habitat for rare, threatened and endemic species. The complex dynamics between rainforests and tall open forest particularly demonstrates the close evolutionary and ecological links between these communities.

Species continue to be discovered in the property including the re-discovery of two mammal species previously thought to have been extinct: the Hastings River Mouse (Pseudomys oralis) and Parma Wallaby (Macropus parma).

Integrity

The Gondwana Rainforests contains the largest and most significant remaining stands of subtropical rainforest and Antarctic Beech (Nothofagus moorei) cool temperate rainforests in the world, the largest and most significant areas of warm temperate rainforest and one of only two remaining large areas of Araucarian rainforest in Australia.

Questions related to the small size of some of the component parts of the property, and the distance between the sites for the long-term conservation and continuation of natural biological processes of the values for which the property was inscribed have been raised. However, noting that the serial sites are in reasonable proximity and are joined by corridors of semi-natural habitats and buffers, compensation for small size and scattered fragments is being made through intensive management consistent with approved management plans and policy.

Since inscription, there have been significant additions to the protected area estate in both New South Wales and Queensland in the region encompassing the Gondwana Rainforests. These areas have undergone a rigorous assessment to determine their suitability for inclusion in the property and a significant extension of the property is planned as indicated by the addition of the property extension to Australia's Tentative List in May 2010. In relation to ongoing evolution, the level of legislative protection provided for World Heritage properties will minimise direct human influence and enable the continuation of natural biological processes.

Protection and management requirements

Institutional arrangements for the protection and management of Gondwana Rainforests are strong. The property is made up of 41 reserves, almost all of which are within the protected area estate, and primarily managed by the Queensland Parks and Wildlife Service and the New South Wales National Parks and Wildlife Service. Both States have legislation relating to protected areas and native flora and fauna that provide protection for the values of the Gondwana Rainforests.

In 1993, Governments agreed to establish a Coordinating Committee, comprised of on-ground managers from these agencies and the Australian Government, to facilitate the cooperative management of the property at an operational level. A Technical and Scientific Advisory Committee and a Community Advisory Committee have also assisted with management advice since their establishment in 2002.

In 1994 when the property was extended, the World Heritage Committee requested the Australian authorities to complete the management plans of individual sites, particularly those within Queensland. Management

plans have been produced for the majority of individual reserves within the property, and are in draft form or planned for the remainder.

In 2000 a Strategic Overview for Management for the Central Eastern Rainforest Reserves of Australia (now Gondwana Rainforests) World Heritage Area was published. This overarching document is a major element in guiding cooperative management by the three Governments in relation to the identification, protection, conservation, rehabilitation and presentation of the Gondwana Rainforests.

All World Heritage properties in Australia are 'matters of national environmental significance' protected and managed under national legislation, the Environment Protection and Biodiversity Conservation Act 1999. This Act is the statutory instrument for implementing Australia's obligations under a number of multilateral environmental agreements including the World Heritage Convention. By law, any action that has, will have or is likely to have a significant impact on the World Heritage values of a World Heritage property must be referred to the responsible Minister for consideration. Substantial penalties apply for taking such an action without approval. Once a heritage place is listed, the Act provides for the preparation of management plans which set out the significant heritage aspects of the place and how the values of the site will be managed.

Importantly, this Act also aims to protect matters of national environmental significance, such as World Heritage properties, from impacts even if they originate outside the property or if the values of the property are mobile (as in fauna). It thus forms an additional layer of protection designed to protect values of World Heritage properties from external impacts.

On 15 May 2007, the Gondwana Rainforests of Australia was added to the National Heritage List; National Heritage is also a matter of national environmental significance under the EPBC Act.

The impacts of climate change and high levels of visitation, undertaking effective fire management, and mitigating the effects of invasion by pest species and pathogens present the greatest challenges for the protection and management of Gondwana Rainforests. Climate change will impact particularly on those relict species in restricted habitats at higher altitudes, where particular microclimatic conditions have enabled these species to survive. Management responses include improving the resilience of the property by addressing other threats such as inappropriate fire regimes and invasion by pest species, and trying to increase habitat connectivity across the landscape.

A.2 Extract from *World Heritage and Associative Natural Values of the Central Eastern Rainforest Reserves of Australia* (Hunter 2004)

10.5.2. Oxley Wild Rivers National Park

Oxley Wild Rivers NP samples a significant part of the Kunderang Brook and Macleay Gorges sections of the Macleay rainforests. The reserve encompassed 93 220 hectares when it was listed as a World Heritage area in 1994. There have been significant additions to the reserve since then, including a transfer of 9 600 ha from the World Heritage listed Werrikimbe National Park. It is estimated that the final reserve system is potentially 285 000 hectares in extent. The estimated total area of rainforest in the Macleay Gorges / Kunderang Brook is about 15 000 hectares.

Rainforest is obviously not the dominant vegetation type in this reserve. However, the area is a biophysical unity and contains superlative examples of the gorges dry rainforests and an unparalleled sample of the transition of dry rainforest along gradients of moisture, exposure and soil depth. Thus, while not a predominantly rainforest area, Oxley Wild Rivers NP represents an extreme of rainforest distribution and complements other World Heritage listed rainforest areas.

The dry and steep Macleay Gorges are regarded as a 'hotspot' for rare and endangered species of plants (L. Copeland, pers. comm.). They are the centre of distribution of restricted species such as the Ravine Bird's Eye, the Gorge Wattle (*Acacia ingramii*) and the Gorge Hakea (*Hakea fraseri*). They are of special importance to plant geographers as they encompass part of a vital corridor whereby species such as the Wollomombi Wattle, Gorge Laurel, Narrow-leaved Scrub Wilga and the Gorge Mock Olive have interconnections with populations in the Bunya Mountains area with those in the Macleay Valley via the Clarence Valley and its most southern tributary, the Guy Fawkes River. The presence in these gorges of species such as Black Cypress Pine (*Callitris endlicheri*), Kurrajong (*Brachychiton populneus*), Cough Bush (*Cassinia laevis*), Mealy Saltbush (*Rhagodia parabolica*), Western Silkpod (*Parsonsia lanceolata*) and Caustic Vine (*Sarcostemma australe*) - species that are more typical of the western slopes of NSW - suggests that the area has acted as a refugium in past arid cycles.

10.5.3. World Heritage Values and Associative Natural Values of the Macleay Group

The Macleay Group has World Heritage values related to all of the three criteria for which the property was listed. The reserves include excellent examples of the seemingly oxymoronic vegetation type, dry rainforest. The development of dry adapted flora from ever-wet Gondwanan rainforest was an important stage in the earth's evolutionary history. The sifting of rainforest taxa to develop rainforest communities that could tolerate periods of restricted water availability paralleled the emergence of taxa such as eucalypts that are adapted to fire. The spread of these floras was stimulated by the marked decrease in precipitation in the mid-late Miocene that was accompanied by development of a distinct dry season and an increase in burning. The Macleay Group, particularly Oxley Wild Rivers NP, contains excellent examples of the development and interaction of these two dry adapted floras, the dry rainforests and the eucalypt forests. The role of fire in determining the boundaries between the two is particularly evident, with the rainforest being generally confined to areas of no or low intensity or infrequent fire (Mantle 1997).

Dry rainforest on the most marginal sites is structurally reduced to microphyll vine thicket. While floristically related to araucarian notophyll or microphyll vine forests further north, it is distinct enough to be recognised as a specific suballiance, the *Alectryon forsythii-A. subdentatus-Notelaea microcarpa* suballiance (Floyd 1990). This suballiance has its major occurrences in the Guy Fawkes River, Wollombi-Chandler Rivers and Aspley-Tia Gorges; the latter two areas are both within Oxley Wild Rivers NP.

The presence of a number of endemic or near-endemic plants within the Macleay Group has been noted above. While there are no vertebrates known to be endemic to these reserves, the limestone habitats are important sites of invertebrate endemicity. Limestone outcrops, particularly those of the Macleay Valley, are important focal points of terrestrial snail endemism (Stanisic 1997, Williams 2002). Cave systems, often associated with limestone, are important for conservation of associated, often endemic or localised, arachnid and insect faunas.

Lists of rare and threatened plant and animal species are shown in Tables 24 and 25.

Table 24. Rare or Threatened Flora of the Macleay Group

Species	Conservation Status*		Distribution in Group
	B & L	NSW	
Acacia barringtonensis	3RCa		Oxley Wild Rivers NP
Acacia ingramii	2RCa		Oxley Wild Rivers NP
Acacia tessellata	2RC	V	The Castles
Bertya ingramii	2VCit	E	Oxley Wild Rivers NP
Bothriochloa biloba	3V	V	Oxley Wild Rivers NP
Callistemon pungens	3R		Oxley Wild Rivers NP
Chiloglottis platyptera	2KC		Oxley Wild Rivers NP
Cryptocarya floydii	3RCi		Oxley Wild Rivers NP
Cryptocarya williwilliana	2RCi		The Castles FR
Cynanchum elegans	3ECi	E	Oxley Wild Rivers NP
Discaria pubescens	3RCa		Oxley Wild Rivers NP
Dodonaea rhombifolia	3RCa		Oxley Wild Rivers NP
Dodonaea serratifolia	2RC		Oxley Wild Rivers NP
Eucalyptus elliptica	3KC		Oxley Wild Rivers NP
Eucalyptus magnificata	3K		Oxley Wild Rivers NP
Eucalyptus malacoxylon	3R		Oxley Wild Rivers NP
Eucalyptus michaeliana	3RCa		Oxley Wild Rivers NP
Eucalyptus nicholii	3VC		Oxley Wild Rivers NP
Eucalyptus youmanii	2RC		Oxley Wild Rivers NP
Gonocarpus longifolius	3RC		Oxley Wild Rivers NP
Grevillea beadleana	3ECi	E	Oxley Wild Rivers NP
Grevillea beadleana	3ECi	E	Oxley Wild Rivers NP
Grevillea granulifera	3KCa		Oxley Wild Rivers NP
Grevillea guthrieana	3V	E	Oxley Wild Rivers NP
Hakea fraseri	2VC-	V	Oxley Wild Rivers NP
Haloragis exalata subsp. *velutina*	3VC-		Oxley Wild Rivers NP, The Castles FR
Hibbertia hermanniifolia	3RCa		Oxley Wild Rivers NP
Olearia sp.2 (Wollomombi; J.B. Williams s.n. 1974)	2KC-		Oxley Wild Rivers NP
Ozothamnus adnatus	3KC-		Oxley Wild Rivers NP
Phebalium squamulosum subsp. *verrucosum*	2RC-		Oxley Wild Rivers NP
Picris evae	3V	V	Oxley Wild Rivers NP
Plectranthus suaveolens	3KC		Oxley Wild Rivers NP
Prostanthera cineolifera	2K	V	Oxley Wild Rivers NP
Pultenaea campbellii	3K	V	Oxley Wild Rivers NP
Ricinocarpus speciosus	3RCi		Oxley Wild Rivers NP
Sarcochilus aequalis	3RC-		Oxley Wild Rivers NP
Sarcochilus fitzgeraldii	3VC-	V	Oxley Wild Rivers NP
Sarcochilus hartmannii	3VC	V	The Castles
Senecio macranthus	3RC-		Oxley Wild Rivers NP
Senna acclinis	3RC-	E	Oxley Wild Rivers NP
Thesium australe	3VCi+	V	Oxley Wild Rivers NP
Westringia glabra	2RC-		Oxley Wild Rivers NP

Conservation status: Briggs and Leigh 1996 (B and L) for Australia, *Threatened Species Conservation Act 1995* (NSW) for NSW

Table 25. Rare or Threatened Fauna of the Macleay Group

Species		Conservation Status*	Distribution in Group	
			OWR	TC
Amphibians				
Adelotus brevis	Tusked Frog	Endangered population	+	
Litoria booroolongensis	Booroolong Frog	E	+	
Birds				
Calyptorhynchus lathami	Glossy Black-Cockatoo	V	+	
Chthonicola sagittata	Specked Warbler	V	+	
Climacteris picumnus	Brown Treecreeper	V	+	
Melanodryas cucullata	Hooded Robin	V	+	
Neophema pulchella	Turquoise Parrot	V	+	
Ninox strenua	Powerful Owl	V	+	+
Pachycephala olivacea	Olive Whistler	V		+
Pandion haliaetus	Osprey	V	+	
Ptilinopus magnificus	Wompoo Fruit-Dove	V	+	+
Ptilinopus superbus	Superb Fruit-Dove	V		+
Stagonopleura guttata	Diamond Firetail	V	+	
Tyto novaehollandiae	Masked Owl	V	+	+
Tyto tenebricosa	Sooty Owl	V	+	+
Xanthomyza phrygia	Regent Honeyeater	E	+	
Mammals				
Dasyurus maculatus	Spotted-tailed Quoll	V	+	
Falsistrellus tasmaniensis	Great Pipistrelle	V	+	
Miniopterus australis	Little Bent-wing Bat	V	+	+
Miniopterus schreibersii	Eastern Bent-wing Bat	V	+	+
Petaurus australis	Yellow-bellied Glider	V	+	
Petaurus norfolcensis	Squirrel Glider	V	+	
Petrogale penicillata	Brush-tailed Rock Wallaby	E	+	
Phascolarctos cinereus	Koala	V	+	
Potorous tridactylus	Long-nosed Potoroo	V	+	
Pseudomys oralis	Hastings River Mouse	E	+	
Pteropus poliocephalus	Grey-headed Flying-fox	V	+	

* Conservation status is based on the *Threatened Species Conservation Act 1995*

Key to locations in Group:
OWR = Oxley Wild Rivers NP
TC = The Castles FR

A.3 Extract from *Oxley Wild Rivers National Park, Oxley Wild Rivers State Conservation Area, Cunnawarra National Park and Georges Creek Nature Reserve Plan of Management* (NSW NPWS 2005)

The natural values of the area, many of which form part of its World Heritage value, are summarised below, along with… other values.

Key **natural values:**

- diverse plant communities including rainforests, eucalypt forests and woodlands, heath and swamps, some of which are rare and/or restricted;
- examples of dry, subtropical, warm temperate and cool temperate rainforest types, including an unparalleled sample of the transition of dry rainforest along gradients of moisture, exposure and soil depth;
- significant areas of old growth including well developed moist forests that contain some of the tallest trees in NSW;
- areas of tall moist tablelands forest, most of which has been cleared in surrounding lands;
- a large number of threatened fauna species and rare and threatened plant species, the centre of distribution of several restricted and threatened species and limits of distribution of several species;
- endemic invertebrate species in the Kunderang Brook Karst System (and probably in the rainforest areas).

Significant **landscape values:**

- spectacular gorges, cliff lines and deep, steep sided valleys illustrating on-going geomorphological processes associated with the Great Escarpment;
- numerous high waterfalls;
- panoramic views from locations along the escarpment edge;
- attractive tall moist forests and rainforests and diverse vegetation types across the landscape.