

ETHOS URBAN

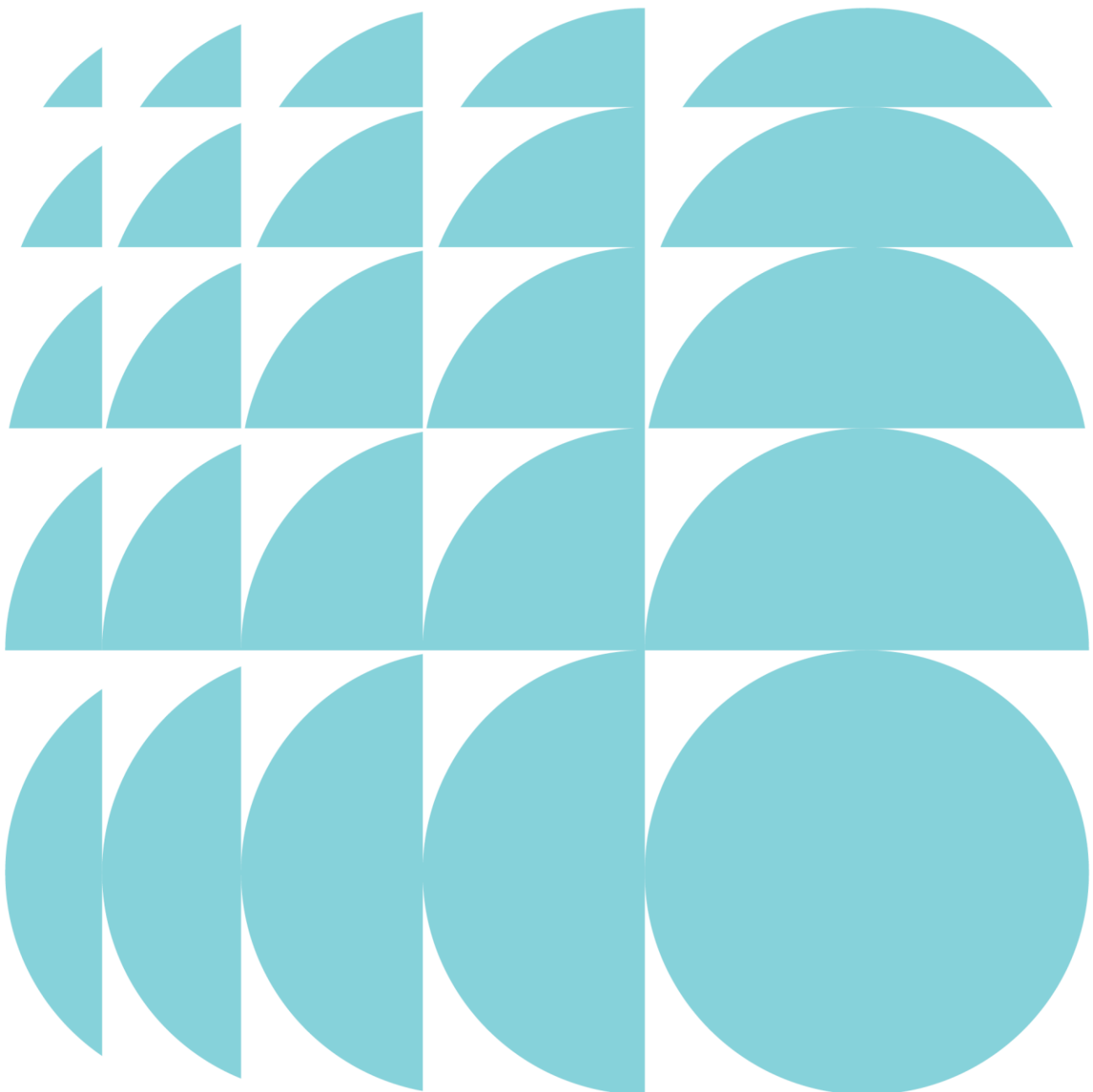
Sydney Zoo SSD 7228 Section 96(1A) Modification 1

Bungarribee Park (Western Sydney Parklands)

Submitted to Department of Planning and
Environment

On behalf of Sydney Zoo

16 January 2018 | 15247



CONTACT

Chris Curtis Tim Ward tward@ethosurban.com 9409 4962

Reproduction of this document or any part thereof is not permitted without prior written permission of Ethos Urban Pty Ltd.

This document has been prepared by:

This document has been reviewed by:

Eliza Arnot and Chris Curtis

16 January 2018

Tim Ward

16 January 2018

Reproduction of this document or any part thereof is not permitted without written permission of Ethos Urban Pty Ltd. Ethos Urban operates under a Quality Management System. This report has been prepared and reviewed in accordance with that system. If the report is not signed, it is a preliminary draft.

VERSION NO.	DATE OF ISSUE	REVISION BY	APPROVED BY
Draft	22/12/2017	EA/CC	TW
Final Draft	12/1/2018	EA/CC	TW
Final	16/1/2018	EA/CC	TW

Ethos Urban Pty Ltd
ABN 13 615 087 931.
www.ethosurban.com
173 Sussex Street, Sydney
NSW 2000 t 61 2 9956 6952

Contents

1.0	Introduction	3
1.1	Background	3
2.0	Site Analysis	4
2.1	Site Location and Context	4
2.2	Site Description	5
3.0	Proposed Modifications	6
3.1	Modifications to the Development	6
3.2	Stormwater Drainage	8
3.3	Modifications to Conditions	9
3.4	Substantially the Same Development	9
4.0	Assessment of Environmental Impacts	10
4.1	Matters for consideration under Section 79C(b) of the EP&A Act	10
4.2	Built Form	11
4.3	Landscaping	11
4.4	Accessibility	12
4.5	Visual Impact	12
4.6	Water, Drainage and Stormwater	12
4.7	Site Suitability	14
4.8	Social and Economic Impacts	14
5.0	Conclusion	14

Figures

Figure 1 –Site Location	4
Figure 2 Site Context	5
Figure 3 Approved Australiana Exhibit	8
Figure 4 Proposed Australiana Exhibit	8

Tables

Table 1 Summary of modifications	6
Table 2 Peak Site Discharge – Zoo Grounds West	13
Table 3 Peak Site Discharge – Zoo Grounds East	13
Table 4 Peak Site Discharge – Sealed Carpark West	13
Table 5 Peak Site Discharge – Sealed Carpark East	13

Contents

Appendices

- A** Landscape Drawings
Aspect Studios
- B** Stormwater Management Statement
Northrop
- C** Stormwater Management Plans
Northrop

1.0 Introduction

This report is submitted to the Department of Planning and Environment (DPE) pursuant to Section 96(1A) of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to modify State Significant Development (SSD) 7228 relating to the Sydney Zoo in Bungarribee Park, Western Sydney Parklands.

The proposed modifications, which are detailed in **Section 3** include:

- reduction in size of the administration / curatorial building;
- minor relocation and increase in floor space for the nocturnal pavilion, and the reptile and insect pavilion;
- minor relocation of the aquarium, and amendments to provide a partial indoor/outdoor exhibit space;
- minor relocations of and adjustments to floor space associated with Back-of-House animal enclosures;
- minor associated refinements to the orientation of amenity blocks, service buildings and kiosks; and
- minor associated refinements to stormwater management system.

1.1 Background

On 8 September 2017 the Planning Assessment Commission (PAC) approved the SSD 7228 for the construction and operation of a zoological facility within the Western Sydney Parklands, the Sydney Zoo. The proposed development will provide a new recreational facility for Western Sydney. The development will comprise a zoological facility containing animal exhibits and associated infrastructure over the site, being a total area of approximately 16.5ha, for the following key components:

- Animal exhibits across several enclosures of varying design for a range of native and exotic animals;
- Back-of-house buildings for exhibits;
- Main entrance building comprising entry/exit, and gift shop;
- Restaurant and café;
- Kiosks and amenities;
- Educational show arena;
- Picnic areas and gardens;
- Wetlands and waterways;
- Service building containing:
 - Administration areas;
 - Curatorial and food preparation areas; and
 - Veterinarian space;
- Wayfinding signage;
- Service yard with maintenance shelter;
- Internal services and utilities to support the zoo, including water, sewer, electricity and telecommunications;
- Car parking for 1,053 vehicles;
- Bus and coach parking;
- Subdivision; and
- Landscaping of the site associated with all of the above.

This S96(1A) (Modification No. 1) seeks to modify the consent to provide for design refinement based on the operational needs of the zoo and after consultation with the Department of Primary Industries (Exhibited Animals) in relation to improving animal welfare, handling and management. This is the only modification to date for SSD 7228.

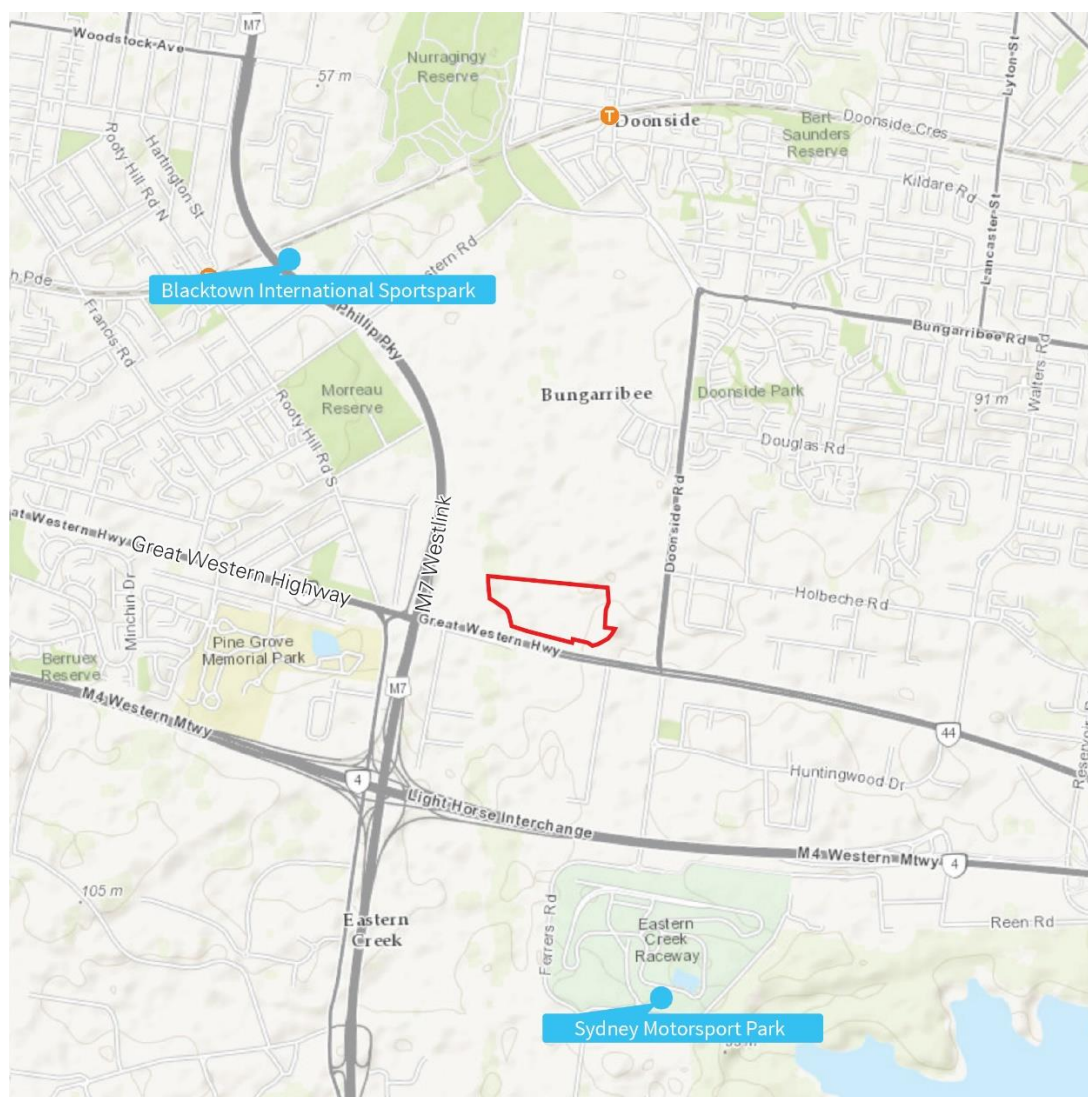
2.0 Site Analysis

2.1 Site Location and Context

The site is located approximately 33 kilometres west of the Sydney Central Business District (CBD), and approximately 15 kilometres east of Penrith. It falls within the Western Sydney Parklands, and is in close proximity to the Great Western Highway, M4 Western Motorway and Westlink M7, providing excellent access to both the state and regional road network and surrounding parkland areas.

The site of the proposed Sydney Zoo is 16.5ha in size, with an irregular shape. Access will be from the Great Western Highway approximately 75m from its southern border.

The site's locational context is shown at **Figure 1** below.



The Site

Figure 1 –Site Location

2.2 Site Description

The Zoo's site area is 16.5 hectares. It is irregular in shape with access currently provided by a restricted access gate along its southern frontage to the highway, and by an entry gate off Doonside Road. An aerial photo of the site is shown at **Figure 2 Site Context**



- Sydney Zoo
- Western Sydney Parklands

Figure 2 Site Context

Source: NearMap

Towards the centre of the site the land rises to a small ridge which runs north-south through the eastern third of the site, and slopes down towards the east, north, south and west. The land slopes to the west towards the Eastern Creek which forms the western boundary of the site.

Being part of the larger Bungarribee precinct of the Western Sydney Parklands, there is little in the way of immediate proximate residential housing – the closest being the Bunya residential development approximately 800m to the north (within the suburb of Bungarribee).

Access to the site is afforded off the Great Western Highway just to the south of the southern boundary, which is classified as a State Road (HW5) which runs in an east-west direction. At the existing entry to the site, it is a six-lane dual carriageway, with this decreasing to two lanes each way when moving east and west of the site. A speed

limit of 80km/h applies at this location. To the east of the site is the Western Sydney Parklands, then Doonside Road, a Regional Road with a four-lane dual carriageway. Aligned in a north-south configuration, Doonside Road has a 70km/h speed limit. Doonside Road forms the eastern boundary of the Western Sydney Parklands.

The site is in close proximity to the Great Western Highway and M7 Motorway interchange, approximately 800m to the west. This interchange does not contain any south-facing ramps to the M7 Motorway, with traffic approaching from the south required to utilise the Wallgrove Road off-ramp, approximately 2.5km south of the Great Western Highway. Wallgrove Road is a State Road.

3.0 Proposed Modifications

This application seeks approval under Section 96(1A) of the EP&A Act to modify the approved SSD to provide a refined design based on operational needs of the zoo. The scope of the modification application is addressed in the following sections. Amended Landscape Drawings are included at **Appendix A**, including new site plan (as it will be proposed under the Section 96 Modification Application) and a plan that shows the location of the new/relocated buildings overlying the approved site layout plan to illustrate the extent of the changes.

3.1 Modifications to the Development

The key modifications proposed include:

- reduction in size of the administration / curatorial building;
- minor relocation and increase in floor space for the nocturnal pavilion, and the reptile and insect pavilion;
- minor relocation of the aquarium, and amendments to provide a partial indoor/outdoor exhibit space;
- minor relocations of and adjustments to floor space associated with Back-of-House animal enclosures;
- minor associated refinements to the orientation of amenity blocks, service buildings and kiosks;
- deletion of the amphitheatre in order to improve animal welfare outcomes for elephants, to be replaced by a smaller show area; and
- minor associated refinements to stormwater management system.

The back of house buildings will generally be of a similar built form and structure as that of the approved, with variations for different animal species as required. For instance, shelter heights will differentiate specific to requirements for a giraffe and heavy-duty construction materials for elephants and hippopotamus.

The proposed modifications are a result of design development changes to suit the operation and functioning of the back of house buildings for optimal animal welfare, management and handling, and have been subject of consultation with Department of Primary Industries (Exhibited Animals). Amended drawings illustrating the revised locations of built form are provided at **Appendix A**.

The built form of each structure will be generally consistent with the approved buildings and structures, with the attached plans illustrating the refinements to the layout and general arrangement of exhibit and back of house buildings throughout the site. In many instances, the building areas have changed due to the inclusion of outdoor pen areas being incorporated into the back of house space for animals, to improve animal welfare outcomes. The outdoor pen areas are generally covered, resulting in an overall building roof area calculation.

An overview of the proposed changes to each building envelope is described in **Table 1** below.

Table 1 Summary of modifications

Building reference	Proposed changes
Entry Pavilion (1)	Minor relocation north including a minor increase in building roofed area by 16.4m ² .
Boma Restaurant (2)	Minor changes to waste servicing area to increase size of visitor seating areas.

Building reference	Proposed changes
Administration and Curatorial Building (3)	Reduction in size of building roofed area by from 1,130m ² to 480m ² due to a change in the indoor floor area of the building. Importantly, the reduced floor space reflects the relocation of the food preparation area to the Zoo Services Facility (in the northwest corner of the site), to improve efficiency. The floor space for veterinary services and the office administration has not changed, so these services will not be compromised.
Nocturnal Habitat (4)	Minor relocation to the east and increase in building roofed area by approximately 99.8 m ² (the building remains underground beneath landscaping).
Reptile Habitat (5)	Minor relocation to the east and increase in building roofed area from 350m ² to 450m ² (the building remains underground beneath landscaping).
Aquarium (6)	Increase in building roofed area from 343m ² to 461.3m ² (from changes in the indoor and outdoor areas of the building) and inclusion of a combined indoor/outdoor aquarium exhibit to increase wetland aesthetic and experience. Stormwater retention remains unchanged.
Back of house – Farm experience (7)	Relocated adjacent to the Aquarium. Increase in building roofed area from 68.9m ² to 153.3m ² due to an increase in the indoor floor area.
Picnic and Play Area (8)	No change.
The Boulevard (9)	No change.
Main pedestrian path and elevated boardwalk (10)	No change.
Back of house – Kiosk (11)	Re-oriented to provide improved access.
Main pedestrian path and elevated boardwalk (12)	No change.
Water Storage (13)	Inclusion of retention basin for better stormwater management in accordance with the conditions of consent (refer to Conditions C10, C11 and C12).
Back of House – service building (14)	Service area redesigned with an increased roofed area of 400m ² (from an increase in the indoor floor area) and reduced outdoor area to allow for water retention basin. Animal back of house building shifted to the eastern side of service areas.
Perimeter Services Road (15)	No change.
Main car park/overflow car park (16/17)	No change.
Site Pond (18)	No change.
Exhibit Water/Dry Moats (19/20)	No change.
Show Area (21)	Amphitheatre replaced with smaller show area and relocated to provide additional space for elephants.
Back of House – Lions/Cheetah/Hyena (22)	Buildings shifted and separated for better species management and welfare. Changes will provide better access to the service road and indoor/outdoor options.
Back of House – African Wild Dogs (22)	Shifted to the western end of the exhibit to be grouped. Minor increase in building roofed area by 5.2m ² .
Back of House – Water Buffalo (22)	Inclusion of a small shade structure. Reduction in building roofed area from 157.7m ² to 40m ² (from a reduction in indoor exhibit area).
Back of House – Giraffe (22)	Minor reduction in building roofed area by 2.2m ² and a reduction in overall building height by one metre.
Back of House – Zebras (22)	Building shifted due to reconfiguration of service area and reduce pad for improved stormwater management. Reduction in building roofed area from 97.8m ² to 61.8m ² .
Back of House – Rhino (22)	Increase in building roofed area and open caged from 105.5m ² to 218.5m ² (due to increased indoor and outdoor areas).
Back of house – Sun Bears (24)	'L' shaped building deleted. Animals housed in smaller buildings next to their respective exterior enclosure for better management. Minor reduction in building roofed area by 7.5m ² .
Back of House – Elephants (24)	Moved approximately 60m to the west and removal of amphitheatre. Increase in building roofed area from 452m ² to 225m ² (due to increases in both indoor and outdoor areas).

Building reference	Proposed changes
Back of House – South East Asian Tropical (24)	Reduction in building roofed area from 114.8m ² to 25m ² and reduction in building height by 300mm (due to indoor and outdoor building changes). Relocated adjacent to Back of House – Sun Bears (building 24).

The proposed modifications substantially retain the key features of the approved development, but include design development changes in accordance with the requirements for the operation of the zoological facility and after consultation with Department of primary Industries (Exhibited Animals). The materials and finishes to each of the back of house buildings are not proposed to be modified as part of this application.

As a result of the proposed design refinements, which have arisen from the adjustment in position of the Nocturnal, Reptile and Insect Pavilions, the Australiana walk-through exhibit space is calculated to be approximately 0.8ha, generally consistent with the area as it was approved. Figures 3 and 4 indicate the relative similarity in terms of area allocated to the walk-through of the proposed Australiana Exhibit, compared to the consent. The display of Australian animals therefore remains compliant with Condition B6 of the consent, which limits the area of Australian native animal display to a maximum of 1.6ha.



Figure 3 Approved Australiana Exhibit



Figure 4 Proposed Australiana Exhibit

3.2 Stormwater Drainage

The main change in the stormwater system is that the pit and pipe network has been partially replaced with overland swales where appropriate and feasible. A revised Stormwater Management Strategy has been prepared by Northrop as part of this modification application which includes an assessment of the revised Stormwater Water Management System (**Appendix B**) and a set of Stormwater Plans (**Appendix C**) that have been prepared for construction, but are attached for the purposes of illustrating the refinements to the stormwater management system.

The site is broken into three distinct areas including the primary sealed car park, the unsealed overflow carpark and the Zoo grounds. The Northrop letter (**Appendix B**) confirms that the stormwater management for the site remains largely unchanged from Stormwater Management Plan prepared by Lindsay Dynan and submitted with the original DA. The increased area of the storage basin at the north-western corner of the site will be the primary non-potable water storage for the site, along with a smaller “holding basin” adjacent to the restaurant.

Similar to the previously approved stormwater management plan, on-site detention measures have been provided to ensure runoff from all portions of the site will be less than or equal to the pre-developed catchment. In accordance with the Blacktown City Council’s OSD requirements, measures were designed to limit runoff in the 5 to 100 year ARI storm events, for all storms between 5 minutes and 4.5 hours. As such, the revised stormwater management design presented has been prepared to comply with Blacktown City Council’s DCP and Design Guidelines. Further discussion is provided in **Section 4.6** below.

3.3 Modifications to Conditions

The proposed modifications above necessitate amendments to the consent conditions as identified below. Words proposed to be deleted are shown in ~~**bold strike-through**~~ and words to be inserted are shown in ***bold italics***.

Condition B2. The Applicant shall carry out the Development in accordance with the:

- (a) EIS, RTS, ~~**Modification Application 1**~~ and Supplementary Information and Additional Information;*
- (b) Development layout plans and drawings in the EIS, RTS, ***Modification Application 1*** and Supplementary Information; and*
- (c) The Management and Mitigation Measures (see Appendix B).*

Reason: This condition is sought to be updated to reference the modification application and amended drawings. The built form of the modified development retains the key parameters for each building envelope. As demonstrated on the plans, the modification includes the relocation and reconfiguration of buildings to enable better management and improve animal welfare. The proposed changes will not affect the overall footprint of the development. These minor design development changes are illustrated on the Architectural Plans at **Appendix A**.

3.4 Substantially the Same Development

Section 96 (1A)(b) of the EP&A Act states that a consent authority may modify a development consent if “*it is satisfied that the proposed modification is of minimal environmental impact*” and “*it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all)*”.

The development as proposed to be modified is substantially the same development as the development for which consent was granted as:

- there are no changes to the architectural qualities and materials;
- the proposed modifications do not generally alter the key components of the approved development description;
- the proposed amendments do not seek to amend the approved land use;
- the proposed changes do not affect the overall footprint of the development, or its interaction with the public domain and urban design;
- there are no changes to car parking areas, access arrangements or the vehicular/pedestrian circulation paths;
- there are no changes to the total exhibit spaces associated with the display of native animals, pursuant to the 1.6ha maximum display allowed under Condition B6 of the consent;
- there are no changes to the overall capacity of the development in regard to staff numbers or visitors;
- the proposed modifications are internal to the Zoo, with no changes proposed to areas visible from the public domain; and
- the environmental impacts of the modified development remain the same as the approved development.

For these reasons, the Department can be satisfied that the modified proposal is substantially the same development for which consent was originally granted.

The extent of the proposed modifications are minor in nature and are also considered to have only minimal environmental impact beyond those considered during the assessment of SSD 7228, as set out in the assessment provided in Section 4 below. As the changes result in minimal environmental impact, the modification application can be appropriately assessed and determined under Section 96(1A) of the EP&A Act.

4.0 Assessment of Environmental Impacts

This section considers the planning issues relevant to the proposed modifications and contains our assessment of the associated environmental impacts. Section 96(1A) of the EP&A Act requires the consent authority to take into consideration such of the matters referred to in section 79C(1) as are of relevance to the development, the subject of the application.

Section 79C(1) of the EP&A Act states:

“In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:

(a) the provisions of:

- (i) any environmental planning instrument, and*
- (ii) any draft environmental planning instrument that is or has been placed on public exhibition and details of which have been notified to the consent authority, and*
- (iii) any development control plan, and*
- (iv) any matters prescribed by the regulations, that apply to the land to which the development application relates,*
- (b) the likely impacts of that development, including environmental impacts on both the natural and built environment, and social and economic impacts in the locality,*
- (c) the suitability of the site for the development,*
- (d) any submissions made in accordance with this Act or the regulations,*
- (e) the public interest.*

Each of these matters, as are relevant to the development, are discussed below.

4.1 Matters for consideration under Section 79C(b) of the EP&A Act

Section 96(1A) of the EP&A Act states that a consent authority may modify a development consent if “it is satisfied that the proposed modification is of minimal environmental impact.” Under Section 96(4) the consent Authority must also take into consideration the relevant matters to the application referred to in Section 79C(1) of the EP&A Act. The following assessment demonstrates that the proposed modifications will not create any additional environmental impacts beyond those considered during the assessment of SSD 7228. The key considerations are summarised below.

- The proposed modifications do not alter the approved development’s compliance with the statutory and strategic plans including:
 - *Environmental Protection and Biodiversity Conservation Act 1999;*
 - *Environmental Planning and Assessment Act 1979;*
 - *Exhibited Animals Protection Act 1986;*
 - *Roads Act 1993;*
 - *Threatened Species Conservation Act 1995;*
 - *Contaminated Land Management Act 1997;*
 - *Biosecurity Act 2015;*
 - *State Environmental Planning Policy (Western Sydney Parklands) 2009;*
 - *State Environmental Planning Policy (State and Regional Development) 2011;*
 - *State Environmental Planning Policy (Infrastructure) 2007;*
 - *State Environmental Planning Policy No 64 – Advertising and Signage;*
 - *State Environmental Planning Policy No 55 – Remediation of Land;*

- *State Environmental Planning Policy No 33 – Hazardous and Offensive Development*;
- NSW Biosecurity Strategy 2013-2021;
- NSW State Plan 2021;
- NSW State Plan 2021;
- Plan for Growing Sydney;
- Western Sydney Parklands Plan of Management 2020;
- The proposed modifications will not create any additional environmental impacts beyond those already considered by the Department as part of the original assessment of SSD 7228 with regard to the following:
 - Air and odour;
 - Noise;
 - Traffic, parking and access;
 - Aboriginal Heritage;
 - Vegetation and biodiversity;
 - Waste management
 - Bushfire management;
 - Hazards and risk;
 - Ecologically sustainable development;
 - Infrastructure and servicing; and
 - Accessibility.

The relevant matters that require specific detailed assessment in relation to the modification application are further discussed below.

4.2 Built Form

The built form of the modified buildings generally retains the key parameters of each approved building envelope. As demonstrated in the Landscape Plans at **Appendix A**, the changes comprise minor reconfiguration and locational changes, which do not adversely alter the bulk and scale of the approved development.

Overall, the proposed modifications are considered to offer a better outcome than the approved design, as the modified design achieves better animal welfare, handling and management outcomes for different animal species through:

- better integration of back of house buildings with exhibit spaces, resulting in greater amenity for visitors and improved animal welfare outcomes.
- better segregation of back of house buildings between certain species resulting in improved animal welfare outcomes.

The proposed design refinements have been proposed based on consultation with Department of Primary Industries (Exhibited Animals) in relation to optimising animal welfare outcomes.

The proposal will still provide a zoological facility of a high quality with key buildings architecturally designed.

4.3 Landscaping

A Landscape Masterplan prepared by Aspect Studios was submitted with the original DA. The Landscape Masterplan addressed the areas of biological importance and the inclusion of a Planting Strategy to ensure a contiguous connection with the wider Western Sydney Parklands area. As the proposed modifications to the development are internal and generally relate to relocation and reconfiguration, no amendments to the approved Planting Strategy are proposed. Landscaping such as bamboo, timber and vegetation planting as well as exhibit features will be used to screen the Back-of-House buildings in accordance with the approved Planting Strategy.

4.4 Accessibility

As the proposed modifications are relatively minor in nature, no substantive changes have been made to the general arrangement of the Zoo. Minor changes to the Entry Building and Boma Restaurant as well as the relocation to some Back of House buildings will not result in adverse impacts on vehicle / pedestrian circulation paths. The modifications proposed will continue to provide a permeable network for pedestrians and provide improved spaces for customer experience as well as optimal animal welfare.

4.5 Visual Impact

The Zoo has been designed to integrate into the existing environment through the use of landscaping and architectural design, reflecting the future desired built form of the wider Bungarribee Precinct under the Western Sydney Parklands Management. As the proposed modifications are primarily internal, no changes are expected to be visible from the public domain. The minor changes to the location of some back of house buildings will not adversely impact on the bulk and scale of the zoo as a whole, and ultimately the modifications will facilitate the optimal operation and functioning of the Zoo.

It is considered that the proposed design development changes will not result in any significant visual impacts and will generally retain the visual amenity outcomes of the development as approved.

4.6 Water, Drainage and Stormwater

As discussed previously, a revised Stormwater Management Plan has been prepared by Northrop at **Appendix B** and **Appendix C**. The Northrop letter (**Appendix B**) confirms that the minor associated refinements to the stormwater management system on site remains generally the same as the approved development.

Stormwater Harvesting

The stormwater harvesting strategy for the site remains largely unchanged from that proposed in the previous Stormwater Management Plan. The 1790m³ storage basin at the north western corner of the site will be the primary non-potable water storage for the site, along with a smaller 'holding basin' located adjacent to the Boma Restaurant. A reuse efficiency target of 80% previously adopted has been retained.

On-site Detention (OSD)

OSD measures have been provided to ensure runoff from all portions of the site will be less than or equal to the pre-developed catchment. Three detention storages have been provided to limit site discharge including:

- within raingardens built into medians in the eastern carpark;
- within the wetland at the north-eastern corner of the site; and
- within the open space at the north-western corner of the site.

In accordance with Blacktown City Council's requirements, OSD measures were designed to limit runoff in the 5 to 100 year ARI storm events, for all storm durations between 5 minutes and 4.5hours. The following **Tables 2-5** (sourced from **Appendix B**) summarise the configuration of the proposed detention measures for each portion of the site and the estimated post-developed run-off rates, using the modelling parameters in accordance with the Blacktown City Council Drainage Design Manual. It should be noted that the peak outflow for each ARI has been provided. The modelling indicates that the OSD systems sufficiently reduce the peak site discharges to pre-development rates for all storms.

Table 2 Peak Site Discharge – Zoo Grounds West

Zoo ground West		
Contributing Catchment	10.18 ha of which 37% is impervious	
Total storage volume	1,850m ³ Open Space Detention Basin	
Annual Recurrence Interval	Pre-Developed Peak Discharge (m ³ /s)	Post-Developed Peak Discharge (m ³ /s)
5	0.58	0.56
10	1.31	0.85
20	1.72	1.15
50	2.58	1.51
100	3.0	2.07

Table 3 Peak Site Discharge – Zoo Grounds East

Zoo ground East		
Contributing Catchment	2.75 ha of which 40% is impervious	
Total storage volume	1,120m ³ Wetland	
Annual Recurrence Interval	Pre-Developed Peak Discharge (m ³ /s)	Post-Developed Peak Discharge (m ³ /s)
5	0.23	0.21
10	0.46	0.28
20	0.62	0.32
50	0.94	0.37
100	1.10	0.40

Table 4 Peak Site Discharge – Sealed Carpark West

Sealed Carpark West		
Contributing Catchment	0.84 ha of which 89% is impervious	
Total storage volume	190m ³ Biofiltration Basin	
Annual Recurrence Interval	Pre-Developed Peak Discharge (m ³ /s)	Post-Developed Peak Discharge (m ³ /s)
5	0.18	0.17
10	0.28	0.18
20	0.32	0.18
50	0.38	0.18
100	0.43	0.19

Table 5 Peak Site Discharge – Sealed Carpark East

Sealed Carpark East		
Contributing Catchment	0.74 ha of which 100% is impervious	
Total storage volume	190m ³ Median Raingardens	
Annual Recurrence Interval	Pre-Developed Peak Discharge (m ³ /s)	Post-Developed Peak Discharge (m ³ /s)
5	0.15	0.12
10	0.24	0.13
20	0.28	0.14
50	0.33	0.16
100	0.37	0.18

Stormwater Quality

The water quality objectives for the site are generally unchanged from the previous stormwater proposal. In accordance with the parameters recommended in the BCC's 2013 Water Sensitive Urban Design Developer Handbook and the 2010 Draft NSW MUSIC Modelling Guidelines, the proposed treatment measures were analysed using the MUSIC software. The revised Stormwater Management Strategy indicates that the stormwater quality remains generally unchanged from the original DA and is compliant with the BCC's water quality objectives.

4.7 Site Suitability

The site remains suitable for the proposed development and will continue to provide a catalyst for tourism and recreation in Western Sydney.

4.8 Social and Economic Impacts

The proposed development will continue to have positive socio-economic impacts for Western Sydney. It is expected that the zoo will become a destination of choice and will contribute to the economic growth of Western Sydney. As well, the zoo remains in accordance with the Western Sydney Parklands Plan of Management which identifies Bungarribee Super Park as suitable for a tourist and commercial hub.

5.0 Conclusion

This Section 96(1A) seeks to modify the approved development to allow a number of minor changes which have occurred through detailed design and in accordance with the Department of Primary Industries (Exhibited Animals). In accordance with Section 96(1A) of the EP&A Act, the Minister may modify the consent as:

- the development is substantially the same as the development for which the consent was originally granted;
- the proposed modification is of minimal environmental impact; and
- the development's compliance with key statutory strategic plans and controls remains the same as that originally approved.