THE ZOOLOGICAL PARKS BOARD OF NSW

TARONGA ZOO

BULL ELEPHANT FACILITY
PADDOCK & BARN

STATEMENT OF ENVIRONMENTAL EFFECTS

PLANNING NSW (NOVEMBER 2006)

PRELIMINARY ASSESSMENT (MAJOR PROJECT APPLICATION)



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TABLE OF CONTENTS

1 INTRODUCTION 3
2 LIST OF DEFINITIONS 4
3 EXISTING SITE CHARACTER & UTILITIES 5
3.1 THE SITE 5
3.2 TOPOGRAPHY 8
3.3 ADJACENT FACILITIES 8
3.4 LANDSCAPE SETTING AND CHARACTER OF THE SITE 8
3.5 HERITAGE AND ARCHAEOLOGICAL SIGNIFICANCE 9
3.6 EXISTING AND PROPOSED SERVICES 9
3.7 WASTE MANAGEMENT 13
3.8 VISITOR CIRCULATION AND EXHIBIT ACCESS 13
3.9 ADJOINING FACILITIES AND OPERATIONS 14
4 DESCRIPTION OF THE PROPOSAL 15
4.1 SCOPE OF THE PROJECT 15
4.2 BUILT FORM 15
4.3 BUILT ELEMENTS 19
4.4 VISUAL QUALITY 20
4.5 PLANT EQUIPMENT AND FACILITIES 21
4.6 ESD INITIATIVES AND DESIGN INTENT FOR THE BUILT FORM, EXHIBITS AND SERVICES WITHIN THE NEW BULL ELEPHANT FACILITY. 21
4.7 CONSTRUCTION STRATEGY AND TIMING 23
4.8 ANIMAL DISPLACEMENT 24
4.9 CONSULTATION 24
5 STATUTORY CONTROLS 28
5.1 GENERALLY 28
5.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 29
5.3 STATE ENVIRONMENTAL PLANNING POLICY 56 29
5.4 SYDNEY REGIONAL ENVIRONMENTAL PLAN 23 - SYDNEY AND MIDDLE HARBOURS AND DEVELOPMENT CONTROL PLAN (SREP 23) 30
5.5 NSW HERITAGE ACT 1977 31
5.6 MOSMAN LOCAL ENVIRONMENTAL PLAN 32
6 ASSESSMENT OF IMPACT 33
6.1 PARKING AND TRAFFIC 33
6.2 ACOUSTIC ENVIRONMENT 33
6.3 VISUAL IMPACT STUDY 33
6.4 HERITAGE IMPACT 36
6.5 OTHER IMPACTS 36
7 CONCLUSION 37

APPENDIX 1: HERITAGE IMPACT STATEMENT
APPENDIX 2: DRAWINGS
APPENDIX 3: PHOTOMONTAGES. VIEWS FROM HARBOUR
APPENDIX 4: PHOTOMONTAGES. VIEWS FROM WITHIN THE ZOO

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1 INTRODUCTION

The newly completed elephant exhibit located in the "Wild Asia" Precinct at Taronga Zoo was designed for the occupancy of four female Asian elephants (Elephas maximus), which will form the nucleus of Taronga Zoos new breeding herd of Asian Elephants. After the commencement of construction in February 2003 and the Zoological Parks Boards (ZPB) commitment to a regional breeding program, an additional male "Bull" elephant was acquired by the ZPB to complete the breeding group.

This "Bull" elephant (Gung) is currently only a juvenile (6 years old) and is still part of the herd of elephants that will be imported into Taronga Zoo towards the end of 2006.

As part of the ZPB's commitment to the findings and conditions of the Administrative Appeals Tribunal (AAT) decision handed down on 6 February 2006, the ZPB is required to construct a new "Bull" holding facility for the juvenile bull (Gung). This facility will be designed to hold the bull elephant currently being imported to Taronga Zoo and any subsequent bulls that will be bred as part of the regional breeding program being undertaken by Taronga Zoo. When juvenile bull elephants reach maturity (approximately 8-10 years of age) they are required to be separated from the females and are only brought together for breeding purposes, which is what occurs with Asian elephants in the wild. As part of the AAT conditions, the ZPB is committed to building the "bull" holding facility, ready for occupation and operation by the end of 2008 which is the subject of this application.

The new bull facility will comply with all current ARAZPA (Australasian Regional Association of Zoological Parks and Aquaria) guidelines for elephant management in Australasian Zoos. The young bull elephant (Gung) and 4 female elephants are currently in quarantine on the Cocos (Keeling) Islands and are due to arrive at Taronga Zoo towards the end of 2006.

The "Bull" elephant facility has an estimated construction budget of $6.0 million. Documentation is programmed for completion by mid 2007 and construction is scheduled to be completed by late 2008.

2 LIST OF DEFINITIONS

AAT	Administrative Appeals Tribunal
ARAZPA	Australasian Regional Association of Zoological Parks and Aquaria
DA	Development Application
DPI.	Department of Primary Industries
EAP Act	Exhibited Animal Protection Act 1986
EP&A 1979	Environmental Planning and Assessment Act 1979
ERD	Elephant Restraint Device
ESD	Environmentally Sensitive Design
FMCS	Facilities Monitoring Control System
HIS	Heritage Impact Statement.
JTCW	Jackson Teece Architecture
MLEP	Mosman Local Environment Plan
MPI	Master Plan Implementation Strategy (Taronga Zoo)
PA	Public address
SEPP 56	State Environmental Planning Policy No 56 - Sydney Harbour Foreshores and Tributaries
SREP 23	Sydney Regional Environmental Plan No 23 1990 - Sydney and Middle Harbours
UDAS	Urban Design Advisory Service. (Urban Design Principles and Visual Analysis document, May 2001)
VENM	Virgin excavated natural material
ZPB	The Zoological Parks Board of NSW

3 EXISTING SITE CHARACTER & UTILITIES

3.1 THE SITE

Taronga Zoo is located on the northern foreshore of Sydney Harbour on Athol Bay within the electorate of Mosman. Taronga Zoo is Crown land managed by the Zoological Parks Board of New South Wales. (Refer to FIG 1)

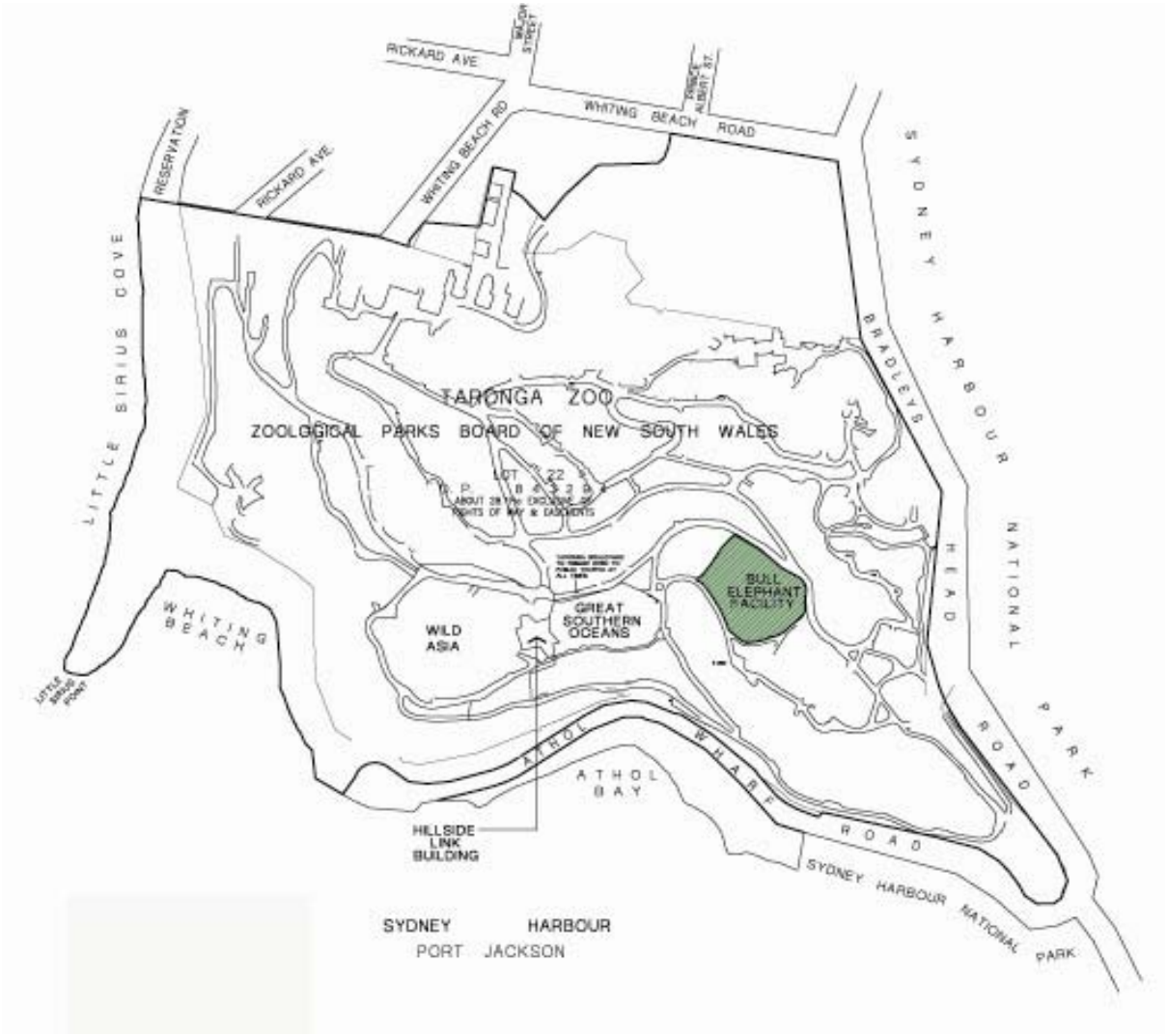


FIG 1 Site Location

Address: Bradley's Head Road Mosman NSW 2088

Nearest Intersection: Whiting Beach Road

Boundaries: The boundaries of the Zoo are irregular and are generally formed by Whiting Beach Road, Rickard Avenue & Steps, Bradley's Head Road, Athol Wharf Road and the harbour foreshore to mean high water mark around Athol bay, Whiting beach and Little Sirius Cove.

The site of the proposed “bull” elephant facility is located centrally in the eastern half of the Zoo, approximately halfway between the top and lower entrance. The site is on Taronga Boulevard, the Zoo’s main vehicle and pedestrian circulation spine. Taronga boulevard will provide service access to the site as well as serve as the main visitor viewing area.

The proposed facility is on the former 1916 Elephant exhibit site, which includes the Heritage listed Elephant Temple. Asian Elephants were housed on this site up to 2005 until they were re-located to Western Plains Zoo. The Elephant Temple was previously the exhibit and night house for Taronga Zoo’s Asian elephants, however current ARAZPA guidelines and OH & S requirements now prohibit the use of this building as an animal exhibit and holding facility.

The heritage listed elephant temple is proposed to be refurbished into a public interpretation centre, the first stage of which was completed in July 2006. The site is otherwise currently vacant.



Photograph of existing elephant temple and old elephant exhibit at Taronga Zoo. November 2005

The following photographs are typical images of the existing site character in and around the site.

















3.2 TOPOGRAPHY

Taronga Zoo is located at the head of Athol Bay on the northern shore of Sydney Harbour and is comprised of steeply sloping land that predominantly faces south. Although generally southerly in aspect, the site comprises three small ridges, which offer variations in aspect, microclimate and views. Ridges run north-east and fan out from the Zoo's upper car park. Most of the natural landforms within the Zoo have been extensively modified since the Zoo's inception on this site in 1916. Many areas have been levelled and filled.

The Taronga site is typical of Hawkesbury sandstone foreshores with natural soils comprised of poor sandy loams deficient in phosphorous and organic matter.

The site of the proposed "Bull" elephant facility is almost level. The open area of the former Elephant exhibit was constructed with a circle of pre-cast concrete retaining walls around the southern and western sides, behind which backfilling provided a flat yard for the elephants. The northern and eastern sides are relatively level with the adjacent ground, which adjoins Taronga Boulevard. Within the yard, there are concrete wallows and containment moats, the remainder being earth or grassed.

3.3 ADJACENT FACILITIES

The site is located centrally within the zoo. There are no physical boundaries or visual connections to adjoining property owners. The site is bounded by Taronga Boulevard to the north, the concert lawns to the south, the Tree Tops Café to the east and the Crocodile and Gibbon exhibits to the west. (Refer to SITE PLAN / SURVEY in Appendix 2).

3.4 LANDSCAPE SETTING AND CHARACTER OF THE SITE

The landscape character of the site can be described as an open clearing bounded by dense mature tree plantings. Within the confines of the site itself there is very limited vegetation due to the area being occupied by elephants for almost 90 years. The confines of the existing site can be described as gently sloping turf mounds inter-dispersed with remnant push poles and animal husbandry structures such as moats, bathing pools and containment fences.

Within the old elephant exhibit there is one mature palm tree (*Livistona australis*, cabbage tree palm) located in the centre of the western portion of the Yard. This palm is proposed to be transplanted off site during the construction works and then reinstated in the exhibit along with new mature palm trees. Located in the north western corner of the exhibit is a mature fig tree which is also proposed to be retained in the new exhibit. The palms and fig tree are required for screening and animal shade amenity purposes.

The landscape character of all the site boundaries with the exception of the eastern boundary can be described as densely vegetated landscape curtilages that provide screening of the site both internally and externally.

The western perimeter boundary is heavily planted with mature trees, including she oaks, Australian cedar trees and a large fig tree), all these trees are proposed to be retained for screening and amenity purposes. The ground level from which these grow is at the rear of the Gibbons Exhibit, some 5 metres below the existing elephant yard in one of the remnant drainage lines that run parallel to the central north

– south ridge line that divides the topography of the zoo. Refer to DA.07 PROPOSED AND EXISTING TREES in Appendix 2 for trees to be removed.

New plantings recently put in place around the refurbished heritage temple are designed to compliment the colour scheme of the temple as well as maximising the viewing of the structure itself. Traditionally the gardens that surround the temple have been planted with ornamental plants reflecting the general landscape cultural trends of the time.

3.5 HERITAGE AND ARCHAEOLOGICAL SIGNIFICANCE

The Indian Elephant Temple is of Exceptional heritage value. It is an iconic landmark both within and from outside of the Zoo. This significance of the Temple is recognised through its inclusion on the ZPB Section 170 Heritage Register, where it is identified as item 21B. The Temple Yard, in its modified configuration, is recognised as having High significance and recorded as item 23L.

The Elephant Temple and Yard, built at the time of the Zoo's opening in 1916, has remained largely as originally built until 1986, when the Zoo's emphasis shifted towards the breeding and conservation of elephants. At this time, modifications were made to the Temple and Yard, with a substantial tripling of the paddock area, requiring the remodelling of the original Yard and incorporation of adjoining open space to the west of the exhibit.

The design of elephant houses evolved to reflect these changes, as the principles of conservation and zoology have developed. As part of the implementation of the "Zoo 2000" view to the future Master Plan, a new Asian Rainforest Precinct was opened in late 2005, featuring state-of-the-art facilities for housing and breeding Asian elephants. This facility is located approximately 300 metres away, along Taronga Boulevard, the main vehicular and pedestrian thoroughfare through the Zoo.

While it is most desirable that historic items continue to be utilised for the purposes they were designed for, it is recognised that the current ARAZPA elephant management guidelines and OH& S requirements prevent the ongoing use of the Indian Elephant Temple and Yard as an enclosure suitable for exhibiting elephants. The proposal significantly retains the subject area's continuous association with the display of elephants since the Zoo's opening in 1916.

The adaptive reuse of the Indian Elephant Temple as a public interpretation centre will have minimal physical impact on the fabric and provide the public with a unique opportunity to compare the development of zoological design since Taronga's opening. To some extent it continues its historic function.

3.6 EXISTING AND PROPOSED SERVICES

All required services for the proposed development are available at the site. A number of the services that have not been upgraded as part of the Great Southern Oceans and Wild Asia precinct upgrades will be replaced as part of this development.

Stormwater

The existing Stormwater drainage lines have been identified as being undersized and in a dilapidated condition. New pipe work, ranging from 300-450ø, will run around the top end of the site, along Taronga

Boulevard and part of the western service road, installed as part of the Wild Asia and Great Southern Oceans Precincts construction. These new facilities will be utilised by the new barn and exhibit drainage system for surface runoff and pool drainage. All stormwater collected from the site is directed to Taronga Zoos Waste Water Treatment Plant where it is treated and recycled for use in the Zoo.

Domestic and Recycled Water supply

The site is currently traversed by the lower of two independent ring mains supplying the Zoo's domestic and fire hydrant water. A new Fire Hydrant ring main independent of the domestic potable water ring main has recently been installed in the adjacent Taronga Boulevard as part of the Wild Asia exhibit works. The proposed bull elephant facility will be utilising both these services.

The new bull elephant barn and exhibit will also utilise the existing re-cycled water line which is located in Taronga Boulevard. Recycled water is proposed to be used for animal waste wash down, cleaning and irrigation purpose.

Sewerage

The site is currently traversed by a 225mm and 300mm Sydney Water main, which traverses the site north-south. This is in fair condition and will be retained. Waste water from the new barn facility will utilise this main.

Sewerage will be generated from the staff facilities in the elephant barn and from hose-outs in each of the holding pens.

Gas supply

As part of the new "Wild Asia" infrastructure services upgrade a new natural gas line has been installed under Taronga Boulevard adjacent to the site. The supply lines to the Zoo from AGL are currently 210 kPA regulated at the meter. The new line installed from Back yard to Bush to Tree Tops café is a 160mm diameter polyethylene line which changes down to a 110mm diameter polyethylene line from Tree Tops café to the Gorilla exhibit.

It is proposed under the bull elephant facility to connect into this gas line so that gas hot water heaters and other utilities can be used for warm water wash down and heating.

Electrical

High Voltage distribution network for the site

The Zoo site is currently supplied with electricity by 5 substations on an 11kV ring main. Substation 3 is at the western side of the site, below the precinct and substation 4 is at the eastern side of the Great Southern Oceans site. A new transformer kiosk substation with a capacity of 1,000kW has been recently installed at the lower end of the Hillside Link building. The new facility will be utilising power from the Zoos lower HV ring main.

The existing high voltage infrastructure is considered adequate for the requirements of the proposed bull elephant facility.

Low Voltage distribution network for the site

The main low voltage switchboard for the new barn and exhibit will be designed to be fed via underground low voltage sub main cables. These sub mains are generally located within conduits and have moulded case circuit breaker protection. Local electrical distribution boards MSBs / EDBs will be designed and located in the newly constructed barn. The existing EDBs located in the old elephant

temple will also be utilised for the new facility.

The following features will be designed into the low voltage distribution network to match all other newly constructed exhibits and buildings across the zoo.

- Earthing systems for all new switchboards and distribution boards in the new facility will be designed to have a M.E.N. link to minimise the likely over voltages due to lightening strikes.
- All final sub circuits for power, night zoo lighting and lighting sub circuits where cable runs underground have been designed with a RCD protection and 30mA trip.
- All switchboards will be designed with surge protection.
- All lighting sub circuits for night zoo lighting shall be controlled via the C-bus control system. Each main switchboard (MSB) and distribution switchboard (EDB) is to include a C-bus control section.
- Surge arrestors shall be installed in each board. Category C protection to MSB-061 and category B protection to distribution boards to ANS1/1EEE C62.41-1991.
- All metering shall be capable of remote electronic monitoring by the FMCS.

Proposed new cabling, conduits and trenches will be specified for all components the designed / specified low voltage distribution network to be installed through out the new facility. All existing redundant cabling and conduits noted to be demolished will be removed once the new system is commissioned.

Data & Communications

The proposed bull elephant facility will utilise a new fibre optic cable that has been designed and installed in the new building distributor IDF (BD F6) located in the Hillside Link Building. This cable runs under Taronga Boulevard to the existing junction pit located at the Urban House at Backyard to Bush (B2B) from where it is proposed the new bull elephant facility can branch in. From this junction pit the fibre optic cable can then be connected through to the IDF board in the shearing shed which is then connected through to the Zoos main server located in the Zoos Administration building. Once the cable is connected to the junction pit at the Urban House in B2B the data / communications systems designed in the new Bull Elephant facility can be commissioned.

The new Bull elephant facility will be designed with multiple data points in keeper areas that can be utilised for data and communications as well as CCTV surveillance of the facility and elephants.

Emergency Power

The new bull elephant facility will be designed with emergency back up power via a connection to an external MSB proposed to be located adjacent to the new holding barn. In the event of a site wide power failure and access to a functioning MSB in this location, the Zoos emergency power generator can be connected into this MSB to energise the gate motors and gate control panel for the elephant pens so that the elephant facility can maintain normal operations. Back up generator power at this location will also power all electrical services run from this MSB.

The following facilities in the new facility will also have local battery and uninterruptible power supply (UPS).

- Hot wire energisers. (8 hour smart battery pack back up)
- Two way radio system
- All data / Communications / computer hubs through the Zoos PABX and main computer server
- Site wide Public address system (PA)

Note: All hot wire energisers for the external exhibit in the new facility will have a battery back up pack (UPS) with 8 hour capacity.

Facilities Monitoring and Control system (FMCS)
As part of the new bull elephant facility design and MPI recommendations it is proposed to implement a number of services and facilities with FMCS capability.

In general the overall systems design for the new facility will be designed with the capability of implementing FMCS in the future. This system will assist in maintaining the assets in the new bull elephant facility and designated systems beyond the site. The system would ultimately provide a safer more efficient working environment for Taronga Zoo staff and its animal collection and would support the Zoos commitment to ESD.

The main function of a future FMCS would be to monitor the following functions and services in the new facility and also on a broader site wide context.

- Irrigation controllers (landscape) Status / fault monitoring and programming
- Recycled water treatment plant. (Status monitoring / metering).
- Soundscape. (Interpretation). (Status monitoring and programming)
- PA (Site wide). (Fault monitoring)
- Night Zoo lighting. (Status / fault monitoring and programming)
- Hot wire systems. (Fault and alarm monitoring)
- Gate and motors controls. (Pumps, elephants gates etc with status and fault monitoring capability)
- High voltage network ring. (Fault monitoring)
- Low voltage distribution network. (Fault and alarm monitoring)
- Data and communications. (Fault monitoring)
- Electronic security systems. (Fault and alarm monitoring)
- Fire protection systems. (Fault and alarm monitoring)

For the above mentioned systems the FMCS would be able to perform the following functions from either an authorised persons lap top computer or designated computer work station.

- Monitor plant alarms or faults
- Monitor plan operational conditions

- Monitor plan efficiencies and usage
- Monitor system status
- Control system set points
- Control systems functions
- Control system operational schedules.

The FMCS should provide a logical and easy to use interface to facilities operations by integrating functionality to monitor information and provide systems control. The system should have a user friendly graphical interface capable of providing all required information.

The FMCS would utilise the existing site wide IT network and is recommended to be a Direct Digital Control system (DDC) which is suitable for operation on an Ethernet based IT data network and is not vendor specific. The system should have the facility for remote alarm notification off site for designated maintenance staff.

3.7 WASTE MANAGEMENT

All proposed stormwater lines within the proposed building and exhibit will be designed to the 1 in 20 year ARI as stated in Australian Rainfall and Runoff (1997). The design of the stormwater system will ensure that the existing system usage is maximised. All new pits will be to AS 3500, and existing pits which do not comply with current standards will be upgraded to meet AS 3500.

All stormwater from roadways and pathways will be directed to the Zoo water treatment plant for recycling.
Where possible, all re-usable / non contaminated spoil from required excavation will be retained on site. It will be crushed and used for general landscaping and filling.

Water for the various ponds and moats is recycled water taken from the Zoo's water treatment plant. The water is filtered, and if necessary, treated with ozone to remove organic wastes. Excess water (backwash from the filters) is returned to the recycling plant for further cleanup.

All stormwater is piped to the water treatment plant and is recycled for various uses around the Zoo. Water from animal holding washouts also goes to the water treatment plant for recycling.

3.8 VISITOR CIRCULATION AND EXHIBIT ACCESS

Visitor circulation
Visitors currently pass by and view the exhibit from Taronga Boulevard and the forecourt to Tree Tops Café. Taronga Boulevard is the main pedestrian and vehicular circulation route running across the Zoo, as well as being the service access route for the site. Visitor circulation is confined to the northern and eastern perimeters of the site along Taronga Boulevard

There is a five-metre level change around the western and southern sides of the site, which prohibits any public access in those directions.

All public access and circulation in and around the proposed facility, including the existing heritage Temple, will meet the requirements of the Australian Standard AS 1428 “Design for Access and Mobility”. Pathways around the exhibit will be ramped, if necessary, with no steps.

Exhibit Access for Service and Delivery

The main service and staff access to the exhibit is through the barn for day to day operations. A set of double gates located next to the old elephant temple are designed to allow large vehicle access to the paddock for animal transactions or major maintenance works.

Internal Zoo deliveries to the rear of the proposed new barn are required for the removal of animal waste and to deliver animal food. Deliveries are generally required to be made before public entry time of 9.00 am, however some deliveries may be required in normal Zoo working hours. Trucks may deliver straight into exhibit or the rear of the barn. The Zoo uses a combination of small delivery vehicles and fixed-axle table-top trucks, max 7 metres long.

Garbage collection, using a fixed-axle compacting truck, occurs three times daily.

Emergency Access Requirements

Emergency vehicles will use Taronga Boulevard. Fire trucks will have clear access to fire hydrants, with the minimum clearance of 4-5 metres allowed for emergency fire truck and ambulance access along Taronga Boulevard. Fire hydrants are located on Taronga Boulevard adjacent to the proposed new bull elephant barn facility.

3.9 ADJOINING FACILITIES AND OPERATIONS

The Precinct is currently adjoined by:

- the Gibbon and crocodile exhibits to the west, at the lower level; Located in the remnant drainage line that runs parallel to the central north – south ridge
- natural bushland and a picnic area / concert lawns to the south, at the lower level;
- Wollomi exhibit and picnic lawns to the north, across Taronga Boulevard at located at a higher level and are not able to be directly viewed from the roadway;
- Tree Tops Café (Food Outlet) and forecourt adjoining the eastern boundary, at the same level as the Temple Yard;

4 DESCRIPTION OF THE PROPOSAL

The proposed bull elephant holding facilities will be an integral part of Taronga Zoo's Regional Asian Elephant breeding program and are required as part of the AAT decision handed down in February 2006 to complement the newly constructed elephant breeding facilities located in the "Wild Asia" precinct. The facility comprises a Barn (night house) and adjacent external paddock and exercise yard.

4.1 SCOPE OF THE PROJECT

The barn to house the following:

- 3 holding pens
- An Elephant Restraint Device (ERD)
- Raceways
- Keeper safe corridors
- Office and amenities
- Food preparation / Food store / Equipment store

The paddock (2000m^2 minimum) to accommodate:

- A pool
- A wallow
- Exhibit enrichment devices
- Containment fences
- Landscaping and shade

The yard (500m^2 minimum) to accommodate:

- A pool
- A wallow
- Exhibit enrichment devices
- Containment fences
- Landscaping and shade

4.2 BUILT FORM

The proposed new holding barn is a single storey building located along the western perimeter of the site, adjacent to the Gibbon and Crocodile exhibits. (Refer to FIG 2). The new barn is proposed to be constructed of facetted pre-cast concrete slab walls that are designed with planting pockets to evoke a stylized landform set in the landscape. The pre-cast concrete slabs will be angled and coated with an applied finish that is coloured to assist the building to blend into the landscape. Differing colour shades and textured finishes on the buildings external surface will be designed to mimic the shadows of the proposed mature palm trees that will be planted along the eastern side of the building in the elephant exhibit. The angled concrete slabs that form the buildings walls will be designed with ventilation penetrations so that natural airflow through the building can be controlled. These penetrations will be able to be opened and closed so that staff can regulate the temperature of the building for animal welfare and husbandry purposes.



FIG 2 Proposed Site Plan (Refer also Drawing DA.03 Site Plan in Appendix 2)

The buildings roof will be a flat concrete structure designed with skylight penetrations for natural light and will be ringed by a generous roof planter able to sustain medium to large shrubs and creepers. The roof top planter is designed to assist the building blend into the landscape when viewed both from within the zoos boundaries and when viewed from the harbour. (Refer FIG. 3)



FIG 3 Building Massing Model

The following table outlines the various factors affecting the built form of the barn, presented in the format of a response to each design issue.

Issue	Design response
Relationship to Heritage Temple	To design the new barn as a background building. The aim is to: - Blend the new building into the existing landscape backdrop which is to be retained on the western edge of the site. - To have the existing Elephant Temple visually dominate the site and not compete with the new barn. - Minimize visual impact of the new barn both from views within the Zoo and from the harbour by using finishes and colours that compliment the adjoining and proposed natural vegetation. - Use super advanced planting to create immediate amenity for elephants and provide screening to the new structure when viewed internally.
Views from the Harbour	- To minimise the visual impact of the new building from the harbour by making the structure a background built form using angular forms and contrasting façade panels to break up the built form. - Maintain and preserve the existing landscape curtilage around the boundary of the exhibit. - Use super advanced trees and palms to provide immediate amenity for animals and to assist the building blend into the existing landscape setting. - Use roof planter boxes and pocket planting with suitable soil depths on the proposed structure to assist the building blend into its natural landscape setting.
Limited site area	- The ARAZPA guidelines for the management of elephants in Australasian Zoos stipulate that Asian elephants must have access to 2500m2 of external exhibit space. - To minimise impacts on adjoining exhibits and comply with ARAZPA guidelines the size of the barn facility including holding pens, ERD and keeper service areas are at their minimum size requirements.
Building Height keep to minimum	- Minimum 8m internal height required for bull elephant
Impact on adjacent Exhibits	- Minor impacts on adjoining Gibbon and Crocodile exhibits during construction.
Materials	Both sides of the majority of the barn walls are required to be elephant proof. The most appropriate material being concrete. The external finish of the concrete panels will be treated with an applied finish, the colours of which will be selected to blend in and compliment the existing natural and proposed vegetation. External roof planter boxes and planting pockets with suitable soil depths are also proposed for the structure and are designed to assist the building blend into the natural landscape setting when viewed both from within the zoos boundaries and when viewed from the harbour
Heritage Items	Refer to section 2.2.7 Heritage and Archaeological Significance

The proposal involves the following key components:

- Retention of the area's continuous association with the display of elephants since the Zoo's opening in 1916;
- Retention and adaptive reuse of the Indian Elephant Temple, an item of Exceptional significance, for use as a public Heritage interpretation centre;
- Modifications to the Yard, including the already modified original Yard and 1987 enlarged yard area;

- Introduction of a new male (bull) elephant holding facility to the west of the precinct;
- Development in the vicinity of the Elephant Temple (Item 21B) Original Bird Aviaries (Item 19B), Gibbon Exhibit (Item 118B) and original pathway layout (Item 99L);
- Existing mature trees and landscaping maintained as part of the backdrop to this exhibit; Ground disturbance relating to the construction of the Barn and modifications to the Paddock levels which has the potential to disturb relics associated with Historical Archaeological Features Original Ladies Lavatory 1916 (AF12), original Perimeter Visitor pathway around Elephant Yard (AF32) and former kiosk (AF6); and
- Modifications to existing views and vistas within and from the Zoo.

While it is most desirable that historic items continue to be utilised for the purposes they were designed for, it is recognised that the current ARAZPA elephant management guidelines and OH& S requirements prevent the ongoing use of the Indian Elephant Temple and Yard as an enclosure suitable for exhibiting elephants.

The proposal significantly retains the subject area's continuous association with the display of elephants since the Zoo's opening in 1916.

The adaptive reuse of the Indian Elephant Temple as a public interpretation centre will have minimal physical impact on the fabric and provide the public with a unique opportunity to compare the development of zoological design since Taronga's opening.

The project’s order of capital cost is estimated at $6 million.

4.3 BUILT ELEMENTS

Refer to the attached drawings for details of the building.
All of the external walls of the barn will be pre-cast concrete, with a cast-in texture suggesting plant/tree forms, and of a colour to be selected to blend in and compliment the natural vegetation.
External roof planter boxes and planting pockets with suitable soil depths will assist the building blend into the natural landscape setting.

Flooring varies between rubberised floors for elephant pens to concrete on grade.

Fences and Barriers
Refer to drawing DA-03 for general location of primary fences and barriers between animal exhibits and the general public.
The design intent is to conceal all animal containment barriers wherever possible by integrating them into the landscape elements. These barriers are typically made of steel bollards with stainless steel cable strung in between. The bollards are painted black so as to visually disappear in the landscape. "Hot wires" or electrically charged horizontal wires will be used in some sections of the fence to keep elephants away from vegetation and the public.

Animal Exhibit
Refer to drawing DA-03 for general arrangement of the proposed exhibit.

The exhibit area is essentially the original Temple Yard space that has been marginally increased to the comply with the ARAZPA guidelines for the management of Asian elephants in Australasian Zoos which stipulate that Asian elephants must have access to an outdoor yard that is 2500m2.

The new yard will be spilt into two different holdings yards that are 2000m2 and 500m2 for animal management and husbandry requirements. Both yards will contain a self filling water body, earth mounds and a mud bath for the animal's behavioural enrichments and amenity purposes. Mechanical gates will control access between the yards and the holding barn. It is a requirement of the ARAZPA guidelines that the elephants have access to both the yard and building during the night.

A safety setback zone of 3m is required where ever the outdoor exhibit runs adjacent to public areas. 3m is considered to be the reach of an adult male elephant.

The grading of the exhibit will be designed so as to allow for the public viewing of elephants as well as to provide privacy zones for the animals so that they can move out of public view at any time if desired.
For landscape elements proposed for the new exhibit facility refer to the landscape section below.

Urban Design Elements
The proposed facility is essentially and animal breeding holding and display facility with limited urban design elements. All public buildings and structures have been themed to provide an appropriate backdrop for the exhibits. Building materials, building style, signage and outdoor furniture will be carefully selected and designed to suit the precinct.

Signage
Minor interpretive signage will be displayed in public areas and will be themed appropriately. The major interpretive theming and signage displays will be located in the refurbished heritage temple which is not part of this submission.

Landscape
The proposal intends to maintain the existing landscape curtilage that bounds the site setting in its entirety, with the exception of selective pruning to existing trees along the western perimeter boundary of the site to accommodate the new barn. (Refer to plan DA-07 for the list of proposed trees to be removed)

The existing elephant paddock and public domain located around the exhibit will be substantially enhanced through the planting of super advanced trees and palms. Super advanced plantings are required to give the animals immediate shade amenity as well as providing the public with an immersive shaded environment in which to view the animals.

The elephant paddocks will be also fully remediated with new grading and topping of turf, complimented with elephant enrichment devices such as bathing pools, mud wallows and earth mounds. All existing identified heritage fabric such as the moats and associated concrete structures will be archivally recorded before being buried and preserved under approximately 1metre of new VENM material that will form the sub-base to the new elephant paddock.
The building itself is designed to blend into the landscape setting through the provision of extensive planter boxes and planting pockets in which tall shrubs and creepers will be planted and encouraged to grow over the building. This form of landscape treatment along with the articulated surfaces and finishes to the external concrete walls will assist the building to blend into the landscape setting when viewed both internally and from the harbour.

4.4 VISUAL QUALITY

The site is currently vacant, but essentially remains as it was when last in use as an elephant exhibit. The main visual element, the Elephant Temple, is considered to be visually significant both from within the site itself and from beyond the boundaries of the Zoo. The secondary visual element, the Temple Yard and its bounding pre-cast concrete retaining walls, is of minor visual significance, other than as a backdrop to the concert lawns to the south and adjoining animal exhibits.

All of the existing yard elements which are dilapidated and of little visual significance will be demolished or buried as part of the new development. All identified heritage structures such as the original moat structure will be archivally recorded and protected by geo-fabric before being buried under 900mm of clean VENM fill.

The landscape visual quality of the Temple Yard itself currently lacks points of particular visual significance with the exception of the mature *Livistona Australia* (Cabbage tree palm). This palm will be transplanted and reinstated in the yard after the construction works have been completed. Additional mature plants will be planted to compliment this palm and provide visual screening to the new elephant barn and shade amenity for the animals. Mature fig trees will also be planted in the new elephant exhibit to provide screening to the new barn and provide immediate shade amenity to the animals.

The dense vegetation along the western and southern edges of the site provides an important landscape curtilage that is critical for screening and providing vital shade amenity for both visitors and the animals. The importance of this landscape curtilage is recognised by the new development which proposes to

retain all the significant trees along the western and southern boundaries. Minor pruning of some of the large trees along the western boundary of the site will be required to accommodate the new barn; however these trees will be adequately protected for the duration of the construction works

The five metre level change along the southern and western perimeter of the site and dense vegetation curtilage means that the site is not able to be viewed from the southern or western aspects. The view from Taronga Boulevard across the Temple Yard is to the tops of trees growing at the lower level and to glimpses of the Harbour beyond. This view will be maintained and not impacted by the new development.

"Section 4 - Description of the Proposal", will describe the improvements this redevelopment will bring to the visual quality of the area.

4.5 PLANT EQUIPMENT AND FACILITIES

Water used in the wading pools will be taken from, and pumped back to, the Zoo's central recycling plant. A pump is proposed to be located in the service area of the old elephant temple.

Any plant for other systems and facilities will be located beneath the barn's floor, accessible from adjacent the gibbons/crocodile exhibit below. It is proposed that plant and associated facilities will not be visible from any public areas.

Heating in the Elephant Barn will be via gas fed heaters located on the barn ceiling. Gas hot water heaters will also be used for warm water wash down of the elephants and in the staff amenities.

All pen / exhibit gates in the facility will be able to be operated both manually and mechanically for remote operation scenarios. Gates will either be electric or hydraulically driven. An overhead gantry crane has also been designed into the concept for both keeper and animal husbandry operational requirements.

The Elephant keeper facilities are located within Barn and comprise a kitchenette (Food prep), food store, toilet, shower and equipment area. A service yard at the rear of the facility is designed for storage and vehicle access to the barn. A keeper safety zone rings all the holding pens in the barn which allows keepers to safely reach an animal non contact area quickly in the event of an emergency.

4.6 ESD INITIATIVES AND DESIGN INTENT FOR THE BUILT FORM, EXHIBITS AND SERVICES WITHIN THE NEW BULL ELEPHANT FACILITY.

The new Bull Elephant Facility is proposed to be constructed to meet Taronga Zoos commitment to environmentally sustainable development through the design of the barn, outdoor exhibit and associated services. All operational facilities within the new facility will be designed with ESD principles in mind. Construction materials have been chosen to promote sustainability – selection of timber is based on current standards. No rain forest timbers are used, materials with high intrinsic energy costs such as aluminium, and PVC, vinyls and other plastics, are avoided where possible.

Built form

The proposed new bull elephant holding barn has been purposefully designed to meet the following ESD principles.

- The bull elephant holding buildings orientation on the site has been designed to minimise visual impact of the structure when viewed from both within the Zoo and from the Harbour. The new

barn has also been designed so as not to visually dominate the landscape setting over the existing heritage temple.

- The bull elephant holding building is designed to maximise external shading and minimise extreme temperatures for both the amenity of the staff and animals.
- The bull elephant holding building is proposed to be designed with natural lighting (Skylights) combined with efficient artificial lighting to provide a safe and comfortable work place environment that is also energy efficient.
- The bull elephant holding building is proposed to be designed with natural ventilation (open louvres) located in penetrations in the concrete walls to provide a comfortable work place environment for both staff and animals that is also energy efficient.
- Recycled building materials will be used where ever practically possible.
- Recycled water will be used for toilets and internal animal holding area wash down / cleaning.
- The implementation of FMCS capability in the new building and operational systems through out the AER will provide a means to closely monitor and reduce energy consumption on a precinct wide basis.

Exhibits

The proposed external holding paddocks and associated animal facilities will be purposefully designed to meet the following ESD principles.

- The external exhibit will use recycled landscape materials where ever possible, including soil mixes, substrates and mulches.
- The external exhibit will use recycled water for irrigation and animal exhibit area wash down. All irrigation is automated to maximise efficient bed coverage and to reduce exposure to high evaporation times during the day.
- All tree plantings across the proposed site have designed for the provision of shade for visitors, staff and to provide animal amenity.
- The use of recycled rubber in the soft floor surfaces required for the Elephant pens / exercise yards .

Services

Mechanical services.

All mechanical services proposed to be used in the new bull elephants holding facility will be designed to provide flexibility of choice by users for the comfort conditions required. General ESD principles of the mechanical services design will include.

- Economy cycle and winter warm up energy saving functions.
- Optimum start program to reduce morning cooling down and warming up period

The ZPB's "Conditions of Entry and Working on Site" sets out environmental controls for the building contractor, including:

- Waste Reduction And Purchasing Policy (WRAPP) reporting – contractors are required to document certain materials used on site and waste materials disposed of or recycled. Completed forms are to be submitted every two months;

- limits on the usage/wastage of water;

- control of sediments.

All water used in water bodies and wash down of animals and their holds is taken from the Zoo's water recycling plant.

4.7 CONSTRUCTION STRATEGY AND TIMING

The work will most likely be staged, with work beginning at the north of the site and moving southward for completion.

Construction is likely to be phased as follows:

1. Demolition and site preparation.
2. Bulk excavation and land contouring.
3. Excavation and laying of infrastructure services
4. Overall building and exhibit set out.
5. Construction of building and exhibit elements
6. Construction of main landscape elements.
7. Completion of detail landscape elements, including advanced tree planting.
8. Completion of theming and educational elements.
9. Final commissioning of all services
10. Project completion.

Areas around the site will be maintained and managed for continued public access to neighbouring exhibits, including the Back-yard to Bush precinct, the concert lawns, Wollemi and vehicular / pedestrian access along Taronga Boulevard.

It is proposed that the contractor's site work sheds are to be located on the site of the existing Great Southern Oceans contractor site sheds at the south eastern corner of the Zoo.

The demolition and building contracts will stipulate conditions for carrying out the works which comply with the Zoos environmental protections. These include:

- construction will be limited to normal construction work hours. This will be from 7.30am to 4.00pm Mondays to Fridays and 8.00am to 1.00pm Saturdays, with no work allowed on Sundays or public holidays;
- construction vehicles over 3 tonnes will be restricted to use of major roads only, not Prince Albert Street;
- noise minimisation and suppression techniques will be employed on all construction equipment;
- erosion and sediment control measures to be installed and maintained around the site during construction;
- measures for protection of trees will be implemented;

- control of vehicular movement within the Zoo;
- various signage to warn or protect visitors;
- erection of hoardings to protect the public;
- compliance with the BCA;
- protection of heritage items.

Noise from operation of the Precinct will not increase current levels.

The ZPBS's Conditions of Entry and Working on Site imposes strict conditions for control of noise, including:

- fitting of silencers to noise absorption to plant and construction equipment;
- carrying out of work with minimum disturbance to visitors, staff and animals;
- excessive noise activities to be identified in construction program;
- principal may require periodic shutdown of equipment found to interfere with Zoo activities.
- implementing site controls for the restricted movements of trucks and controlling hours of operations for deliveries which are nominated in contract conditions.

4.8 ANIMAL DISPLACEMENT

No animals will be displaced for this work. The site is currently vacant and the animal proposed for it will reside with the female herd at Wild Asia until the end of 2008 when this animal must be separated from the herd and move into the new facility.

4.9 CONSULTATION

Planning NSW Pre-submission meeting

Prior to the submission to the Minister seeking approval to proceed on the preparation of a project application for a "Bull" Elephant Holding facility at Taronga Zoo a pre-submission meeting was held at Planning NSW offices on the 15/9/2006.

The following plans were presented at the meeting and copies left with Planning NSW for their information and comment.

1. Concept Design Sketch Massing Model. (A3 Colour)

2. Updated montage View towards Hallstrom Square Pines. (A3 Colour).

3. Site layout plan. SK-N1-C. February 2006 (A3 Colour)

4. View from the Harbour 1, 2 and 3. (A3 Colour copies of each view)

5. Elevations and Sections (A3 black and white copies)

Attendees at the meeting were as follows:

Izlem Boylu	(Sydney Metropolitan Team leader from Planning NSW)
Duncan Mitchell	(Zoological Parks Board Project Manager)
Trevor Williams	(Project architect, Jackson Teece)

Duncan Mitchell presented the back ground to the project and why it was necessary for the Zoological Parks Board of NSW to build a new bull elephant facility.

Trevor Williams presented the concept drawings, harbour view montages and discussed the general design principles of the proposed built form which was to design a building that blended into the natural

landscape setting of the Zoo when viewed internally as well as from the harbour. The functional and animal management requirements of the buildings design were also discussed as were space requirements of the new exhibit and the necessity to comply with the current ARAZPA guidelines for the management of Asian elephants in Australasian Zoos.

Izlem Boylu presented the process and stages that the project application would have to take to gain approval from Planning NSW. This process was described as follows:
1. Submission to the Minister (Major Project requirement) 10 days to process
2. Preliminary Assessment document. (28 days to process)
3. Statement of Environmental Effects Document for public exhibition. (30 days to process)

A letter and submission to the Minister was prepared by the ZPB and submitted to Planning NSW on the 29th of September 2006 seeking approval to proceed with the preparation of a project application for a Bull Holding facility at Taronga Zoo.

Confirmation from Planning NSW that the Director General, as a delegate of the Minister, formed the opinion on the 5th of October 2006 that the proposal is a project and that Part 3A of the Act applies. Consequently the ZPB may now apply for the approval of the Minister to carry out this project. In seeking the Ministers approval, section 75E of the Act requires the ZPB to lodge an application for the project with the Director General which is the purpose of this submission. The signed Major Projects Application form and the required processing payment cheque for $1000 are attached to this submission.
(Refer letter from Planning NSW is MP 06_0270, file S06/00809 dated the 12th of October 2006).

Mosman Council

Prior to the submission of this Preliminary Assessment document for the Major Projects Application to the Minister a pre-submission meeting was held at Mosman Council offices on the 30/10/2006 to brief Council on the proposal.

The following plans were presented at the meeting.

1. Concept Design Sketch Massing Model. (A3 Colour)

2. Updated montage View towards Hallstrom Square Pines. (A3 Colour).

3. Site layout plan. SK-N1-C. February 2006 (A3 Colour)

4. View from the Harbour 1, 2 and 3. (A3 Colour copies of each view)

Attendees at the meeting were as follows:

Joe Vertel	(Mosman Council Strategic Planner)
Duncan Mitchell	(Zoological Parks Board Project Manager)
Jannene Smith	(Taronga Zoo Heritage Officer)

Duncan Mitchell presented the back ground to the project and why it was necessary for the Zoological Parks Board of NSW to build a new bull elephant facility. The functional and animal management requirements of the buildings design were also discussed as was the necessity to comply with the current ARAZPA guidelines for the management of Asian elephants in Australasian Zoos.

Jannene Smith presented the issues regarding the items of heritage significance on the site, such as the Indian Temple and items of archaeological significance. Jannene Smith also discussed some of the internal views that would be impacted as a result of the proposed development.

Joe Vertel was generally positive about the proposal from a heritage and design perspective. Joe made a comment about the proposed holding buildings mass and whether it could achieve the visual anonymity that was shown in the photomontages. Joe was assured that the objective of the buildings design and finishes was to make the built form blend into the landscape as much as physically possible. The animal husbandry and ARAZPA guideline requirements that dictate the buildings design was explained to Joe and it was discussed that these design requirements are the minimum that the ZPB can meet in terms of complying with the ARAZPA guidelines for managing elephants in Australasian Zoos.

NSW Heritage Office

A meeting was held on the 18/10/2006 at Taronga Zoo to introduce the proposal to the NSW Heritage Office.

The following plans were presented at the meeting and a copy supplied to the Heritage Officer for their information.

1. Concept Design Sketch Massing Model. (A3 Colour)
2. Updated montage View towards Hallstrom Square Pines. (A3 Colour).
3. Site Plan. 2005197 DA03. 01 February 2006 (A3 Colour)
4. View from the Harbour 1, 2, 3 and 4. (A3 Colour copies of each view)
5. Montage view from Top of Old Seal Theatre (A3 Colour)
6. Barn Plan & Roof Plan 2005197 DA-04 01 February 2006 (A3 reduction and A1 black and white copies)

Attendees at the meeting were as follows:

Brad Vale	(NSW Heritage Office, Heritage Officer)
Duncan Mitchell	(Zoological Parks Board Project Manager)
Jannene Smith	(Zoological Parks Board, Heritage Specialist)
Ian Brodie	(Jackson Teece, Project Architect)

Duncan Mitchell presented the back ground to the project and why it was necessary for the Zoological Parks Board of NSW to build a new bull elephant facility.

Ian Brodie presented the concept drawings, harbour view montages and discussed the general design principles of the proposed built form which was to design a building that blended into the natural landscape setting of the Zoo when viewed internally as well as from the harbour. This principle enables the retention of the visual prominence of the original Elephant Temple as a landmark in its setting. The functional and animal management requirements of the buildings design were also discussed as were space requirements of the new exhibit and the necessity to comply with the current ARAZPA guidelines for the management of Asian elephants in Australasian Zoos.

Jannene Smith presented the background to the heritage planning for the project and discussed the project's compliance with the Zoo's Heritage Office endorsed conservation principles for development in the vicinity of heritage items. The potential disturbance of archaeological features was discussed and it was concluded that an Excavation Permit be sought following development approval for the project and prior to disturbance of the ground. The proposal for the adaptive reuse of the Temple as an Interpretive Centre was also introduced.

Brad Vale was taken on a tour to the project site and key views and potential impacts arising from the development discussed. The recent refurbishment works, including new colour scheme, for the temple were also shown. Other Section 170 heritage items in the vicinity of the prosed development were also viewed on the site tour.

The Heritage Office has since informed Jannene Smith, that, as the proposal is a Part 3A project, they would review the application if it is referred to the Heritage Office against the existing CMP and AZP and the future heritage impact statement.

5 STATUTORY CONTROLS

5.1 GENERALLY

Taronga Zoo is a 28 Hectare site and is designated Crown Land which falls under the jurisdiction of the planning instruments listed in the sub-sections below.

The site particulars are:

Lot Number:	22
Deposited Plan No.1 :	DP 843294
Zoning:	5a (Special Uses). The proposed use complies
Address:	Bradley's Head Road, Mosman NSW 2088

The boundaries are defined on the Certificate of Title Folio Identifier 22/843294 at Mosman in the LGA of Mosman. Generally the boundaries are Whiting Beach Road, Bradley's Head Road, Whiting Bay and Sirius Cove.

Subject Site: Contained within the boundaries of Taronga Zoo. (Refer to the Context Plan.)

Relevant Planning Controls:

- This project is subject to the provisions of State Planning Policy (Major Projects) 2005, part 3A of the Environmental Planning & Assessment Act 1979. Within part 3A of the act, Schedule 2 nominates – specified sites (clause 6) which lists Taronga Zoo as a specified site. (No 11) - Criteria under which the provisions of this major project are assessed are of State or regional environmental planning significance (75B(2) (a)). In addition to these criteria the estimated capital investment value of the project is more than $5million.
- Regulatory Control State Environmental Planning Policy No 56 - Sydney Harbour Foreshores and Tributaries
- Sydney Regional Environmental Plan No 23 1990 - Sydney and Middle Harbours
- Mosman Local Environment Plan 1998
- Environmental Planning and Assessment Act 1979 Section 79C
- NSW Heritage Act 1977
- Building Code of Australia (BCA)

FSR	N/A
Setbacks	N/A
Building Height	N/A
Private Open Space	N/A
Parking and vehicular access	N/A
Waste Disposal	N/A
Sewer	Designed in accordance with Sydney Water regulations
Stormwater	Collected stormwater is recycled through the Zoo's Water Treatment Plant
BCA	All aspects of the building work will be designed to comply.

EAPA	Designed to comply with the provisions of the EAPA administered by NSW DPI.
Other	Taronga Zoo Master Plan Urban Design Principles and Visual Analysis May 2001, prepared by the Urban Design Advisory Service.

5.2 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT

The matters for consideration in determining this Application are subject to the provisions of State Planning Policy (Major Projects) 2005, part 3A of the Environmental Planning & Assessment Act 1979. Within part 3A of the act, Schedule 2 nominates – specified sites (clause 6) which lists Taronga Zoo as a specified site. (No 11) - Criteria under which the provisions of this major project are assessed are of State or regional environmental planning significance (75B(2) (a)). In addition to these criteria the estimated capital investment value of the project is more than $5million.

5.3 STATE ENVIRONMENTAL PLANNING POLICY 56

The site is listed within part 3A of the act, Schedule 2 nominates – specified sites (clause 6) which lists Taronga Zoo as a specified site. (No 11).

Items a), b), b1), c), e), h), m) and o) Regarding public access to and ownership of the foreshore

Public ownership of the land within the foreshore area and access to the foreshore will not be affected by the proposal. The relationship between harbour and foreshore is not affected.

d) Conservation of significant bushland and other natural features

Significant trees are retained as shown on the site plan. Refer to photomontages attached for a more detailed description.

f) Protection of significant natural and cultural heritage values

Refer To Section 3.5 – “Heritage and Archaeological Significance” for a description of the heritage items on the site. The proposal preserves these items.

The cultural heritage protected by the re-introduction of elephants to the site.

In conjunction with the Elephant enclosure in the Wild Asia exhibit, this contemporary elephant exhibit provides for a “hands on” animal husbandry approach in contrast with the earlier “hands off” approach. The redundant existing heritage elephant temple will be retained and used as a Zoo museum and interpretive centre.

g) Protection and improvement of unique visual qualities of the Harbour

The design of the proposal seeks to minimise the bulk of the new building within the limitations of functional/safety requirements. The building has been styled to minimise any visual impact when viewed from the harbour and when viewed internally.

Materials and finishes of the building were chosen to be as non-intrusive as possible. The walls of profiled pre-cast concrete will be a dark colour and will be screened by planting where possible. The roof is flat, with planters around the perimeter, with plants encouraged to grow down over the walls.

i) The conservation of items of heritage significance

Refer To Section 3.5 – “Heritage and Archaeological Significance”.

j) Scale and character of the site

The proposal maintains the existing scale of the previous, now-defunct, Elephant exhibit. The Yard is marginally increased in size to meet ARAZPA guidelines for the management of elephants in Australasian Zoos. The new barn has also been designed to meet these standards (minimum requirements) and is of a scale that is considered to be visually sympathetic to the heritage Elephant Temple building as well as when viewed from the harbour.

As an animal "hold", the new building is designed to be as concealed as possible, complying with the UDAS Taronga Zoo Master Plan – Urban Design principles and visual analysis, May 2001.

k) Character of development when viewed from the water

The site for is on a flat area, formed by extending the original exhibit yard with tall concrete retaining walls around the lower sides. There is a dense tree canopy around the southern and western sides obscuring views of the site from the Harbour.

The proposed elephant barn sits to the western side of the site amongst a canopy of existing mature trees that are proposed to be retained for screening purposes.

l) The application of ecologically sustainable principles (ESD)

The Zoo considers itself an educator in areas of sustainability for flora and fauna and seeks to incorporate environmentally sustainable principles into its built projects (Refer to section 4.6 of this submission). Impact on natural systems, topography and vegetation is to be minimised. The design avoids use of building materials with high intrinsic energy costs, such as aluminium and, where possible, PVC, vinyls and other plastics.

Refer to Section 4.6 of this submission.

n) The feasibility and compatibility of different land uses

The proposed land use maintains the current role for the Zoo as a place for exhibiting elephants, and seeks to preserve a balance between the natural bushland setting, a contemporary zoo design, and that of visitor-focussed zoo services and activities.

5.4 SYDNEY REGIONAL ENVIRONMENTAL PLAN 23 - SYDNEY AND MIDDLE HARBOURS AND DEVELOPMENT CONTROL PLAN (SREP 23)

The site is located within W1 General Waterways Zone and the proposal is permissible with consent from the consent authority, being the Minister.

This proposal is "land based development" for the purposes of SREP 23 and complies with the aims, objectives, special provisions and heritage provisions of the plan.

The relevant considerations set out in SREP 23, with which this proposal complies, are as follows:

- The proposal maintains and enhances the important natural and visual attributes of the harbour.
- The proposal is an appropriate and compatible adaptation of the existing site character, which is a Zoo.

Other relevant matters under Clause 8.

a. The proposal will not change the appearance of the site from the waterway and the foreshores. The proposal will enhance the natural character of the Zoo site through the retention of significant trees and through proposed planting works.

b. The proposal will not cause pollution or siltation through the use of erosion and sedimentation control measures used during construction.

c. The proposal will not have adverse effect on wetlands or flora or fauna habitats.

d. The proposal will not give rise to any significant noise impact in the surrounding locality or adjoining waterway. The building contract sets restrictions on the allowable noise produced by any construction machinery or plant.

e. The proposal will not change drainage patterns or cause shoreline erosion.

f. The proposal will not alter patterns of use of the waterway.

g. The proposal will not alter demand for storage space for boats.

All items of heritage significance will be retained in this proposal.

5.5 NSW HERITAGE ACT 1977

State Heritage Register

Taronga Zoo is not presently listed on the State Heritage Register, however as the site clearly meets the relevant criteria the site is to be nominated following completion of the current Masterplan projects. The Heritage Office endorsed a Conservation Strategy, 2002, which provides an integrated, multi-disciplinary framework for the management of the heritage resources at Taronga.

Similarly an Archaeological Management Plan was endorsed by the NSW Heritage Office in January 2004 as a document to provide management principles and implementation strategies for the site's Aboriginal and historical archaeological resources. Together with the accompanying Heritage Impact Assessment, these documents form the basis for the assessment of potential impacts arsing from the subject proposal on the identified significance of individual heritage items and the site as a whole.

Section 170 Heritage and Conservation Register

The proposal involves development in the vicinity of a number of Section 170 heritage items; however it does not involve the removal of any item from the register; transfer of ownership; or the demolition of any identified heritage item, requiring notice to be given to the heritage Council of NSW.

Archaeological Relics

The Heritage Act 1977 affords statutory protection to 'relics' that from part of archaeological deposits. Sections 139-145 of the Act prevent excavation of a relic, except in accordance with a gazetted exemption or an excavation permit issued by the Heritage Council of NSW.

There are two known potential historical archaeological features within the subject area, the 1916 Ladies Lavatory (AF 12) and original perimeter visitor pathway around the elephant yard (AF32). The site is also adjacent to a former Kiosk 1943 (AF6).

In accordance with the management processes in the endorsed Archaeological Management Plan an application for an Excavation Permit will be made to the NSW Heritage Office prior to disturbance of the ground.

5.6 MOSMAN LOCAL ENVIRONMENTAL PLAN

Development consent is not required by Mosman Council, unless the works affect certain individual heritage items listed in Schedule 2 of the MLEP. This project is subject to the provisions of State Planning Policy (Major Projects) 2005, part 3A of the Environmental Planning & Assessment Act 1979. Within part 3A of the act, Schedule 2 nominates – specified sites (clause 6) which lists Taronga Zoo as a specified site. (No 11) - The estimated capital investment value of the project is more than $5million None of those listed items is included in this precinct or in any way affected by this proposal.

In general, the proposal meets each of the stated objectives of the plan in terms of:

- providing business which encourages local employment opportunities;
- encouraging recreational opportunities for residents of Mosman;
- improving the services on community lands;
- enhancing and protecting the scenic foreshore amenity;
- minimising pollution of all types;
- management of waste materials in accordance with ESD principles.

6 ASSESSMENT OF IMPACT

6.1 PARKING AND TRAFFIC

Local parking and traffic conditions will not be affected by this proposal. During construction, truck movements will be restricted to use of major roads only, and during normal construction hours only, to minimise impact on neighbours, consistent with industry practice. (Refer to Section 4.7 Construction Strategy and Timing).

All Zoo related circulation is maintained within the site and has no impact on surrounding residences or land uses.

Foreshore access to the public is not affected by the proposal.

6.2 ACOUSTIC ENVIRONMENT

The physical location of the site in the centre of the Zoo and nature of the proposed animal activity will confine all operational noise to within the boundaries of the Zoo. This proposal will not have any impact on local environment acoustics outside the confines of the Zoos boundary. Elephant occupation and associated operational noise have been carried out on this site for almost 90 years.

The acoustic environment within the locality will remain unchanged. Precautions will be taken to minimise noise during construction (refer to Section 4.7).

6.3 VISUAL IMPACT STUDY

Views to the Zoo:

The lower eastern portion of the north-south ridge (East Gully and corniche) has been identified as an important north to south view corridor with high visual exposure as viewed from the Harbour. It has been identified that significant views of the harbour are obtained above the upper seal pools and from near the floral clock. (UDAS Taronga Zoo Master Plan – Urban Design principles and visual analysis, May 2001).

Relevant Built Form Guidelines

- Retaining the central line of the gully as a wide and well defined view corridor. Built form is discouraged within the line of the corridor so that continuous north south views can be achieved.

- Ensure that the gully retains its role in providing key open spaces and natural amphitheatres with views through to the harbour beyond.

Figure 2.5.6 from the UDAS Master Plan is reproduced below, with the outline of the Bull Elephant Facility superimposed.

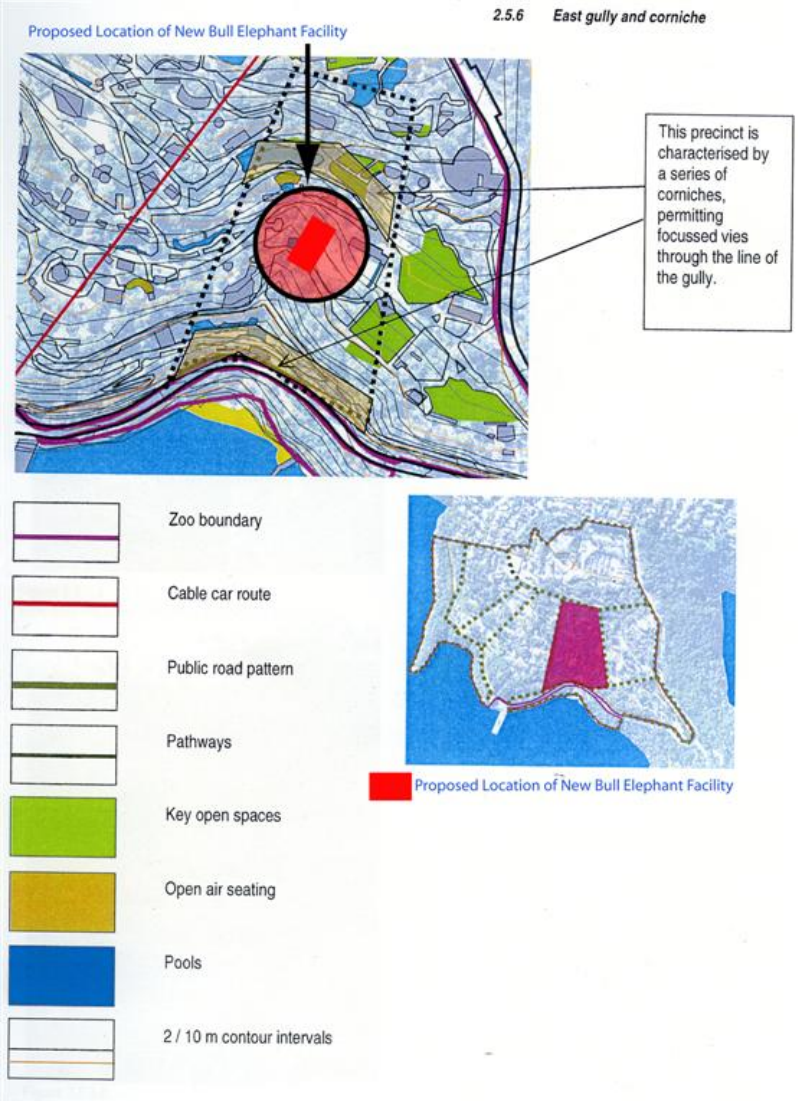


FIG 4 View Corridors (Figure 2.5.6 from the UDAS Master Plan)

The area identified on Figure 2.5.6 shows that the proposed development falls outside of the visually sensitive zones located to the north and south of the precinct. In addition to this the existing gully vegetation to the west, south and north of the exhibit provides a dense landscape curtilage that screens the building. The Elephant barn is the only significant structure to be built in the proposal. By virtue of its necessary size, the structure will have some impact on the on the existing landscape character of the Zoo when viewed internally, however the use of materials and colours will mitigate any visual impact when viewed from the harbour.

Proposed new super advanced palms and fig trees will supplement the existing trees to be retained on site and will substantially add to the dense screening of the building. These trees will not only provide screening but are also required to provide animal and visitor shade amenity.

In addition to the new and existing plantings it is proposed to utilise planting pockets designed into the sides of the building and an extensive roof planter to assist the building blend into its immediate landscape setting. These planters will be planted with dense screening shrubs and climbers that will

grow over the building and soften the edges of the built form. Further softening of the built form will be achieved through the selection of colours and finishes designed to assist the barn blend into the natural landscape setting.

The visual impact when viewed from the Harbour will be minimal. Refer to photomontages attached.

Views A1, A2, B1 and B2

The photomontage views from the Harbour illustrate the existing and proposed impact of development. Only the southern elevation of the new building will be visible when viewed from the Harbour. When viewed from both the Harbour or from vantage points within the Zoo, the proposed landscaping on and around the building will provide a visual and physical link to adjoining precincts.

Views within the Zoo:

Views within the Zoo will only minimally be affected by the development. The steep topography allows views from areas in the northern section of the Zoo to remain over the precinct.

View 1. Tree Tops Café to Hallstrom Square Pines

There is currently a view from Tree Tops Café to the Hallstrom Square Hoop Pines that will be impacted by the new barn development. Only the very tops of the pines will be able to be viewed over the roof of the new barn.

Refer to photomontage No 1 Refer Appendix 4

View 2 Top Seal Pools public Amphitheatre to Harbour

The view from the Top Seal Pools through gully to the Harbour will not be impacted by the proposed new development. Existing trees and palms are retained to screen the proposed building and maintain the densely vegetated character of the east gully.

Refer to photomontage No 2 Refer Appendix 4

View 3 Existing Heritage Temple

The elephant temple is recognised as being one of the most visually significant buildings in the Zoo and the proposed bull elephant facility development intends to preserve this status. The design intent of the proposed barn building and surrounding exhibit elements is to maintain the visual dominance of the architecture of the existing elephant temple in the landscape.

Through ground modelling, finishes and the extensive use of landscape the proposed building is designed to blend into the densely vegetated back drop of the east gully that runs around the western perimeter of the site.

Any views from public viewing areas to the existing heritage elephant temple will not be impacted by the proposed new development.

Refer to photomontage No 3 Refer Appendix 4

Views from the Zoo:

The new barn development is not located in any of the visually sensitive zones outlined on Figure 2.5.6 taken from the UDAS Master Plan (Urban Design Principles and Visual Analysis document, May 2001). The existing flat paddock area of the elephant exhibit falls in between these zones ensuring that the proposed design heights and mass of the building remains below existing view lines.

There are no public viewing opportunities to the harbour from vantage points in this exhibit, due to the existing Elephant Temple and animal access areas only (Exhibit area) which will remain in place.

6.4 HERITAGE IMPACT

As discussed in Section 3.5, the proposal reinstates the site's continuous association with the display of elephants since the Zoo's opening in 1916.

While it is most desirable that historic items continue to be utilised for the purposes they were designed for, it is recognised that the current ARAZPA elephant management guidelines and OH& S requirements prevent the ongoing use of the Indian Elephant Temple and Yard as an enclosure suitable for exhibiting elephants.

The adaptive reuse of the Indian Elephant Temple as a public interpretation centre will have minimal physical impact on the fabric of the heritage item and will provide the public with a unique opportunity to compare the development of zoological design since Taronga's opening. To some extent it also continues its historic function.

The potential impacts have been mitigated by the incorporation of the following design actions:

- The use of colour and vegetation to reduce visual impact on internal views and views of the site from the harbour;

- Location of the built form away from the Temple in order to retain the visual dominance of the Temple building in key views from Taronga Boulevard;

- Retention of mature landscape elements; and complimentary planter boxes and planting pockets integrated into the built form

- Management of the potential archaeological resources within the subject site, in accordance with the conditions of an Excavation Permit (subject to NSW Heritage Council approval), of the ground disturbance.

6.5 OTHER IMPACTS

The site is centrally located within the boundaries of the Zoo and is more than 300 metres from the nearest residential boundary.

Neither the proposed building nor the Yard will be seen by neighbouring residences and there will be no overlooking of neighbouring residences from them. Therefore, there will be no loss of privacy or increased overshadowing onto any other property. There will be no increased overshadowing of other areas within the Zoo from the precinct.

The Sydney Harbour National Park on Bradley's Head is the only other neighbouring land that will have views to the Precinct. These views are over Athol Bay. There will be no visual impact from these vantage points.

7 CONCLUSION

The proposed new Bull Elephant Facility is an appropriate adaptation of use for the site considering the site's continuous association with the exhibition of elephants since the Zoo's opening in 1916.

The proposed new Bull Elephant Facility development has taken into account the site, character and surrounding Zoo environment. The project is a sympathetic response which reflects the Zoo's responsibilities to maintain its natural environment for visitors in the Zoo as well as for the public viewing of the Zoo site from the foreshores and harbour. The siting, scale, mass and quality of all elements within the proposed development have been a considered response to the Zoo's natural and cultural setting and are consistent with the vision and principles proposed in the UDAS Taronga Zoo Master Plan – Urban Design principles and visual analysis document of May 2001

The planting strategy and overall scale and quality of the development will ensure that all built forms are successfully integrated into the existing densely landscaped environment as well as complimenting the architecture of existing elephant temple.

The proposal ensures that the Zoo is on track to meet its commitment to the findings and conditions of the Administrative Appeals Tribunal (AAT) decision handed down on 6 February 2006, which required the ZPB to construct a new "Bull" holding facility for the juvenile bull (Gung). The ZPB is committed to building the "bull" holding facility, ready for occupation and operation by the end of 2008 which is the subject of this application. The new bull facility is designed to comply with all current ARAZPA (Australasian Regional Association of Zoological Parks and Aquaria) guidelines for elephant management in Australasian Zoos and meets the requirements of modern animal husbandry practices. The proposal will ultimately provide greatly enhanced behavioural enrichment opportunities for the animals to be exhibited, as well as providing a unique experience for visitors to Taronga Zoo.

The proposal meets the objectives of the relevant planning and statutory controls that govern development on the Taronga Zoo site will comply with the ZPBs (DPI) Legislative requirements under the EAPA (act) administered by the NSW Department of Primary Industries.

APPENDIX 1: HERITAGE IMPACT STATEMENT

THE ZOOLOGICAL PARKS BOARD OF NSW

TARONGA ZOO

BULL ELEPHANT FACILITY
PADDOCK & BARN

HERITAGE IMPACT STATEMENT

PLANNING NSW (NOVEMBER 2006)

PRELIMINARY ASSESSMENT (MAJOR PROJECT APPLICATION)



TABLE OF CONTENTS

1. INTRODUCTION 3

2. BACKGROUND TO THE SUBJECT DEVELOPMENT PRECINCT 6

3. DEVELOPMENT PROPOSAL 12

4. HERITAGE IMPACT ASSESSMENT 15

5. MITIGATIVE MEASURES 18

6. CONCLUSION 20

1. Introduction

1.1 Preamble

This Heritage Impact Statement has been prepared by the CWI Division for the Zoological Parks Board of New South Wales (ZPB), to accompany a Statement of Environmental Effects for the Major Project's Application for the Bull Elephant Facility at Taronga Zoo, Mosman.

The Taronga Zoo site as a whole has been identified as an item of State heritage significance and a number of items within the zoo have been identified as individual heritage items.

This document provides an evaluation of the potential impacts arising from the subject proposal on the heritage values of the individual items in the vicinity of the proposed Bull facility as well as the significance of Taronga Zoo as a whole in accordance with the conservation policies of the Conservation Strategy, July 2002, and the Heart of the Zoo Strategic Heritage Advice, October 2003.



Figure 1.1 View of Temple from the New Guinea Bird Aviaries, to the north of the subject site.

1.2 Background

Master planning

Since the Zoo opened in 1916, the planning of the site has continued to evolve in response to changing zoological philosophies and practices.

Taronga Zoo is currently implementing a redevelopment program for the Zoo based on the Master plan 2000, which provided guidance on the planning, management and design issues for the upgrading of the site as a whole.



Figure 1.2 View across Elephant Yard towards Hallstrom Square.

Heritage and Conservation Planning

The Taronga Zoo Conservation Strategy, endorsed by the NSW Heritage Office was prepared to provide a policy framework for conservation, interpretation, management and use of the site as part of the implementation of the endorsed Master plan.

The ZPB Section 170 Heritage and Conservation Register identifies over one hundred individual heritage items within Taronga Zoo, including items in the vicinity of the proposed development.

The Zoo is identified in the Mosman Heritage Study as a place of State Significance. The only individual heritage item listed on Schedule 2 (Heritage Items) of the Mosman Local Environmental Plan (LEP) 1998, which is in the vicinity of the proposed development, is the Elephant Temple.

The Elephant Temple is also classified by the National Trust of Australia (NSW) and is identified on the Register of Twentieth Century Items of Significance, which is maintained by the Royal Australian Institute of Architects (RAIA).

Elephant Exhibits at Taronga Zoo

The Indian Elephant Temple and Yard were built in 1915, as part of the original infrastructure at the zoo designed by the NSW Government Architect to house Jessie, the female Indian elephant and Moore Park Zoo's most famous exhibit at that time.

At that time, the Zoo's emphasis on the keeping of elephants was for entertainment purposes, with elephant rides a popular highlight of a visit to Taronga (a feature which continued until 1978).

The Elephant Temple and Yard remained largely as built until 1986, when the zoo's emphasis shifted towards the breeding and conservation of elephants. At this time modifications were made to the Temple and Yard, with a substantial tripling of the paddock area, requiring the remodelling of the original Yard and incorporation of adjoining open space to the west of the exhibit.

As part of the implementation of the Master plan 2000 a new Wild Asia exhibit was opened in late 2005, to the west of the original Indian Temple and Yard, and within the area of the original elephant walk. Wild Asia features state-of-the-art facilities for housing four female and one juvenile male Asian elephants, forming part of an Australasian breeding herd.

The proposed new bull holding facility is to be constructed within the confines of the old Elephant enclosure, as an integral part of the breeding program for Asian Elephants.

The facility is required to manage the new bull elephant "Gung" when he reaches maturity and will need to be separated from the four female elephants. The new facility will be designed as a non-contact facility that can hold 1 x adult male, 1 x juvenile male and 1 x visiting female elephant.

The requirement for a separate facility for the male elephants has been identified in the import application to the Department of Environment and Heritage (DEH) and is a condition of approval from the Administrative Appeals Tribunal (AAT) hearing. The new bull facility also complies with all current ARAZPA (Australasian Regional Association of Zoological Parks and Aquaria) guidelines for elephant management in Australasian Zoos.



Figure 1.3 View from Taronga Boulevard towards proposed site for the Holding Facility.

1.3 Study Area

Taronga Zoo is located on Sydney Harbour's northern foreshore at the head of Athol Bay. The land is under the ownership of the Zoological Parks Board of New South Wales and is within the municipality of Mosman.

The Elephant Temple is located within the central gully of the site, just to the east of the Zoo's centre.

The study area for this report includes the existing Elephant Temple and Yard, incorporating the original, smaller Yard and is bounded by Taronga Boulevard to the north, the concert lawns to the south, the Tree Tops Café to the east and the Crocodile and Gibbon exhibits to the west.

1.4 Methodology

This HIS has been prepared consistent with the Conservation Strategy recommendation:

A Heritage Impact Statement (HIS) should be prepared for all new developments at Taronga Zoo to identify potential impacts on items in the vicinity, views, setting, original pathway layout,

landscape and built elements, archaeology and the site as a whole.

Previous Reports
A number of previous reports for the Zoo have been used as the basis for the assessment of the proposed impacts on the heritage values of the place, including:

- Section 170 Heritage and Conservation Register, April 1998, prepared by the Heritage Group of the New South Wales Department of Public Works and Services;
- Taronga Zoo Conservation Strategy, July 2002, prepared by Godden Mackay Logan, endorsed by the NSW Heritage Office;
- Taronga Zoo Archaeological Management Plan, November 2002, prepared by Godden Mackay Logan, endorsed by the NSW Heritage Office; and
- Taronga Zoo Heart of the Zoo Precinct, Strategic Heritage Advice, October 2003, prepared by Godden Mackay Logan.



Figure 1.4 Elephant Temple and Yard.

Section 2.0 of this report provides a background to the cultural landscape, significance and conservation policies relating to the subject development area.

The proposed development of the Gung Facility is described in Section 3.0.

Section 4.0 assesses the heritage impacts on the items in the vicinity and on the Zoo as a whole.

The Mitigative Measures and Conclusion are in Sections 5.0 and 6.0.

The methodology is based on the guidelines contained in the *NSW Heritage Manual* (DUAP and the Heritage Council of NSW, 1996) and the principles contained in the *Burra Charter* of Australia ICOMOS. .



Figure 1.5 The front facade of the Elephant Temple, from Taronga Boulevard.

1.5 Author Identification and Acknowledgements
This report has been prepared by the Capital Works and Infrastructure (CWI) Division of Taronga Zoo.

The personnel involved in the project and their major roles were:

Duncan Mitchell, Senior Project Manager reviewed the report; and Jannene Smith, Senior Project Manager, Heritage Specialist, prepared the report.

1.6 Terminology
The terminology used within this report is consistent with the NSW Heritage Manual and the definitions contained in the Burra Charter of Australia ICOMOS. Throughout this report, the terms *place, cultural significance, fabric, conservation, maintenance, preservation, restoration, reconstruction, adaptation* and *compatible use* are used in accordance with the definitions of the Burra Charter.

The reference number identification for heritage items within the Zoo follows the existing terminology established in the Section 170 Register, Conservation Strategy and AMP.

2. Background to the Subject Development Precinct

2.1 Preamble

The Conservation Strategy identified five key phases of historical development at Taronga Zoo since its initial construction began in 1913.

The key periods and a brief discussion of the work undertaken within the subject development precinct during those periods are described below.

Phase One: Initial Construction 1913-1916 (Designer Albert le Souef)

During this period the basic infrastructure of the Zoo was constructed, including the pathways, New Guinea Bird Aviaries and the Indian Elephant Temple and Yard.

In planning the Zoo, the designer, Albert Le Souef was inspired by the Hagenbeck Zoo in Germany, the most modern zoo at that time. Taronga was designed around the concept of a bar-less zoo, with enclosures for the animals constructed in the most open plan possible, generally with a surrounding concrete wall and moat

Designed and built by the Public Works Department the Indian Elephant Temple and original Yard remain as one of the earliest animal enclosures at Taronga Zoo.

A Ladies Retiring Room was also constructed in 1916 to the west of the original Elephant Yard area. This building was a timber-framed and weatherboard lined structure.

Phase Two: Consolidation 1916-1940 (Superintendent Albert le Souef)

No substantial works were undertaken within the subject area during this time.

Phase Three: The Hallstrom Era 1941-1967

The Temple underwent some changes including the replacement of the original parapet wall with the current decorative tiling and the construction of concrete bollards to ensure the elephants could not enter the perimeter moat.

A concrete wall was also added to the south side of the original aviaries as a protective measure for the birds.

Phase Four: Restructure 1968-1986

No further works within the subject development area were undertaken during this period.

Phase Five: Planning for the New Millennium 1987-Present

As part of the evolution in the way elephants were exhibited at Taronga, the original Yard was modified, by almost trebling its size.

Additional keeper and public safety measures, such as hydraulic doors and additional bollards and an extension to the exterior perimeter wall, were also added to the Temple.

The Ladies Retiring Room was demolished as part of the extension of the yard.

Original pathway around the moat was either removed or buried also as part of the Yard extension.



Figure 2.1 1916 view of Temple and original Yard configuration.



Figure 2.2 1916 view of Temple and original Yard featuring the round elephant bath.

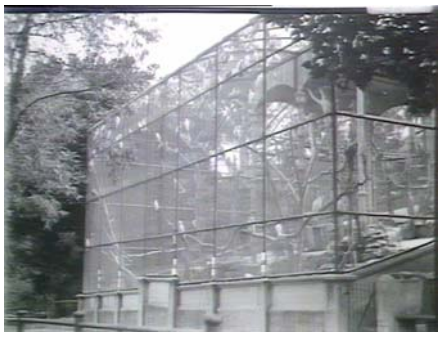


Figure 2.3 Early view of the New Guinea Bird Aviary prior to the construction of the southern concrete wall.

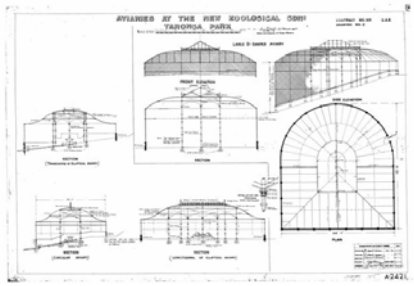


Figure 2.4 Original architectural documentation of the New Guinea Bird Aviaries.

Existing Cultural Landscape Values
As stated in the Conservation Strategy *The cultural landscape of Taronga Zoo reflects the evolution of particular cultural values, norms and attitudes towards both landscape design and the display of animals*.

A discussion of the cultural landscape components within the subject development site are outlined below.

The Natural Landforms
The narrow, linear sandstone terraces of the site determined much of the Zoo's layout and the evolution of 'movement pathways' across it.

Taronga Boulevard was designed as a major east-west pedestrian circulation pathway across the site.

The natural ground levels of the Yard and the area immediately to its west were significantly built up to increase the yard's size in 1987, providing a significant increase in the flat paddock area for the elephants. This work resulted in a five metre high retaining wall along southern boundary of yard.

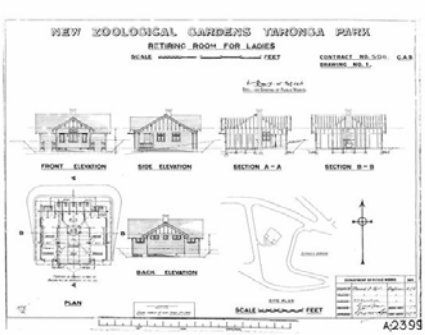


Figure 2.5 Original architectural documentation of the Ladies retiring Room.

The Gibbon enclosure, that has been in continuous use as a water feature since the establishment of the Zoo, remains as one of a number of existing water features within the Zoo located in line with the site's natural watercourse and evidencing the former creek line.

Views
Views within the site constitute an important part of the visitors' perceptual experience and create vistas across the site providing orientation for visitors.

One such view, in the vicinity of the subject development site, includes the view from the east of the Elephant Yard looking west towards the mature hoop pines at Hallstrom Square.

Buildings
The Indian Elephant Temple is the only major building in the vicinity of the subject development area. The Temple and Yard functioned continuously from the establishment of the Zoo until 2005 as the area for exhibiting elephants.

The Edwardian Baroque design of the Temple building is typical of the original architectural style of the place and is a significant component of the overall built environment of the place.

The dome of the Temple also acts as a landmark physically locating the Zoo site from across the Harbour.

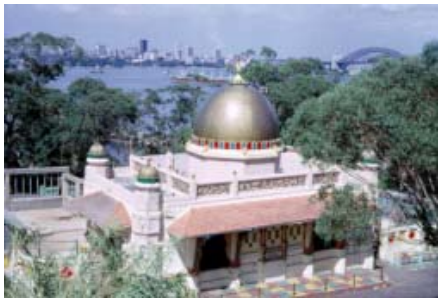


Figure 2.6 1967 view of the Temple and Yard.

Animal Enclosures and Aviaries
Since the opening of Taronga the focus of animal collections has gone from a menagerie, where the animals were displayed primarily for the amusement of visitors, to a focus on the animals' well being, to the more recent educational approach.

The New Guinea Bird Aviaries are surviving examples that demonstrate the attempt to present birds and their cages as an aesthetic whole.

Botanic Estate
Of particular importance to the cultural landscape of the Zoo is the botanic estate of ornamental, native and functional vegetation, which establishes the 'natural' visual appearance of the place, particularly when viewed from the harbour.

Significance of Taronga Zoo

Taronga Zoo is a significant place for the state of New South Wales. The primary significance of Taronga Zoo lies in its unique and powerful cultural landscape; the place's ability to evidence the evolution of zoological approaches throughout the twentieth century at Taronga zoo and in an international context; its continuity of use as a zoo of world-standing; its historic associations with earlier zoos in Australia and Carl Hagenbeck's zoo in Germany; and the iconic sense of place it has for the people of NSW and Sydney in particular.

The significance of Taronga Zoo as a whole is articulated in the Conservation Strategy as follows:

> *Taronga Zoo is a place of national significance as an urban zoo with unique physical and associative attributes, including links with early modern zoo philosophy, a unique and powerful cultural landscape and a wide range of landscape elements, architectural styles and enclosure designs evidencing the development of zoos in Australia.*
> *Features that contribute to Taronga's cultural landscape include the steeply sloping topography of the site; its location on the northern foreshore of Sydney harbour; the exploitation of the natural stone landforms and complimentary faux rock formations; the circulation layout and associated staircase and seating; the exotic and grand built elements used for public buildings and animal enclosures; the native and introduced vegetation on the site, the internal visual corridors within the site and expansive views from the site across Sydney Harbour to the city skyline.*
> *The original fabric at Taronga demonstrates the earliest example in Australia of Carl Hagenbeck's and early twentieth-century European zoological philosophies. In the differing design and approaches to the animal enclosures and aviaries, Taronga also evidences key aspects of international zoological philosophy that have influenced the Zoo's development throughout the twentieth century.*
> *As an educational, entertainment and recreational facility, Taronga is a highly revered institution within Sydney's social fabric, evoking memories across generations of visitors. The Zoo is also an important keystone in distinguishing Sydney's sense of place. For the zoological community, Taronga is internationally recognised as a leading centre of biodiversity conservation and for the Zoo's educational focus.*
> *Taronga's archaeological resource has some potential to provide information about the Aboriginal community, the early use of the site as a quarantine station and the development of the zoo. In combination, the extensive archive collection, built structures, landscape features and archaeological features at Taronga have great potential for research and community education.*



Figure 2.7 Hallstrom period alterations to the original moat included the addition of concrete bollards.



Figure 2.8 1989 view of the modified Yard and newly refurbished Elephant precinct.

Elements of Significance in the Vicinity of the Male Elephant Facility

In addition to the overall values of the Zoo as a whole, there are specific values attached to individual elements, which are recognised in the Section 170 Heritage and Conservation Register and the Conservation Strategy.

The Section 170 Register items in the vicinity of the proposed development area are:

Indian Elephant Temple:

The Statement of Significance for the Indian Elephant Temple (Item 21B) states:

The Elephant Temple is one of the earliest structures built in the Zoo and is still in used for its original function. It is of historical association with 'Jessie', the famous female Indian elephant, and to some extent shed light upon the architectural style of the principal buildings built at the Zoo then.

It demonstrates an unusual diversion of the designers from the contemporary zoo philosophy to imitate an animals' natural surroundings but instead to illustrate the built surroundings found in the animals country of origin. It is part of the Taronga Zoo's unique complex of highly individual structures. It is an economical adaptation of a grand style showing interesting Indian features and is of landmark quality.

Elephant Yard:

The Statement of Significance for the Elephant Yard (Item 23L) states:

As the enclosure is one of the oldest elements on the site, it has historical significance, although the actual fabric – apart from the Elephant Temple itself – is more recent.

New Guinea Bird Aviaries:

The Statement of Significance for the New Guinea Bird Aviaries (Item 19B)

The New Guinea Bird Aviaries are among the earliest structures built on site prior to Taronga zoo's opening. Its continuous usage is associated the historical development of the Zoo. The aviaries exhibit interesting and typical early detailing and are fine examples of aviaries built during that period. These aviaries, together with the Nicobar Aviary, display an oriental influence.

Panelled Concrete Wall:

The Statement of Significance for the Panelled Concrete Wall opposite the Elephant Enclosure (Item 20L)

This wall has historical significance for its association with the Hallstrom period of the Zoo's development when priority was made for the welfare of the animals by protecting them from southerly winds by the use of concrete walls.

Additional items

Additional items in the vicinity of the subject development area are:

Gibbon Exhibit (Item 118B), recognised as an area, which has been continuously used as a water feature within the Zoo since 1916.

Original Circulation Layout (Item 99L), which includes the section of Taronga Boulevard to the north of the subject development site, which is recognised as an integral part of the original site's layout.

Archaeological Potential
The survival of archaeological remains at Taronga Zoo is difficult to predict. The Taronga Zoo Archaeological Management Plan, November 2002, provides a detailed discussion of the nature and likelihood of archaeological features.

The AMP identified the following potential Historical Archaeological features, which define evidence of the development of the Zoo, as likely to have survived within the vicinity of the development area:

Archaeological Feature 6 Kiosk 1943 (AF6)
This Kiosk appears on guide maps in 1943.

Archaeological Feature 12 (AF12)
Original Ladies retiring Room built in 1916, likely to have been demolished sometime between 1943 (when it last appeared in guidebooks) and 1986 (when the site was remodelled to incorporate the increased elephant Yard.

Archaeological Feature 32 (AF6)
Original pathway around the Elephant Yard. This feature was utilised as a pathway from 1916 to 1987, after which the original Yard was enlarged to include the existing paddock area.

Significance of Archaeological Features
The archaeological resources identified have the potential to yield information that will contribute to an understanding of the twentieth century development of the Taronga Zoo site. This includes information on the evolution and changing zoological practices of the Zoo itself. They also provide interpretation opportunities for explaining the history of the development of the Zoo to visitors.

Operational and Zoological Requirements of the Zoo
The challenge for the ZPB is to achieve a balance between cultural heritage conservation objectives and the requirements for the physical well being of the animals and their keepers and visitor expectations, to support the economic well being of the Zoo.

The upgrading of Taronga Zoo is consistent with its historical values as a place that was considered a state of the art zoological park at the time of its construction.

Elephants/Keepers
The Tribunal has set specific goals and criteria regarding the importation of the elephants to Taronga Zoo.

The new facility also needs to comply with all current ARAZPA (Australasian Regional Association of Zoological Parks and Aquaria) guidelines for elephant management in Australasian Zoos.

While it is most desirable that the original use of the Indian Elephant Temple as an elephant house be retained, it has been recognised that the size and configuration of this exhibit prevents its ongoing use as an elephant enclosure, thus creating a redundant resource.

The Yard, in its current configuration, also requires modifications in order to meet minimum standards for the exhibiting of elephants.

Physical Assets
The design of the elephant enclosure, aviaries and Gibbon exhibit are a legacy of a changing zoological ideology and

approach.

Botanic Estate
Besides providing an overall aesthetic visual character and amenity to the site, the landscaping at the Zoo provides a level of complexity within the exhibit to stimulate the exploratory and territorial behaviour of the elephants.

Heritage Statutory Context
NSW Heritage Act 1977
State Heritage Register

Taronga Zoo is not presently listed on the State Heritage Register, however as the site clearly meets the relevant criteria the site is to be nominated following completion of the current Master plan projects. The Heritage Office endorsed a Conservation Strategy, 2002, which provides an integrated, multi-disciplinary framework for the management of the heritage resources at Taronga.

Similarly an Archaeological Management Plan was endorsed by the NSW Heritage Office in January 2004 as a document to provide management principles and implementation strategies for the site's Aboriginal and historical archaeological resources. Together with the subject Heritage Impact Assessment, these documents form the basis for the assessment of potential impacts arsing from the subject proposal on the identified significance of individual heritage items and the site as a whole.

Section 170 Heritage and Conservation Register
The proposal involves development in the vicinity of a number of Section 170 heritage items; however it does not involve the removal of any item from the register; transfer of ownership; or the demolition of any identified heritage item, requiring notice to be given to the Heritage Council of NSW.

Archaeological Relics
The Heritage Act 1977 affords statutory protection to 'relics' that from part of archaeological deposits. Sections 139-145 of the Act prevent excavation of a relic, except in accordance with a gazetted exemption or an excavation permit issued by the Heritage Council of NSW.

There are two known potential historical archaeological features within the subject area, the 1916 Ladies Retiring Room (AF 12) and the original perimeter visitor pathway around the elephant yard (AF32).

The site is also adjacent to a former Kiosk 1943 (AF6).

In accordance with the management processes in the endorsed Archaeological Management Plan an application for an Excavation Permit will be made to the NSW Heritage Office prior to disturbance of the ground.

MOSMAN LOCAL ENVIRONMENTAL PLAN

Only a small number of individual items within Taronga Zoo are identified as Items of Environmental Heritage on Schedule 2 of the Mosman LEP, including the Indian Elephant Temple, which is in the vicinity of the proposed development.

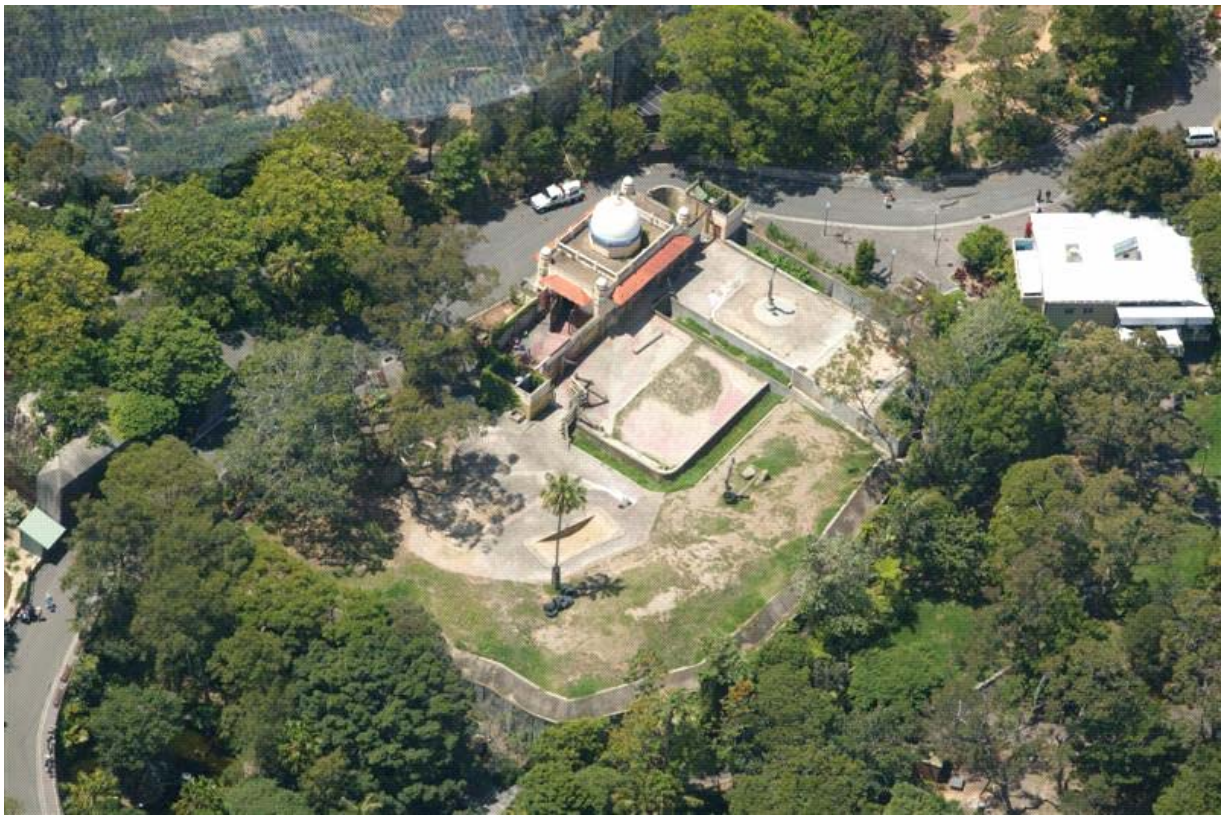


Figure 2.9 Aerial view of the existing elephant temple and old Elephant Exhibit, November 2005. The configuration of the original moat can be seen within the extended elephant Yard.

3. Development Proposal

3.1 Introduction

The proposed bull elephant holding facilities will be an integral part of Taronga Zoo's Regional Asian Elephant breeding program and are required as part of the AAT decision handed down in February 2006 to complement the newly constructed elephant breeding facilities located in the "Wild Asia" precinct.

The facility comprises a Barn (night house) and adjacent external paddock and yard. The documentation relating to the Statement of Environmental Effects for the Major Projects Application has been prepared by Jackson Teece, Architects.

The outcome has been the end product of an ongoing process of consultation between Godden Mackay Logan, Taronga Zoo CWI Senior Project Manager and CWI Heritage Specialist and the project's architects.

The Statement of Environmental Effects for the Major Projects Application documentation has also been informed and guided by the conservation planning processes of the Taronga Zoo Conservation Strategy, the Taronga Zoo Archaeological Management Plan and the Taronga Zoo, Heart of the Zoo Strategic Heritage Advice report.

These conservation processes have worked together to minimise potential adverse impacts on the heritage values of the individual items in the vicinity of the development as well as on the Zoo as a whole, by providing specific heritage input into to the design with the aim of achieving the best outcome, in heritage terms while having regard for relevant constraints, such as the requirement to address the importation regulations.

3.2 Major Projects Application Documentation

This HIS is based on the following Major Projects Application documentation for the Male Elephant Facility, prepared by Jackson Teece Architects:

- DA-01 Site location
- DA-02 Site Survey

- DA-03 Site Plan
- DA-04 Barn Plan + Roof Plan
- DA-05 Elevations
- DA-06 Sections
- DA-07 Proposed & Existing Trees
- Montage View towards Hallstrom Square.
- View from harbour A1.
- View from harbour A2.
- View from harbour B1.
- View from harbour B2.

3.3 Key Major Projects Application Components
The proposal for the new male Elephant Facility at the original Elephant Temple and Yard site involves the following main components:

- Retention of the area's continuous association with the display of elephants since the Zoo's opening in 1916;
- Retention of all heritage items in the vicinity;
- Conservation and adaptive reuse of the Indian Elephant Temple, identified as having Exceptional significance;
- Modifications to the existing Elephant Yard (extended and modified previously in 1987), identified as having High significance;
- Retention of the existing New Guinea Bird Aviaries, identified as having Exceptional significance;
- Retention of the concrete wall to the aviaries, identified a shaving Some significance;
- Retention of the landmark qualities of the Temple and its dome within the Zoo and along Taronga Boulevard;
- Retention of the existing original; pathway layout, identified as having Exceptional significance;
- Loss of existing view looking west across yard to Hallstrom Square pines;
- Erection of a new male elephant holding barn, to the west of the subject development site;
- Retention of existing landscaping and introduction of new mature plantings within the subject development area; and
- Ground disturbance relating to the construction of the Elephant Holding facility and modifications to the Yard.

3.4 Proposed Works

Elephant Temple (Item 21B)
The Indian Elephant Temple has been recently refurbished, including waterproofing the roof; render repairs and a new colour scheme. The Temple is now open to the public and is used as an interpretation space, telling the story of Taronga's elephants and the zoological evolution of their display at Taronga.

This adaptive reuse did not require any physical works to the original fabric other than essential maintenance.

No further specific works are proposed to the Temple as part of the current proposal.

Elephant Yard (Item 23L)
Modifications to the existing Yard, including the already modified original Yard and 1987 enlarged yard area will be undertaken.

Proposed new super advanced palms and fig trees will supplement the existing trees to be retained on site and will substantially add to the dense screening of the building. These trees will not only provide screening but are also required to provide animal and visitor shade amenity.

New Elephant Holding Facility
The proposed new holding barn is a single storey building located along the western perimeter of the site, adjacent to the Gibbon and Crocodile exhibits. The new barn is proposed to be constructed of facetted precast concrete slab walls that are designed with planting pockets to evoke a stylized landform set in the landscape. The pre-cast concrete slabs will be angled and coated with an applied finish that is coloured to assist the building to blend into the landscape. Differing colour shades and textured finishes on the buildings external surface will be designed to mimic the shadows of the proposed mature palm trees that will be planted along the eastern side of the building in the elephant exhibit. The angled concrete slabs that form the building's walls will be designed with ventilation penetrations so that natural airflow through the building can be controlled. These penetrations will be able to be opened and closed

so that staff can regulate the temperature of the building for animal welfare and husbandry purposes.

New Guinea Bird Aviaries and Concrete Wall (Item 19B and 20L)

No works are proposed to these items.

Gibbon Exhibit (Item 118B)

The east boundary of the Gibbon Exhibit will be utilised for part of the current Bull Facility building. Works will not include any modification to the exiting water feature within the exhibit.

Original Pathway Layout, including Taronga Boulevard (Item 99L)

Taronga Boulevard will remain in its existing layout. No works are proposed for this pedestrian pathway.

4. Heritage Impact Assessment

4.1 Heritage Impact Assessment

The following report section provides an assessment and evaluation of the heritage impacts of the described development proposal on the heritage significance of the zoo as a whole, the individual heritage items and archaeological potential within the subject area.

A discussion of measures that may be taken to reduce negative impacts and/or recommendations for additional actions that could assist in mitigating assessed impacts is in the following section.



Figure 4.1 The Elephant Temple in its setting along Taronga Boulevard.



Figure 4.2 The Elephant Temple in its setting from the Harbour.

4.2 Impacts of Proposal on Cultural Landscape

Natural Landforms

The proposal includes some modifications to the existing Yard area, however these changes will have no impact on the overall existing landform of the subject area.

Views

The built form of the Holding facility will impact on the western view of the top of the pines at Hallstrom Square.

The proposal will not impact on the existing views of the Temple from along Taronga Boulevard.

The new development will not impact on the existing views to the temple dome form the Harbour.

Buildings

The new holding facility has been located to the west boundary of the subject area providing the maximum distance between the new development and the exiting built form of the Temple building.

Animal Enclosures and Aviaries

The proposal does not impact on any of the existing New Guinea Bird Aviaries.

A small area of the Gibbon Exhibit, along its eastern boundary will be used as part of the new holding facility building, however, there are no works proposed to the central water feature within the Gibbon Exhibit.

Botanic Estate

No heritage items associated with the significant botanic estate will be affected by the proposal.

4.3 Evaluation of Heritage Impacts

The following design features have been incorporated into the new Bull Holding Facility to mitigate any potential impacts arising from its necessary size and bulk:

- Natural colours and mature vegetation have been used to reduce the visual impact on internal views and views of the site from the harbour;
- Location of the built form away from the Temple in order to retain the visual dominance of the Temple building in key views from Taronga Boulevard;
- Retention of mature landscape elements; and complimentary planter boxes and planting pockets integrated into the built form of the holding facility; and
- Management of the potential archaeological resources

within the subject site, in accordance with the conditions of an Excavation Permit (subject to NSW Heritage Council approval), of the ground disturbance.

Evaluation of Positive Impacts

The implementation of the proposal will ensure the retention of the area's historic association with the display of elephants at Taronga Zoo. This association is an important part of the visitors' experience of the Zoo and of the collective long-term social memory of Taronga.

The proposal retains all items of significance in the vicinity of the development area.

The retention of the Temple as a public interpretation space will ensure an appreciation of the heritage value's associated with the evolution of the display of elephants.

The location of the new holding facility, the choice of materials and the use of landscaping will ensure the new built element is recessive and that the landmark values of the Temple and its dome are retained, both from views within the Zoo and from the Harbour.

The modification to the Yard, in its current configuration, will ensure that the original moat fabric is buried and retained.

Evaluation of Negative Impacts

The proposal will result in the loss of one identified view across the gully to Hallstrom Square.

The scale, size and height of the new holding facility have been designed to ensure the bulk of the building has been kept to its minimum dimensions in order to meet animal, keeper and public welfare conditions, while also minimising any potential impact on the heritage items in the vicinity arising from a change to their setting.

While it is inevitable that the setting of the heritage items in the vicinity of the new facility will be modified, the choice of materials, landscaping and siting of the new works has ensured that any potential impact has been minimised.

4.4 Impact of Proposal on Potential Archaeological Features

The proposed scheme would require excavation of the existing ground surfaces within the Elephant Yard to various depths.

As the subject area is unlikely to contain any Aboriginal archaeological material, these works would have no impact on Aboriginal archaeological resources.

The development area has the potential to contain historical archaeological evidence associated with the development of the Zoo, which if discovered would require their destruction.

The opportunity to investigate and record these remains in conjunction with the proposed works would reduce the impact of any required destruction of these remains.

4.5 Summary of Heritage Impacts of Proposed Male Elephant Facility

The proposal for the new Male Elephant Holding Facility importantly retains the area's historic association with the display of elephants at Taronga.

While necessarily large, the new built holding facility has been designed to the minimum size requirements and the choice of materials, colour and landscaping will assist in blending the new development into the landscape.

While the siting of the building along the most western boundary of the Yard will have some impact, albeit minor on the Gibbon exhibit, the location ensures any visual impact on the Elephant temple is kept to a minimum in order to retain the visual dominance of this significant architectural element within the Zoo.

While there will be a loss of view across the gully from the Yard to Hallstrom Square, views along Taronga Boulevard have been retained and views of the Temple dome from the Harbour will also be retained. (Refer to the photomontage documentation).

5. Mitigative Measures



5.1 Preamble

The Male Elephant Holding Facility represents an integral part of Taronga's Asian Elephant breeding program and the implementation of the elephant husbandry requirements in accordance with the ARAZPA guidelines for the management of elephants in Australasian zoos.

The area in the vicinity of the new facility contains a number of early animal enclosures and items identified in the Zoo's Section 170 Heritage and Conservation Register. Therefore, the proposed scheme, although not making any direct physical impact on individual heritage items, has the potential to impact on the setting of these items and the Zoo as a whole.



5.2 General Mitigative Measures

The following general recommendations are made in relation to mitigative actions associated with the proposed development.

Conservation Advice

Appropriate conservation advice should be available throughout the works program. This should include availability for response to unforseen circumstances that may arise during construction.

Archival Recording

The history of the site is well documented and extensive material is available. However, as the Zoo's current Master plan implementation represents an important stage in the evolution of approach to animal exhibit design at Taronga, a record has already been made of the subject area in its current condition.

Additional recording should be made during the works, paying attention to individual heritage items, their respective settings and views to and from the subject development area.

Archaeology

Approval from the Heritage Council of NSW under Section 140 of the *Heritage Act 1977* (NSW) would be required to undertake proposed excavation works within the exiting Elephant Yard. An Archaeological Research Design report, outlining the proposed methodology and research framework for the proposed investigation of the site, in accordance with the policies and recommendations outlined in the Taronga Zoo AMP, is required as part of the permit application.

Archaeological Research Design

Suitable clauses should be included in all site contractor and subcontractor contracts to ensure that on-site personnel are aware of their obligations and requirements in relation to the *Heritage Act 1977* (NSW).

Specifically, relevant on-site personnel should be made aware of the procedure to be followed for notification and stopping works should items of heritage significance be found during site works.

Unexpected Remains

In the event of unexpected historical archaeological relics are encountered during site works, works will cease immediately and the NSW Heritage Office notified, pursuant to Section 146 of the Heritage Act 1977 (NSW).

Interpretation
An important obligation arising from the historic significance of Taronga Zoo is that its cultural heritage values should be interpreted, on site, to the visiting public.

Interpretive media explaining the historic zoological development of the display of elephants at Taronga has already been placed within the original Temple elephant barns.

In the medium to long-term, the opportunity exists to also use this historic space for the display of the Zoo archives' collection of movable heritage items and other stories of the Zoo's evolution over the past century.

Removal of Intrusive Elements
The opportunity exists for the removal of the current intrusive elements in the vicinity of the development site, including the intrusive pool fencing along Taronga Boulevard and obsolete signage and replacement with new barriers, which are more consistent with the heritage values of the Temple.

Protection of Heritage Items during Works
Adequate signage should be erected in the vicinity of the subject heritage items alerting contractors and subcontractors to their existence and fragile nature.

6. Conclusion



The proposed development of the Male Elephant Facility within the original elephant precinct at Taronga Zoo maintains the area's important association with the display of elephants, retaining the site's historic framework of significant elements and ensuring the aesthetic, historic and social context of Taronga Zoo is maintained as a whole.

The use of the redundant Indian Elephant Temple as a publicly accessible interpretation centre provides the opportunity to increase public understanding and appreciation of the cultural heritage values of the individual item as well as a background to the zoological evolution and historic changes at Taronga Zoo as a whole.

Overall, the proposal satisfies the objectives of the Conservation Strategy and Archaeological Management Plan and does not have any negative impacts arising from its implementation on the heritage values of the individual items or the place as a whole while facilitating Taronga's obligations as a breeding centre for Australia's Asian elephant herd.

APPENDIX 2

DRAWING LIST

ARCHITECTURAL

DA-00 COVER SHEET
DA-01 SITE LOCATION
DA-02 SITE SURVEY
DA-02A TEMPLE PHOTOGRAPHS
DA-03 SITE PLAN
DA-04 BARN PLAN + ROOF PLAN
DA-05 ELEVATIONS
DA-06 SECTIONS
DA-07 PROPOSED AND EXISTING TREES



THE ZOOLOGICAL PARKS BOARD OF NSW

TARONGA ZOO

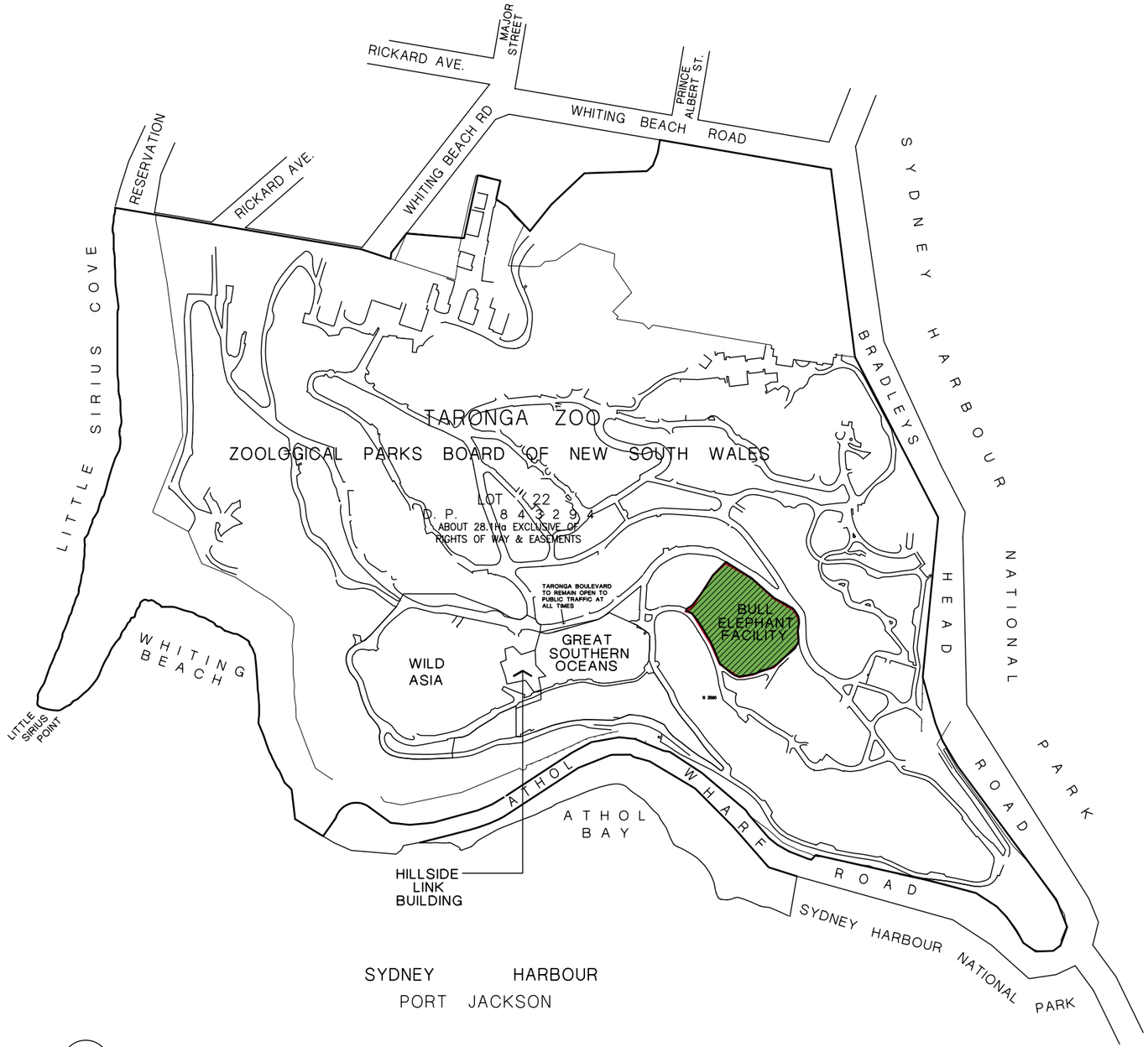
BULL ELEPHANT FACILITY
PADDOCK & BARN

NOVEMBER 2006



PRELIMINARY ASSESSMENT (MAJOR PROJECT APPLICATION)

JACKSON TEECE



1 / - SITE LOCATION
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TARONGA ZOO

CLIENT
TARONGA ZOO CAPITAL WORKS & INFRASTRUCTURE
02 99784 666

PROJECT
MALE ELEPHANT HOLDING FACILITY
TARONGA ZOO MOSMAN

DRAWING TITLE
SITE LOCATION

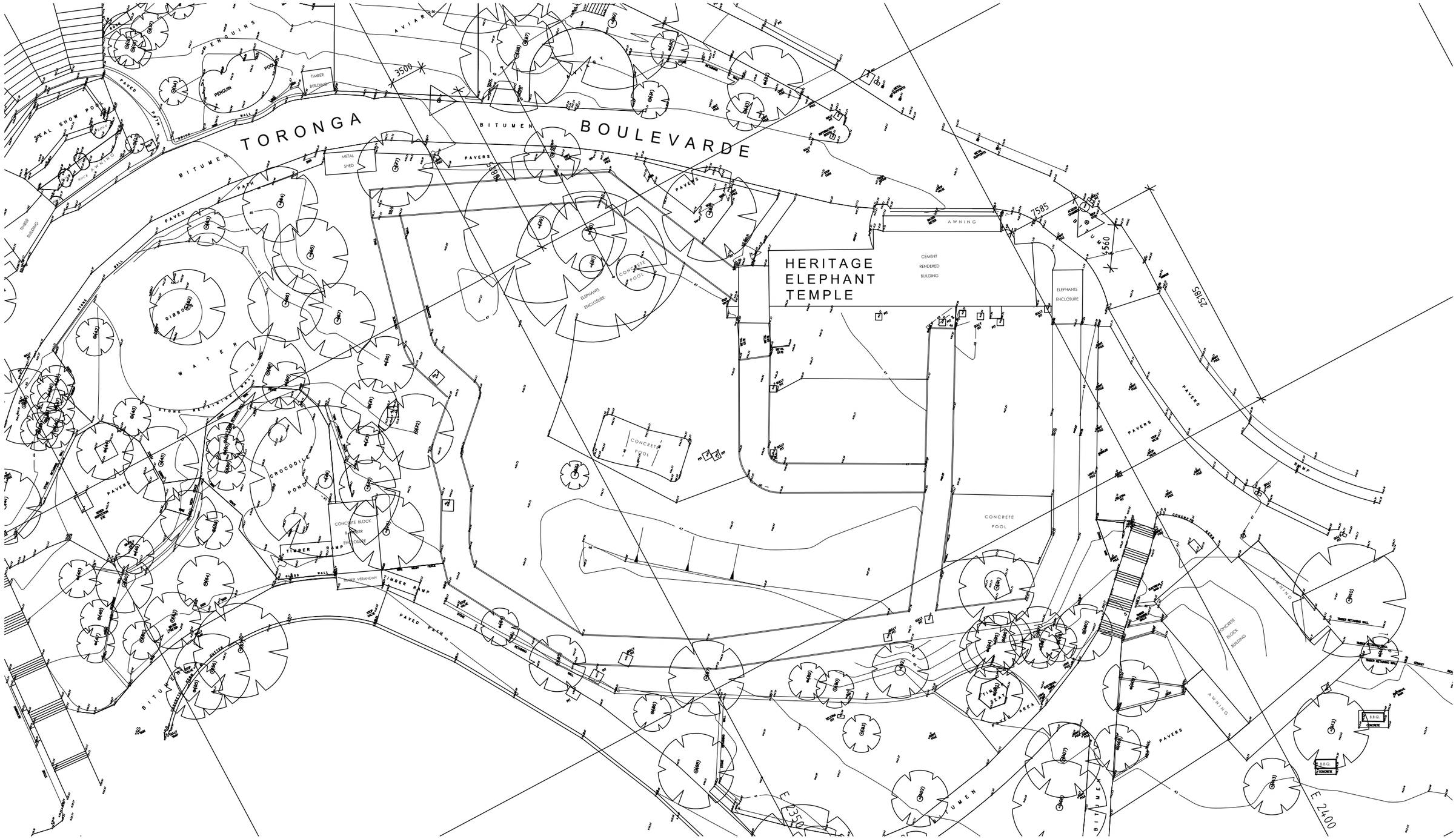
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2005197	**DA-01**	**A**

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PROJECT
MALE ELEPHANT HOLDING FACILITY
TARONGA ZOO MOSMAN

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SITE SURVEY
By CRAIG & RHODES SURVEYORS

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PROJECT NUMBER	DRAWING NUMBER	ISSUE
2005197	DA-02	A

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VIEW NORTH OF PADOCK TO ASIAN TEMPLE



VIEW WEST ALONG TARONGA BOULEVARDE TO ASIAN TEMPLE

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PROJECT
MALE ELEPHANT HOLDING FACILITY
TARONGA ZOO MOSMAN

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VIEWS

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AREAS SCHEDULE :

BARN		
GROSS AREA		450 m2
PEN		70 m2
PEN 2		70 m2
EXCLUDES		
EXERCISE SHELTER (PEN 3)		70 m2
EXHIBIT PADDOCK (S)	2040 m2	
INCLUDES POOL 1	52 m2	
INCLUDES HATCHED	120 m2	
EXERCISE YARD		500 m2
INCLUDES POOL 2	52 m2	
INCLUDES SHELTER	70 m2	

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PROJECT
MALE ELEPHANT HOLDING FACILITY
TARONGA ZOO MOSMAN

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SITE PLAN

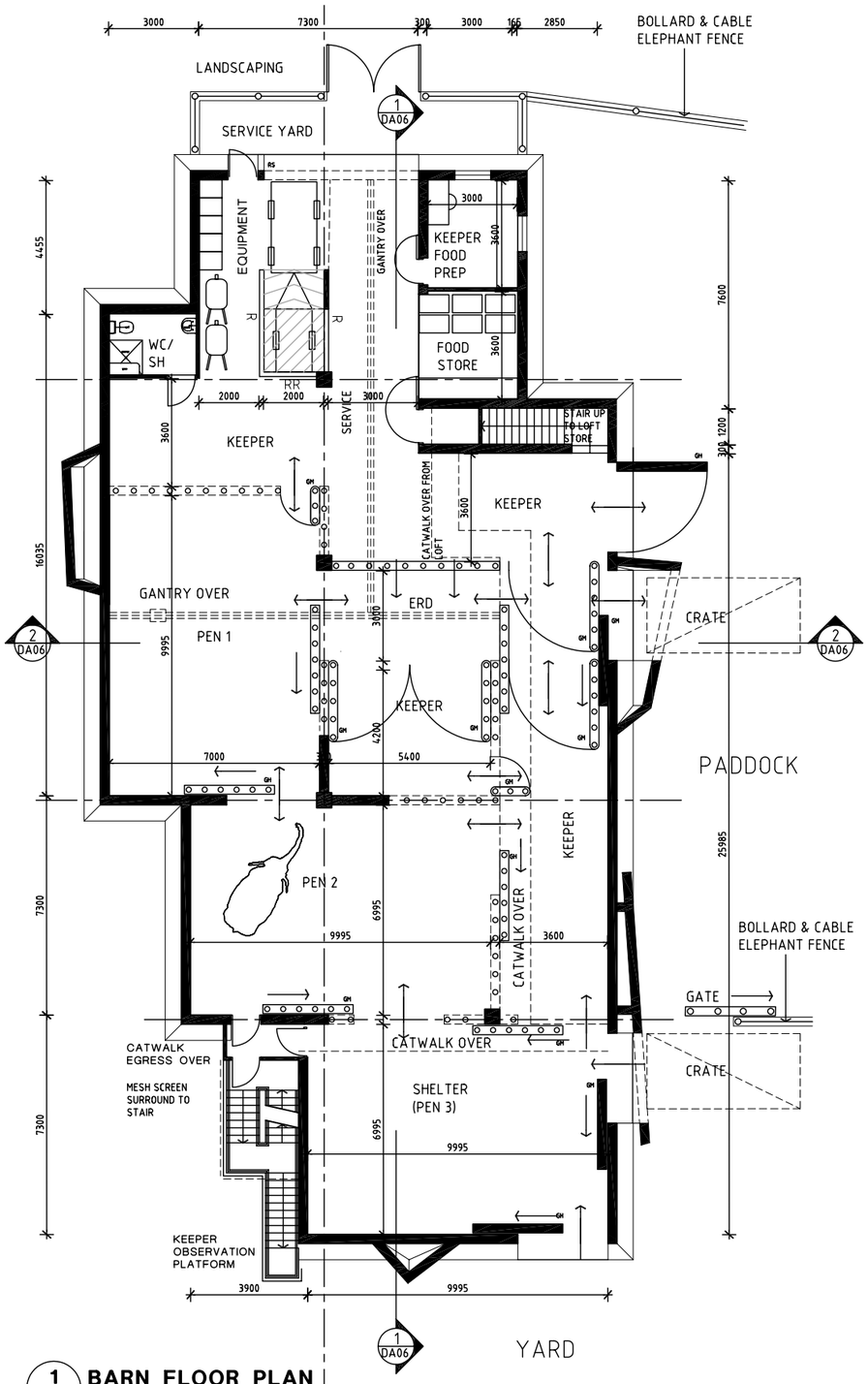
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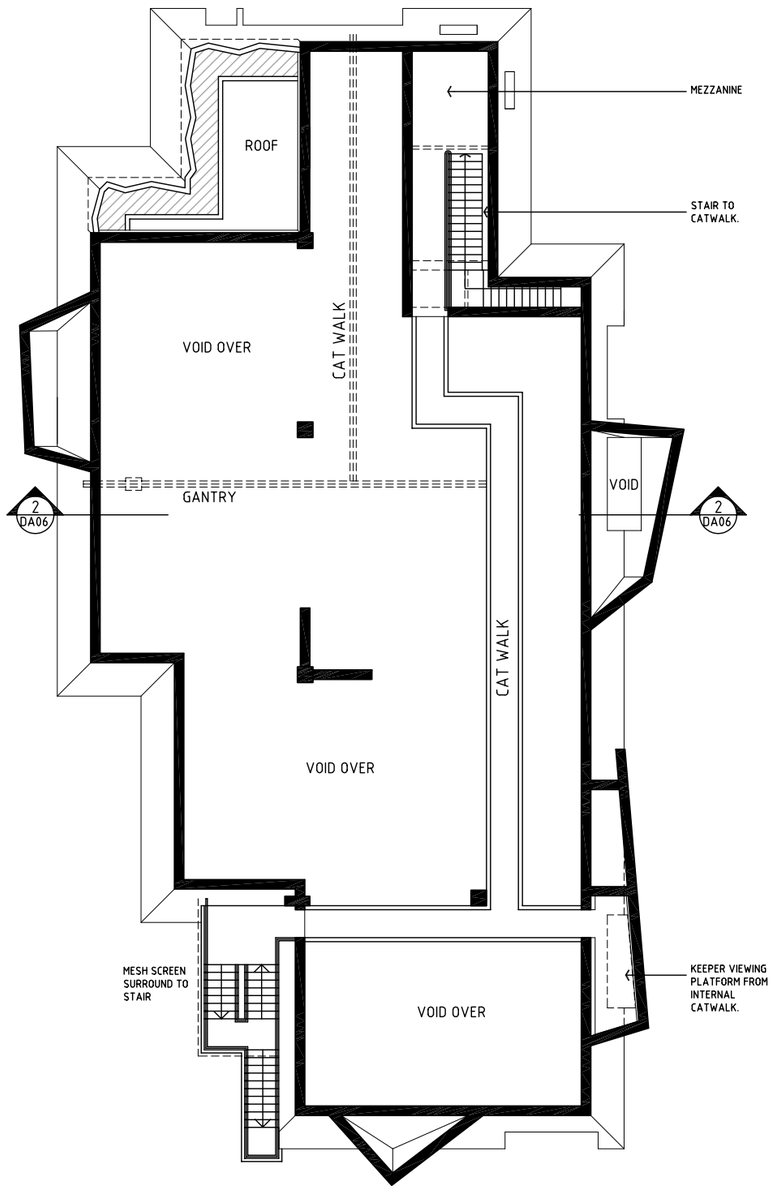
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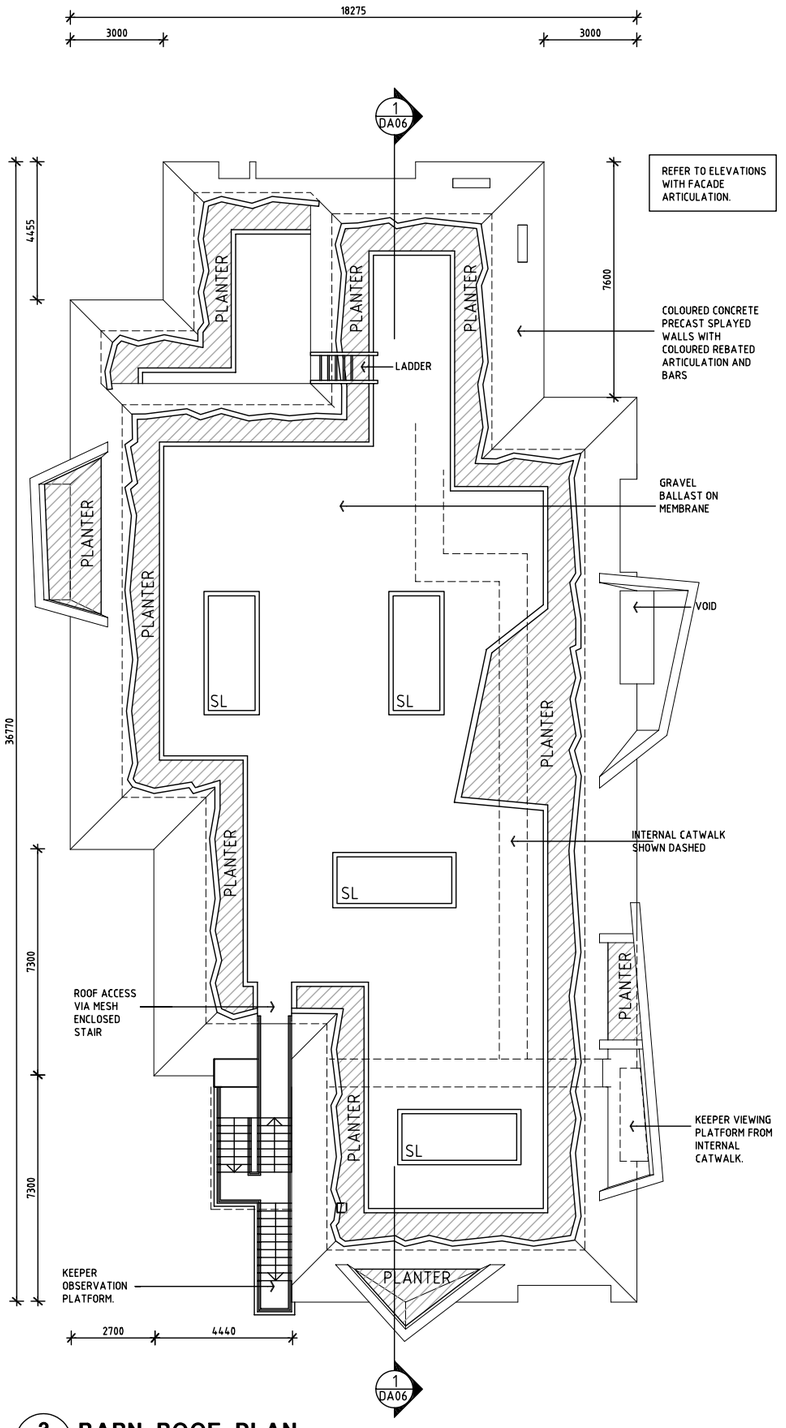
Jackson Teece Chesterman Willis Pty Ltd trading as Jackson Teece
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Nominated Architect Ian Brodie (4275)



1 BARN FLOOR PLAN
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2 BARN MEZZANINE PLAN
SCALE 1:100@A1



3 BARN ROOF PLAN
SCALE 1:100@A1

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B			
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GH HYDRAULIC GATE
GM MANUAL GATE
RS ROLLER SHUTTER
SL SKYLIGHT

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TARONGA ZOO

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TARONGA ZOO CAPITAL WORKS & INFRASTRUCTURE
02 99784 666

PROJECT
MALE ELEPHANT HOLDING FACILITY
TARONGA ZOO MOSMAN

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BARN PLAN & ROOF PLAN

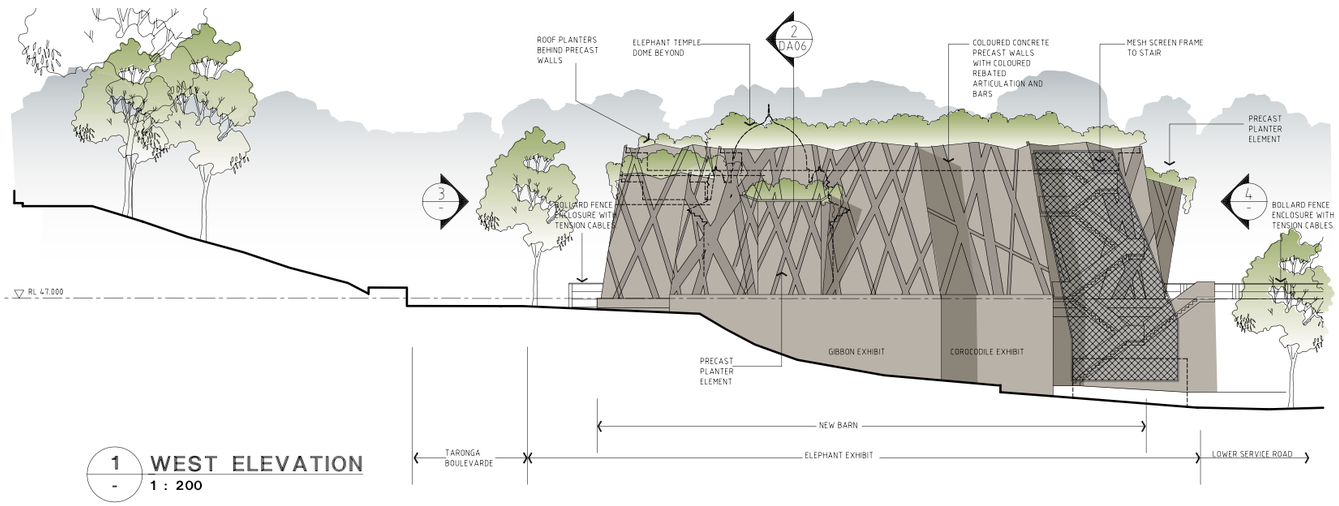
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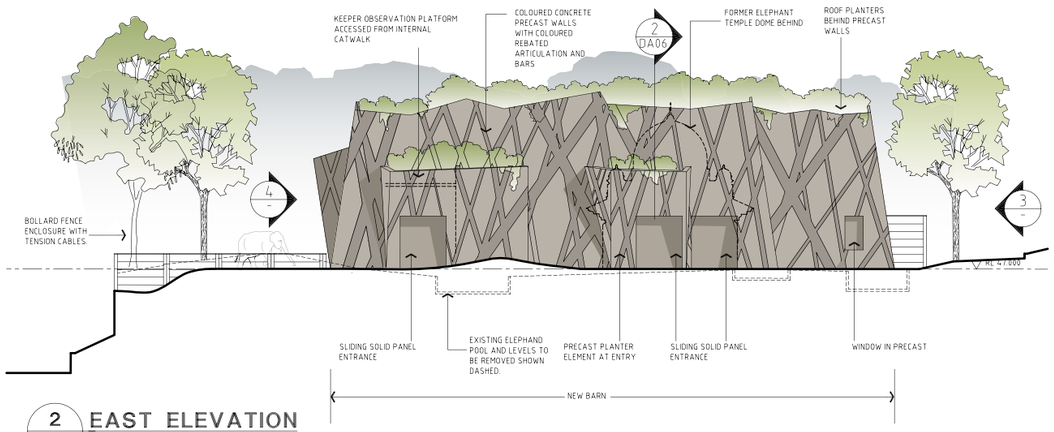
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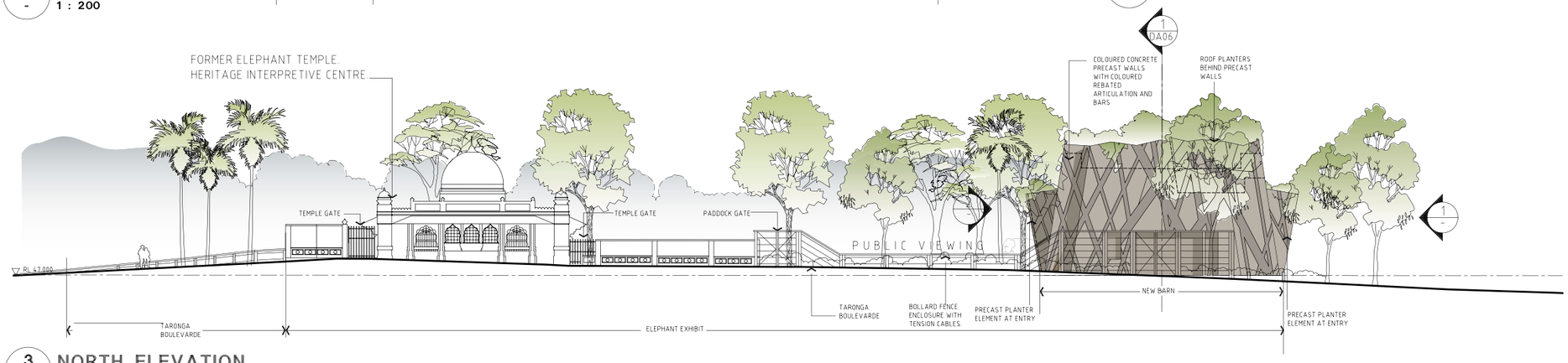
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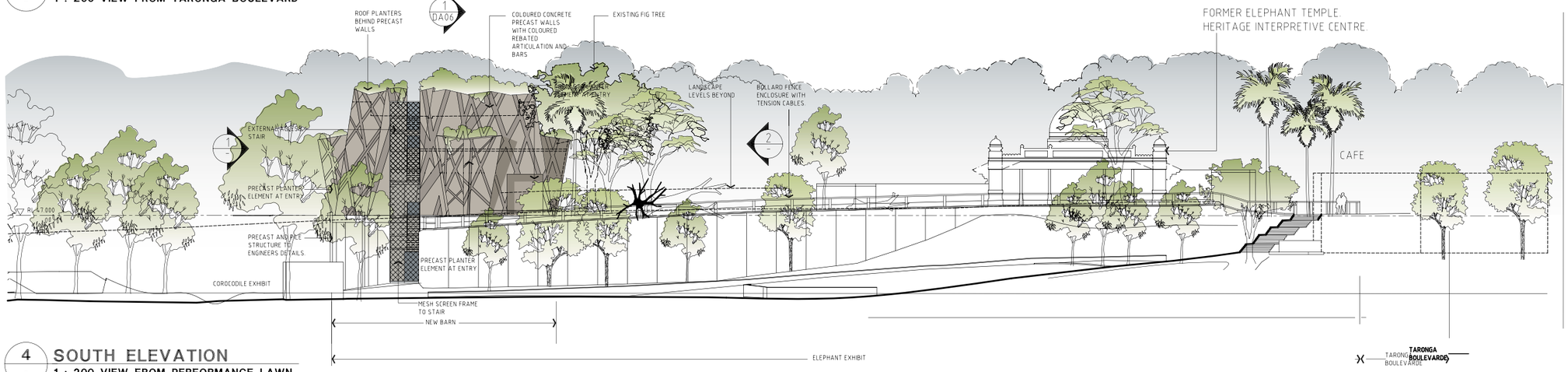
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2 - **EAST ELEVATION**
1 : 200



3 - **NORTH ELEVATION**
1 : 200 VIEW FROM TARONGA BOULEVARD



4 - **SOUTH ELEVATION**
1 : 200 VIEW FROM PERFORMANCE LAWN

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TARONGA ZOO

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02 99784 666

PROJECT
MALE ELEPHANT HOLDING FACILITY
TARONGA ZOO MOSMAN

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ELEVATIONS

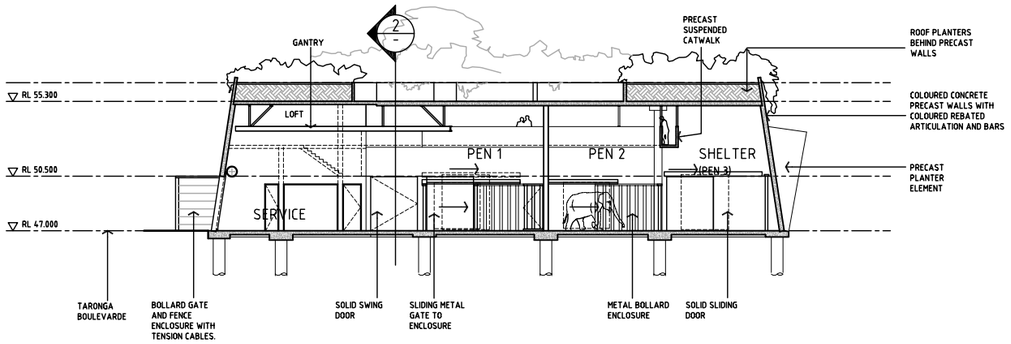
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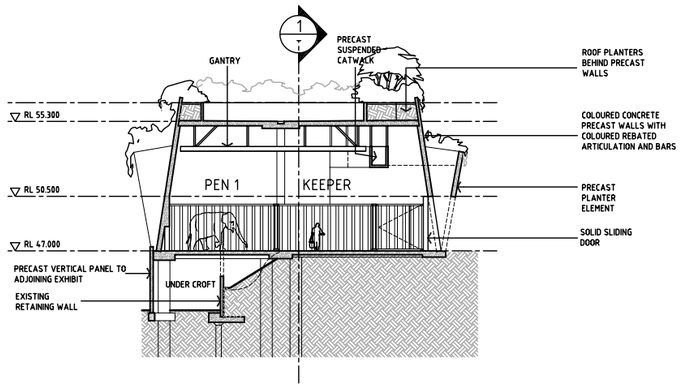
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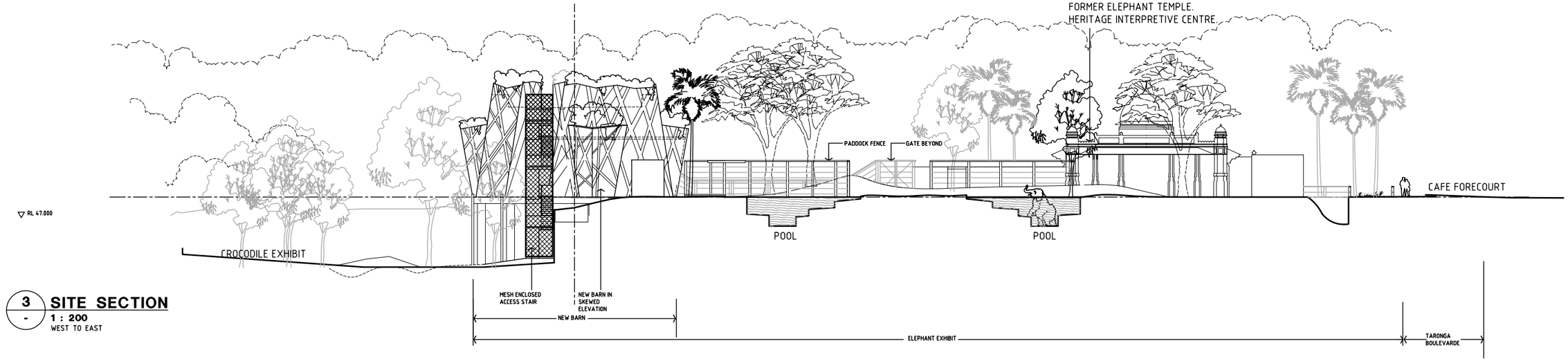
Jackson Teece Chesterman Willis Pty Ltd trading as Jackson Teece
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Nominated Architect Ian Brodie (4275)



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2 - SECTION 2
1 : 200



3 - SITE SECTION
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WEST TO EAST

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TARONGA ZOO

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TARONGA ZOO CAPITAL WORKS & INFRASTRUCTURE
02 99784 666

PROJECT
MALE ELEPHANT HOLDING FACILITY
TARONGA ZOO MOSMAN

DRAWING TITLE
SECTIONS

DATE	SCALE @ A1	DRAWN
NOVEMBER 2005	1:200	MA/CDS
PROJECT NUMBER	**DRAWING NUMBER**	**ISSUE**
2005195	**DA-06**	**A**

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Tree Schedule

Tree No	Botanical Name	Common Name	Height	Canopy Spread	Condition	Retained / Removed
1A	Eucalyptus Saligna	Blue gum	25m	15m	Good	Retained
1B	Ficus rubiginosa	Port Jackson Fig	25m	20m	Good	Retained
1C	Schefflera actinophylla	Umbrella Tree	12m	5m	Good	Retained
1D	Lophostemon conferta	Brush Box	15m	10m	Good	Retained
1E	Casuarina cunninghamiana	She oak	30m	10m	Good	Retained
1F	Casuarina cunninghamiana	She oak	30m	10m	Good	Retained
1G	Toona australis	Australian red cedar	30m	10m	Good	Retained
1H	Casuarina cunninghamiana	She oak	30m	10m	Good	Retained
1I	Brachychiton acerifolium	Illawarra Flame tree	12m	8m	Good	Removed
1J	Syzygium paniculatum	Lilly Pilly	15m	10m	Good	Removed
1K	Toona australis	Australian red cedar	20m	12m	Good	Removed
1L	Eucalyptus Saligna	Blue Gum	20m	6m	Good	Retained
1M	Syncarpia glomulifera	Turpentine	25m	18m	Good	Retained
1N	Ficus rubiginosa	Port Jackson Fig	30m	25m	Good	Retained
1O	Tree spp	Tree spp	12m	8m	Poor	Retained
1P	Eucalyptus Saligna	Blue gum	15m	8m	Good	Retained
1Q	Livistonia Australis	Cabbage Palm	25m	4m	Good	Relocated



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ISSUE NO.	DESCRIPTION	APPROVED	DATE
A	ISSUE FOR DA	TW	03-11-2006
B			
C			
D			
E			
F			
G			
H			
I			
J			
K			

TARONGA ZOO

CLIENT
TARONGA ZOO CAPITAL WORKS & INFRASTRUCTURE
02 99784 666

PROJECT
MALE ELEPHANT HOLDING FACILITY
TARONGA ZOO MOSMAN

DRAWING TITLE
PROPOSED AND EXISTING TREES
SITE PLAN

DATE	SCALE @ A1	DRAWN
01 FEBRUARY 2006	1:200 (1:400 @ A3)	TW, RH SBW
PROJECT NUMBER	DRAWING NUMBER	ISSUE
2005197	DA-07	A

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TARONGA ZOO
BULL ELEPHANT FACILITY

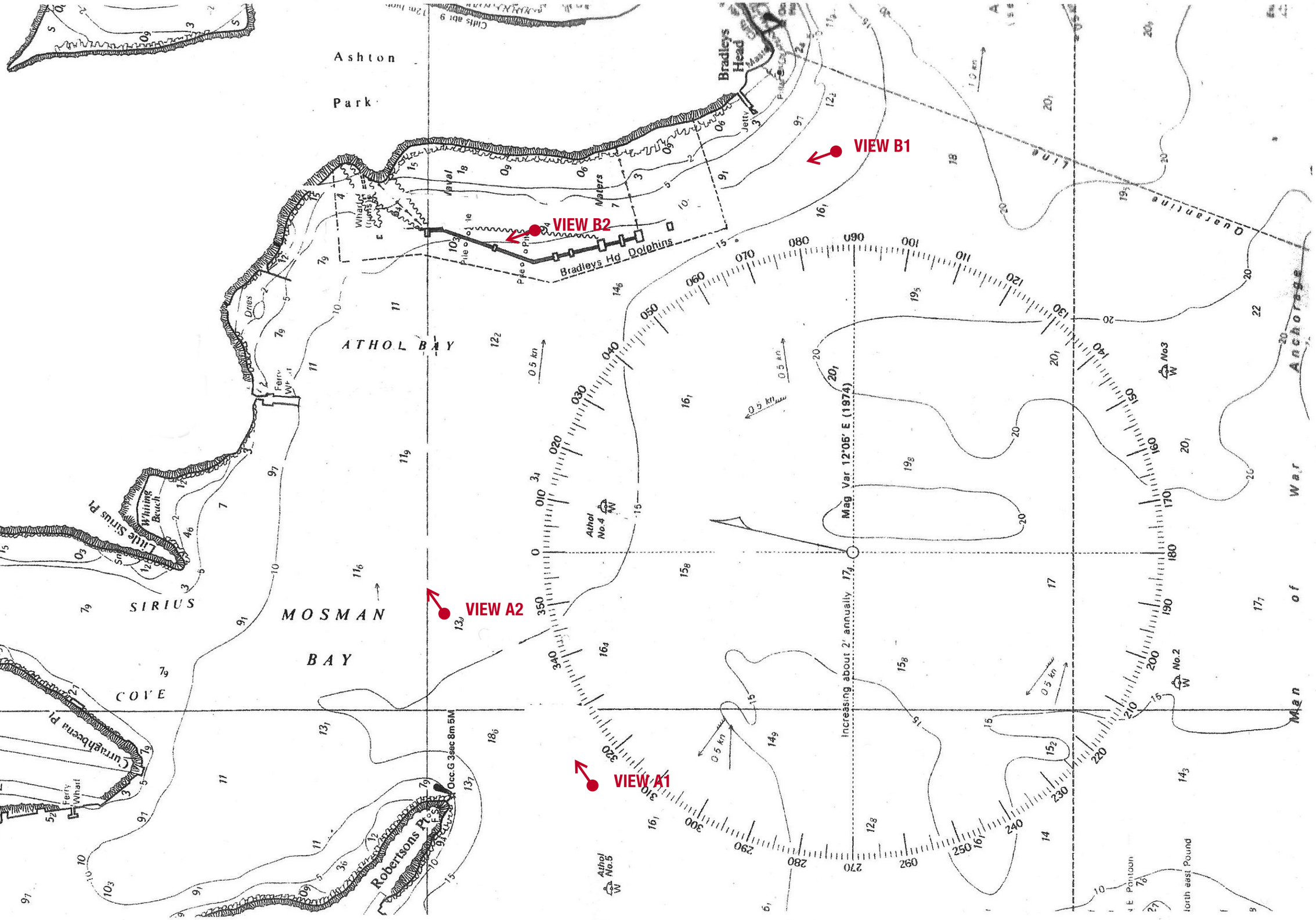
CONCEPT DESIGN SKETCH MASSING MODEL

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APPENDIX 3

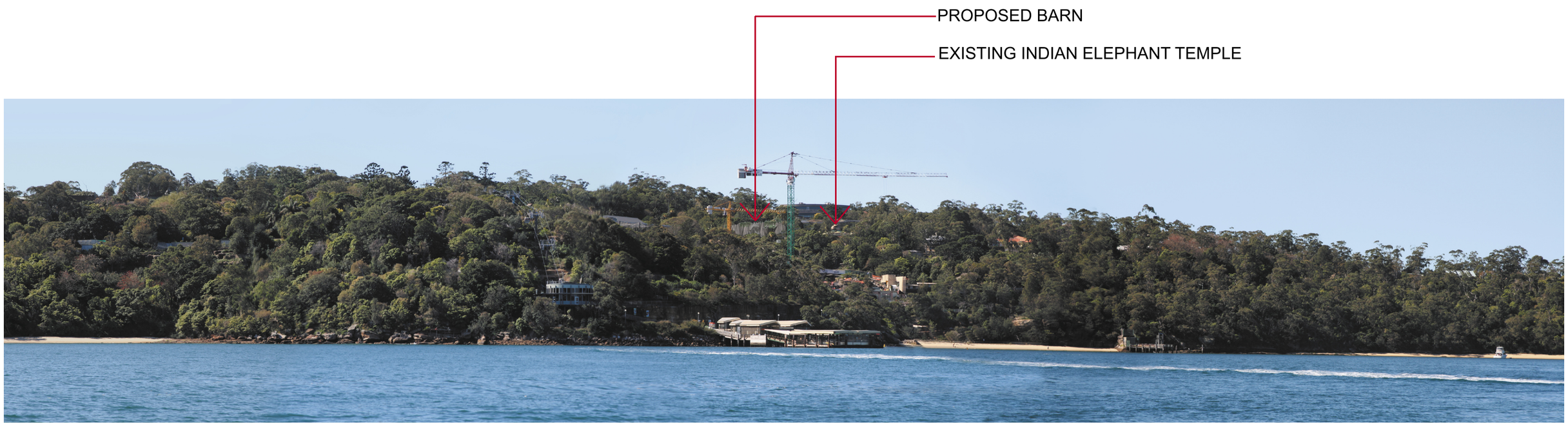
PHOTOMONTAGES

VIEWS FROM THE HARBOUR



TARONGA ZOO
BULL ELEPHANT FACILITY

VIEW POSITIONS FOR PHOTOMONTAGES



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BULL ELEPHANT FACILITY

VIEW A1 FROM HARBOUR

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BULL ELEPHANT FACILITY

VIEW A2 FROM HARBOUR

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BULL ELEPHANT FACILITY

B1 VIEW FROM HARBOUR

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TARONGA ZOO
BULL ELEPHANT FACILITY

B2 VIEW FROM HARBOUR

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APPENDIX 4

PHOTOMONTAGES

VIEWS WITHIN THE ZOO



PHOTOMONTAGE No.1

TARONGA ZOO
BULL ELEPHANT FACILITY

VIEW FROM CAFE FORECOURT TO THE HALLSTROM SQUARE PINES

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PHOTOMONTAGE No.2

TARONGA ZOO
BULL ELEPHANT FACILITY

VIEW FROM TOP OF OLD SEAL THREATRE

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PHOTOMONTAGE No.3

TARONGA ZOO
BULL ELEPHANT FACILITY

VIEW SOUTH WEST ALONG TARONGA BOULEVARD

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