Appendix E

Environmental Assessment Report

Department of Housing and Public Works

Queensland Government

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS

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CONTACT JOSEPH TOON

OUR REF B15016ER010

Clay Target Facility Ministerial Infrastructure Designation Environmental Assessment Report

For Mode Design

TABLE OF CONTENTS

FIGURES

APPENDIX A

APPENDIX B

APPENDIX C

APPENDIX D

APPENDIX E

APPENDIX F

APPENDIX G

APPENDIX H

APPENDIX I

Revision	Date	Description	Author	Verifier	Approver
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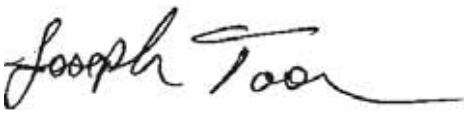

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Position: Division Manager, Environmental

EXECUTIVE SUMMARY

Constructed for the Gold Coast Commonwealth Games, the clay target facility at the Belmont Shooting Complex is now proposed to become a permanent piece of infrastructure through the Ministerial Infrastructure Designation process. As part of this process the plans include completion of the fourth skeet position and an additional four down the line positions. To enable these additional shooting positions to be constructed and allow subsequent proposed management and mitigation activities to be constructed and undertaken, an additional approximate 5.4 ha of vegetation is proposed to be cleared. This includes areas mapped as regional ecosystems (RE), non-remnant vegetation and areas that are partially cleared / scattered vegetation. The cleared areas will allow for best practice isolation and management of lead contamination.

Ecological investigations undertaken within the Infrastructure Designation Area did not identify any conservation significant flora or fauna species. They did however confirm the presence of “Of Concern“ and “Endangered” regional ecosystems (RE) within the Infrastructure Designation Area.

The direct impacts associated with the construction and use of the facility are associated with both the construction of the expanded clay target facility, and also the ongoing use of lead shot and the actions proposed to assist in the management and containment of lead within the Infrastructure Designation Area.

Lead shot and clay targets have the potential to result in contamination of soils and surface water. While the contaminants of concern (lead) is not generally in a soluble or mobile form, over time degradation of the lead pellets and clay targets has the potential to increase levels above background resulting in a contaminated site and potential for elevated levels to migrate offsite. If not managed, it is estimated that, depending on level of use, lead levels in the soils will exceed trigger values within a few years of operation.

The majority of the vegetation proposed to be removed is considered either “Of Concern” or “Endangered” REs that support koala habitat. While no koalas were observed during the surveys, evidence of their presence was observed. Vegetation clearing has been minimised where possible through the inclusion of uncleared operational areas and modelling to understand the areas impacted as a result of lead deposition.

Indirect impacts associated with the permanent use of the facility include noise impacts to adjacent sensitive land uses, mobilisation of sediment and soils as a result of changes to surface water flows and management that result in the deposition of sediments into the adjacent downstream watercourse, and the potential for contamination of soils and surface water beyond the direct impact area following mobilisation of soils.

Management and mitigation measures have been developed to address both direct and indirect impacts. While vegetation clearing is unavoidable under the current proposal, this is partly associated with proposed best practice management and mitigation measures to control lead from mobilising and leaving the deposition area within the Infrastructure Designation Area.

A number of the indirect impacts have been addressed through site design, such as surface water management to address sedimentation and erosion that has the potential to enter the nearby waterways, and the construction of a noise attenuation wall to manage the noise impacts on nearby sensitive receptors.

1.0 INTRODUCTION

1.1 BACKGROUND

A clay target facility has been constructed at the Belmont Shooting Centre (Appendix A), located on Lot 1 RP169229 at 1485 Old Cleveland Road, Belmont (Belmont Shooting Centre) (Figure 1). The clay target facility was constructed as a temporary facility for the 2018 Gold Coast Commonwealth Games. It is now proposed the clay target facility become permanent use infrastructure. Approval to retain the clay target facility is proposed to be undertaken through the Ministerial Infrastructure Designation (MID) process. To support the MID application an environmental assessment report is required. The Environmental Assessment Report (EAR) is prepared to ensure the requirements for adequate environmental assessment are met.

This EAR describes the existing environment, the current infrastructure, proposed activities, and potential environmental impacts and subsequently addresses environmental management opportunities.

1.2 GENERAL DESCRIPTION OF THE PROPOSED AREA

Lot 1 on RP169229 (Lot 1) is situated at 1485 Old Cleveland Road, Belmont on about 499 hectares that have been used by a number of shooting clubs for over 150 years. Much of the site supports open forest and woodland remnant vegetation (Appendix B).

The area is zoned Sport and Recreation and is surrounded by Open Space, Low Density Residential and Emerging Community as per the Brisbane City Council City Plan 2014 (Appendix C). The designated Open Space to the north and east of Lot 1 is predominantly small acreage blocks with little mapped remnant vegetation (Appendix B), or locally significant vegetation present.

Lot 1 is undulating to steep (Appendix D) and includes vegetated watercourses, overland flow paths, drainage features, poorly drained areas, foothills, slopes and ridges, and Mount Petrie (170 metres).

The clay target facility is located in the north-east area of Lot 1 (Figure 1) and was overlaid over an existing 300 m rifle range, in a relatively flat area. The clay target facility is generally surrounded by remnant vegetation, an overland flow line, field archery lanes to the west and the reduced 300 m rifle range to the south. The clay target facility is accessed by a sealed road and includes a carpark area. Lot 1 is further connected to vegetation on surrounding lots.

1.3 THE PROJECT

As the facility was constructed for the Commonwealth Games use only, the majority of the clearing and direct impacts associated with the existing clay target facility infrastructure have

already occurred and relevant environmental approvals obtained. Future proposed activities to facilitate permanent use include but are not limited to (Appendix E):

- Construction of a fourth skeet/trap position;
- Construction of four down-the-line (DTL) positions;
- Removal of the eastern side shot curtain;
- Construction of a future amenities / potential club house facility / building within the carpark area and completion for a sealed carpark area;
- Construction of a noise barrier / wall along the north edge of the carpark to reduce noise at the adjacent residences; and
- Clearing of approximately 5.4 ha of additional vegetation to accommodate additional shooting skeet/trap and DTL positions, and the cleared operational area for improved contamination mitigation works and procedures both within the shot enclosure and in the operational area. This is approximately 1.5% of the vegetated area of Lot 1 (approximately 360 ha).

The project area is described as the “Infrastructure Designation Area”.

1.4 PURPOSE

The purpose of this EAR is to evaluate the potential impacts on the environment associated with the permanent use of the clay target facility and to identify proposed management and mitigation strategies to address the environmental impacts.

2.0 LEGISLATION AND PLANNING

The following overview of legislation and agreements is for those that generally apply to projects that require clearing of remnant vegetation or have potential impacts on the environment. As this project is being managed through the MID process many of these provisions do not apply. However, as the MID process is still required to address environmental impacts an overview of these typical legislative requirements assists in identifying key aspects to be considered:

- International agreements
  - *Ramsar Convention On Wetlands 1971;*
- Commonwealth legislation
  - *Environment Protection And Biodiversity Conservation Act 1999;*
- State Legislation
  - *Vegetation Management Act 1999;*
  - *Nature Conservation Act 1992;*
  - The *Environmental Offsets Act 2014* and subordinate legislation;
  - *Biosecurity Act 2014;*
  - Referrable Wetlands;
  - Koala assessable development areas under the Planning Act 2016 (former Koala SPRP mapping);
  - Nature Conservation (Koala) Conservation Plan 2017; and
  - State Government Supported Infrastructure - Koala Conservation Policy
- Local Government Legislation
  - *Brisbane City Plan 2014*; and
  - *Natural Assets Local Law 2003.*

3.0 SITE DESCRIPTION

3.1 FLORA AND VEGETATION

A number of flora and vegetation surveys (Lambert & Rehbein, 2016; Lambert & Rehbein, 2017a; Lambert & Rehbein, 2017b, Lambert & Rehbein, 2018) have been undertaken in association with this project to determine the vegetation communities and flora species present within Infrastructure Designation Area. Desktop investigations (Appendix B, Appendix F, Appendix G) (Figure 2) identified a number of Regional Ecosystems (RE) within the Infrastructure Designation Area:

- 12.3.5 – *Melaleuca quinquenervia* open forest on coastal alluvium (Least Concern);
- 12.3.6 – *Melaleuca quinquenervia* +/- *Eucalyptus tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* open forest on coastal alluvial plains (Least Concern);
- 12.11.25 – Corymbia henryi and/or Eucalyptus fibrosasubsp. fibrosa +/- E. crebra*, E. carnea, E. tindaliae* woodland on metamorphics +/- interbedded volcanics (Of Concern)
- 12.11.27 – *Eucalyptus racemosa* subsp. *racemose* and/or *E. seeana* and *Corymbia intermedia* woodland on metamorphics +/- interbedded volcanics (Endangered); and
- 12.9-10.4 - *Eucalyptus racemosa* subsp. racemose woodland on sedimentary rocks.

Although no specific Quaternary Regional Ecosystem Assessment sites were established during site surveys, the underlying geology, site observations of soils, and the vegetation associations recorded indicate that the vegetation on site is similar to the mapped REs (Lambert & Rehbein, 2016). Notable differences include differences between the mapped and observed boundaries of the endangered RE 12.11.27 in the south-western area of the investigation area, and an area more closely resembling the least concern RE 12.11.5 behind the eastern half of the shot curtain (Figure 3). An area dominated by *Allocasurina littoralis* exists to the east of the clay target facility (Figure 3).

Desktop information indicates the project area is within the *Protected Plants Flora Survey Trigger Map* area (Appendix B) and a number of conservation significant flora species have been recorded within 5 km of the project area (Appendix F) or have the potential to occur in the area (Appendix G) (Table 1).

Table 1 EVNT flora species potentially occurring within the site

Scientific Name	Common Name	Habit	NCA Status	EPBC Status	Preferred Habitat
Arthraxon hispidus	Hairy-joint Grass	Grass	-	Vulnerable	Freshwater springs on coastal foreshore dunes, in shaded small gullies, on creek banks, and on sandy alluvium in creek beds in open forests, and also with bog mosses in mound springs.
Baloghia marmorata	Marbled Balogia, Jointed Baloghi	Shrub / small tree	-	Vulnerable	Subtropical rainforest/notophyll vine forest and wet sclerophyll forest (brush box woodland) with rainforest understorey between 150 and 550 m above sea level.
Bosistoa transversa	Three-leaved Bosistoa, Yellow Satinheart	Small to medium sized tree	-	Vulnerable	Lowland subtropical rainforest up to 300 m above sea level.
Corchorus cunninghamii	Native Jute	Shrub	-	Endangered	Ecotone of wet sclerophyll forest and dry to dry-subtropical rainforest.
Cryptocarya foetida	Stinking Cryptocarya, Stinking Laurel	Medium sized tree	-	Vulnerable	Coastal sands.
Cupaniopsis shirleyana	Wedge-leaf Tuckeroo	Tree	Vulnerable	Vulnerable	Depauperate rainforest.
Endiandra floydii	Floyd's Walnut	Small tree	-	Endangered	Warm-temperate and subtropical rainforest.
Eucalyptus curtisii	Plunkett Mallee	Tree	Near Threatened	-	Sandy or stony soils, often in sandstone areas. Often cultivated.
Macademia integrifolia	Macademia Nut	Tree	Vulnerable	Vulnerable	Rainforest. Often cultivated.
Macadamia tetraphylla	Macademia Nut	Tree	-	Vulnerable	Rainforest. Often cultivated.
Phaius australis		Large terrestrial orchid up to 2m tall	Endangered	Endangered	Swamps.
Samadera bidwillii	Quassia	Shrub / tree	-	Vulnerable	Lowland rainforest or on rainforest margins.
Symplocos harroldii	Hairy Hazelwood	Tree/shrub	Near Threatened	-	Depauperate rainforest.

Scientific Name	Common Name	Habit	NCA Status	EPBC Status	Preferred Habitat
Thesium australe	Austral Toadflax, Toadflax	Herb	-	Vulnerable	Subtropical, temperate and subalpine climates. Semi-parasitic on roots of a range of grass species.
Zieria furfuraceae subsp. gymnocarpa	-	Shrub	Endangered	-	Rainforest fringes or wetter forest areas in coastal areas.

As the Infrastructure Designation Area is within the Protected Plants Flora Survey Trigger Map area, protected plant surveys have been undertaken at various stages of the project (Lambert & Rehbein, 2016; Lambert & Rehbein, 2017a; Lambert & Rehbein, 2017b). Although protected plants survey specifically target EVNT species listed under the NC Act, given the nature of this project and other surveys being undertaken, EVNT species listed under the EPBC Act were also searched for.

No EVNT species have been recorded during these surveys (Lambert & Rehbein, 2016; Lambert & Rehbein, 2017a; Lambert & Rehbein, 2017b).

3.2 FAUNA

Desktop searches (Appendix F; Appendix G) identified a number of conservation significant fauna potentially occurring within the Infrastructure Designation Area (Table 2).

Table 2 EVNT fauna species potentially occurring within the site

Species	Common Name	NCA Status	EPBC Status	EPBC Comments
Amphibians				
Adelotus brevis	Tusked frog	Vulnerable	-	
BIRDS				
Anthochaera phrygia	Regent Honeyeater	Endangered	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus	Australasian Bittern	-	Endangered	Species or species habitat known to occur within area
Calidris canutus	Red knot	Endangered	Endangered	Species or species habitat known to occur within area
Calidris ferruginea	Curlew sandpiper	Endangered	Critically endangered	Species or species habitat known to occur within area
Calidris tenuirostris	Great knot	Endangered	-	

Species	Common Name	NCA Status	EPBC Status	EPBC Comments
Calyptorhynchus lathami lathami	Clossy black-cockatoo (eastern)	Vulnerable	-	
Charadrius leschenaultii	Greater sand plover	Vulnerable	-	
Charadrius mongolus	Lesser sand plover	Endangered	-	
Dasyornis brachypterus	Eastern Bristlebird	-	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus	Red Goshawk	-	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta	Squatter Pigeon (southern subspecies)	-	Vulnerable	Species or species habitat may occur within area
Lathamus discolor	Swift Parrot	-	Critically Endangered	Species or species habitat may occur within area
Limosa lapponica baueri	Western Alaskan bar-tailed godwit	Vulnerable	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri	Northern Siberian Bar-tailed Godwit, Bar-tailed	-	Critically Endangered	Species or species habitat known to occur within area
Ninox strenua	Powerful owl	Vulnerable	-	
Numenius madagascariensis	Eastern Curlew	Endangered	-	
Poephila cincta cincta	Black-throated Finch (white-rumped subspecies)	-	Endangered	Species or species habitat may occur within area
Rostratula australis	Australian Painted Snipe	-	Endangered	Species or species habitat may occur within area
Turnix melanogaster	Black-breasted Button- quail	-	Vulnerable	Species or species habitat may occur within area

MAMMALS				
Chalinolobus dwyeri	Large-eared Pied Bat	-	Vulnerable	Species or species habitat may occur within area
Dasyurus hallucatus	Northern Quoll	-	Endangered	Species or species habitat may occur within area
Dasyurus maculatus maculatus	Spotted-tail Quoll	-	Endangered	Species or species habitat may occur within area
Petauroides volans volans	Southern greater glider	Vulnerable	Endangered	Species or species habitat may occur within area
Phascolarctos cinereus	Koala (SEQ bioregion)	Vulnerable	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus	Grey-Headed Flying- Fox	-	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Xeromys myoides	Water Mouse, False Water Rat, Yirrkoo	-	Vulnerable	Species or species habitat likely to occur within area
REPTILES				
Delma torquata	Collared Delma	-	Vulnerable	Species or species habitat may occur within area
Saiphos reticulatus	Three-toed Snake-tooth Skink	-	Vulnerable	Species or species habitat may occur within area
Insects				
Argynnis hyperbius inconstans	Australian Fritillary	-	Critically Endangered	Species or species habitat may occur within area

Although fauna and fauna habitat have been observed during all surveys, only one site specific fauna survey has been undertaken (Lambert & Rehbein, 2016). The investigation (Lambert & Rehbein, 2016) included a small area approximately 210 m x 150 m, located at the northern end of the 300 m rifle range. This was prior to the area being modified and cleared for the clay target facility (Figure 4). General site observations at the time of the survey included:

- The site drained east to west by minor overland flow waterways, channels and depressions, although some of the drainage is interrupted by earthworks for the previously existing 300 m rifle range;
- The main receiving waterway runs south-west to north-east running parallel to the western side of the clay target facility. This waterway retains substantial environmental values including a series of ephemeral waterholes downstream from the site, and mature and connected riparian vegetation. This waterway is connected to the Infrastructure Designation Area by an overland flow path that runs through the western side of the Infrastructure Designation area (Appendix H);
- The centre and southern extent of the site was already cleared. The cleared area had been filled and levelled. Surface water flow was diverted around the northern side of the range, and was piped under the range from east to west. The drain was observed to be partially blocked leading to water damming to the east side of the existing 300 m range. This blockage has since been removed as part of the works associated with the construction of the clay target facility;
- The northern, western and eastern sides of the survey area were vegetated and were dissected by an entrance road and linear archery target ranges, creating slight habitat fragmentation and potential barriers to some faunal movement;
- Ecological connectivity with the larger and more intact areas of vegetation to the south and south-east of the site, and ecological connectivity with a larger waterway corridor to the west and south-west of the site, is intact;
- The canopy is closed across the vegetated areas of the proposed development site. Although there were no significant habitat trees observed within the survey area, there were a number of mature trees with potential for hollows observed in the south-west corner of the survey area. Trees observed along the eastern boundary, also have the potential for hollows; and
- Noise from the adjacent shooting ranges was intermittent but a characteristic of this site at all times during the ecological assessment work.

In addition to the 2016 (Lambert & Rehbein) fauna survey, an ecology survey undertaken in June 2018 (Lambert & Rehbein) opportunistically identified fauna and fauna habitat while investigating vegetation and non-juvenile koala habitat trees. Many of the mature trees, in particular *Eucalytpus racemose*, contained extensive hollow development often occupied by Rainbow Lorikeets (*Trichoglossus maluccanus*).

Fauna species observed within the project area are listed in Table 3. A night survey was undertaken during the 2016 survey (Lambert & Rehbein), faunal activity was very low during the ecological assessment, with only two species – Cane Toad (*Rhinella marina*) and Common Brushtail Possum (*Trichosurus vulpecula*) observed during the spotlight surveys.

Table 3 Fauna observed within the survey area

Species	Common Name
Amphibians	
**Rhinella marina*	Cane Toad
Birds	
Platycercus eximius	Pale-headed Rosella
Grallina cyanoleuca	Magpie Lark
Manorina melanocephala	Noisy Miner
Pardalotus striatus	Striated Pardalote
Cracticus nigrogularis	Pied Butcher-bird
Trichoglossus chlorolepidotus	Scaly-breasted Lorikeet
Trichoglossus haematodus	Rainbow Lorikeet
Dacelo novaeguineae	Laughing Kookaburra
Gymnorhina tibicen	Australian Magpie
Melithreptus albogularis	White-throated Honey-eater
Threskiornis spinicollis	Straw-necked Ibis
Egretta novaehollandiae	White-faced Heron
Reptiles	
Physignathus lesueurii	Water Dragon
Mammals	
Macropus giganteus	Eastern Grey Kangaroo
Trichosurus vulpecula	Common Brushtail Possum
**Vulpes vulpes*	European Red Fox

There were no direct observations of any EVNT fauna species during the fauna surveys. Observations of ant nest diggings consistent with echidna (*Tachyglossus aculeatus*) (Special Least Concern (NC Act)) use, provided limited and unconfirmed evidence that echidnas may be active in the Infrastructure Designation Area, despite no direct observations of this species.

No koalas were observed on the site or in close proximity to the site. A juvenile Koala (Vulnerable EPBC Act and NC Act) skeleton was observed approximately 70 m to the east of the clay target facility (Lambert & Rehbein, 2016). A large number of non-juvenile koala habitat trees (NJKHT) have been identified within the project area across multiple surveys undertaken in 2016 and 2018 (Figure 5). Four trees were identified with obvious evidence of koala scats, tracks or scratchings (Figure 5).

There were a total of 903 NJKHTs identified across all surveys. Approximately 5.4 ha of the Infrastructure Designation Area was surveyed for NJKHTs (167 NJKHTs / ha). It was not practical to individually survey all trees in the area cleared operational area. To determine if the density of NJKHTs is consistent across the entire Infrastructure Designation Area, three additional transects were surveyed to the south and south-west of the curtain (Figure 5). The three transects totalled approximately 0.54ha and 205 trees NJKHTs were identified (approximately 380 NJKHTs / ha). This suggests the density of NJKHTs increases to the south of the clay target facility compared to the areas directly adjacent to the north, east and west.

3.3 WATERWAYS AND WETLANDS

An existing secondary overland flow dry watercourse runs from the south around to the west of the Infrastructure Designation Area to join downstream with a larger watercourse running from the south across the 300 m range towards the north-west (Appendix H) (Figure 6).

There are no referrable wetlands mapped within or adjacent to the project area.

4.0 ENVIRONMENTAL IMPACTS

4.1 ENVIRONMENTAL RISK ASSESSMENT

A risk-based approach was implemented to determine the potential environmental impacts associated with the project. This approach was adopted as it allowed for ease of refinement within the project team and provided a framework to allow for adaptive management as the project has evolved.

The framework, whereby measurable management objectives are identified for all relevant environmental factors, and the risk of not being able to meet these objectives, due to the undertaking of specific activities, is determined. The adaptive management process also offers a framework for continual improvement and an ongoing ability to maintain environmental values in the project area.

4.2 RISK EVALUATION PROCESS

An environmental risk evaluation was undertaken to assess the potential or realised effects of the project activities on the environmental values in the project area, referred to as 'Key Environmental Values' (KEV). KEVs can be broadly classified into four groups – land, air, water and social (Table 4). There are a number of environmental factors associated with each KEV.

The outcomes of the evaluation are used to identify the need for specific environmental management measures. Management measures may include a range of design and environmental management programs, procedures or initiatives. The evaluation process also allows a repeatable mechanism for evaluating the effectiveness of management measures that are currently adopted, identification of areas for improvement, or draws attention to areas that have insufficient management in place.

Table 4 Project area key environmental values and identifiable environmental factors

Key Environmental Value	Environmental Factors
Land	Soils, flora and vegetation, weeds and pests, fauna, flooding, sedimentation and erosion, waste generation
Air	Noise, dust, emissions, odour, lighting
Water	Surface water, groundwater, aquatic ecology/wetlands, sedimentation and erosion
Social	Tourism, amenity, traffic, Indigenous heritage, European heritage

Each stage within the Environmental Management Framework process is defined below:

1. Identify KEVs and the various environmental factors that sit within each. This is achieved by an assessment on State and Commonwealth environment registers and databases, as well as on the ground studies, reports and observations, including the work undertaken as part of the environmental impact assessment process.
2. Determine an effective Management Objective and Management Target for each of the environmental factors of the KEVs.
3. Compile a list of project-specific activities undertaken as part of project delivery.
4. An unmitigated risk evaluation is then conducted to evaluate the environmental effects that may arise from each activity to determine the potential that exists for the activity to impact on the proponent's ability to meet the defined management objectives:
    a. The initial evaluation does not take into account any design and environmental procedures, programs, initiatives or other controls that may be common practise in this type of project that contribute to avoiding, minimising or mitigating environment impacts. This is known as an unmitigated Environmental Risk Evaluation and is what might occur in the absence of any controls.
5. Identify design and environmental management measures (control measures) that will be used / are currently in place to avoid, minimise or mitigate each risk.
    a. Once the unmitigated impacts are understood, determine controls that can be implemented to reduce the risk of the impacts occurring. Controls can be developed that may either reduce the likelihood of an impact occurring, or reduce the severity of the impact when it occurs. It should be noted that it is rare for a single control to address both likelihood and severity. Multiple controls are usually required to reduce both.
6. A residual risk evaluation is conducted:
    a. This second evaluation accounts for the change in risk profile as a result of all the existing risk mitigation measures, to arrive at a residual risk. That is, the risk assessment is undertaken for a second time taking into account the control measures that are proposed to be implemented.
7. Identify improvement opportunities and re-evaluate these risks through the adaptive management process.
    a. This final step is used as part of the continual improvement cycle. The risk assessment is a live document that should be re-visited as knowledge improves. Reductions in risk profiles should be investigated when the risk of an incident occurring is still considered unacceptable. Opportunities also exist for improvements if risks are considered acceptable but are not as low as reasonably practical.

This risk assessment was undertaken using available desktop information and ecological surveys undertaken at the site.

Once risks are identified, the likelihood of any associated environmental impacts on KEVs being realised, as a result of project activities, is assessed for each the KEVs against the environmental risk evaluation consequence categories. The initial evaluation is undertaken without consideration of any controlling provisions that may be considered standard operating procedures and assesses the likelihood of not meeting the management objective for each KEV.

4.3 MANAGEMENT OBJECTIVES

To effectively evaluate and manage the potential or realised impacts on KEVs, management objectives (Table 5) have been developed for each of the KEV's environmental factors. These management objectives have been developed to the scale of the project and can be revisited throughout the life of the clay target facility.

Table 5 Project environmental management objectives.

Key Environmental Value	Environmental Factor	Management Objective	Target
Land	Soil	Minimise contamination and land disturbance.	Maintain soil contamination below trigger values.
Land	Flora and fauna	Avoid any conservation significant flora and no clearing outside required footprint.	Retain significant flora and fauna communities, where possible. Implement management activities to minimise impact on connectivity, structure and function of ecosystems the site is associated with. Only the discrete areas marked for infrastructure and other project areas will be cleared.
Land	Weeds and pests	Control any weeds and pests to minimise risk of establishment and spreading beyond site boundaries.	Ensure no outbreak of weeds and pests escape the site boundaries. Eradicate any weeds and pests following collection of bulk sample and leaving the site in maintenance mode.
Land	Flooding	Minimise flooding impacts.	Design site infrastructure to appropriate engineering standards to minimise potential flooding impacts.
Land	Sedimentation and erosion	Minimise the transport of soil off-site during both construction and ongoing operation.	Ensure that all development is undertaken in accordance with sediment and erosion control plans.

Key Environmental Value	Environmental Factor	Management Objective	Target
Land	Waste generation	Minimise waste generation and maximise recycling and reuse of materials and ensure correct handling of waste.	No uncontained materials. Presence and use of recycling receptacles (where appropriate). Provision of adequate quarantine waste facilities. Minimise waste through procurement of low waste goods and services.
Air	Noise	Minimise noise impacts.	Design equipment and operations to minimise noise emissions. Do not exceed agreed noise criteria at the relevant environmental receptor monitoring sites. Where exceedances occur, undertake the necessary measures to reduce noise emissions to below noise reference criteria at relevant environmental receptor monitoring sites. Minimise noise nuisance.
Air	Dust	Minimise dust impacts.	Design equipment and operations to minimise dust emissions. Do not exceed agreed human health reference criteria at relevant environmental receptor monitoring sites. Where exceedances occur, undertake the necessary measures to reduce dust emissions to below agreed human health reference criteria at relevant environmental receptor monitoring sites. Minimise dust nuisance.
Air	Emissions	Minimise air emissions.	Design equipment and operations to minimise air emissions.
Air	Lighting	Minimise lighting impacts.	Minimise nuisance from lighting by directing light away from sensitive receptors where appropriate to do so.
Water	Surface water	Minimise impacts to surface water quality.	Minimise the potential impact of the clay target facility on local surface water resources. Design stormwater, and erosion and sediment control in accordance with relevant guidelines. Comply with the conditions of any relevant Environmental Authority concerning stormwater management and stormwater discharges.
Water	Groundwater	Minimise impacts to groundwater quality.	Minimise the potential impact of the clay target facility on local groundwater resources.

Key Environmental Value	Environmental Factor	Management Objective	Target
Water	Aquatic ecology / wetlands	No net loss of wetland values. No change to the condition assessment of streams and waterways outside the boundaries of the site.	No change to aquatic ecology / wetland values in adjacent overland flow path areas.
Water	Sedimentation and erosion	Minimise the transport of soil and sediment off-site during both construction and ongoing operation.	Ensure sedimentation of overland flow path does not occur as a result of changes due to the clay target facility.
Social	Tourism	Minimise negative socio-economic impacts on the tourism sector and help enhance any positive impacts.	Minimise impact to adjacent facilities and users.
Social	Amenity	Minimise the impact of site development on the overall visual amenity of the area.	No visual amenity issues identified.
Social	Traffic	Minimise the impact of construction and operation traffic on the local road network. Minimise the impact of construction and operation traffic on local amenity.	Undertake all construction and operational activities in accordance with traffic management plans.
Social	Waste generation	Minimise waste generation and maximise recycling and reuse of materials, and ensure correct handling of waste.	No uncontained waste materials. Presence and use of recycling receptacles (where appropriate). Minimise waste through procurement of low waste goods and services.
Social	Indigenous heritage	Avoid unnecessary disturbance to identified cultural heritage sites.	Undertake all construction activities in accordance with cultural heritage management plans.
Social	European heritage	Avoid unnecessary disturbance to identified European heritage sites.	Undertake all activities in accordance with cultural heritage management plans.

5.0 ENVIRONMENTAL IMPACTS

5.1 PROJECT ACTIVITIES

The key construction or operational activities identified include:

- Construction activities:
  - Clearing, cutting and filling to the east and west for a fourth skeet position and four DTL positions, including clearing, cutting and filling within the cleared operational area.

    It is proposed to construct a fourth skeet position at the western end of the clay target facility. In additional it is also proposed to construct a DTL position to the west of the proposed fourth skeet position and three DTLs to the east of the existing first skeet position. To facilitate this, the eastern and western shot curtain will require removal and repositioning. Clearing, cutting and filling will also be required (Appendix E).

    Further, two archery lanes will be relocated within the adjacent field archery range to ensure no archery lanes are within the shotgun safety template. Minimal clearing is required to locate the replacement lanes. The longest lane will use an old redundant lane position.

    It is proposed to clear approximately an additional 5.4 ha of vegetation to accommodate the proposed new infrastructure and cleared operational area. The 5.4 ha of area proposed to be cleared includes the following approximate vegetation areas (Figure 3):

    RE12.11.25 (of concern) – 2.40 ha

    RE12.11.5 (least concern) – 1.20 ha

    RE12.11.27 (endangered) – 0.32 ha

    RE12.3.5 (least concern) – 0.15 ha

    Allocasuarina dominated – 0.10 ha

    Non-remnant (but generally well vegetated) – 0.23 ha

    Partially cleared / sporadic vegetation – 1.0 ha

    Tree counts within the overshoot area indicates there are approximately 903 trees likely to be removed.
  - Construction of a noise attenuation wall.

    The nearest residence is less than 200 m to the north-east of the clay target facility. Recent modelling (ASK, 2018) indicated noise levels were above noise

restriction levels. A noise attenuation wall is proposed to be built along the northern edge of the current carpark area (Appendix E).

- Construction of a clubhouse.

  It is proposed a future clubhouse be built on the existing carpark area. This activity is not expected to require any clearing or significant earthworks. Services will be provided to the clubhouse.

- Operational activities
  - Shooting.

    The main operational use of the clay target facility is for shooting. Lead shot is the preferred cartridge by shooters. Others type of shot used include steel shot however this is not a preferred option for shooters. Additionally current competitions require lead shot to be used. Use of lead shot is known to contaminate soils, surface water and also potentially groundwater. While the majority of lead shot stays where it falls, over time lead shot corrodes, including dissolving into solution binding with soil particles or being transported offsite by surface water flows. Although dependent on use, without controls in place modelling indicates soil will exceed trigger values for lead within a few years (Ground Corp, 2018). Lead is the key contaminant associated with the use of the clay target facility (Ground Corp, 2018). Other potential contaminants of concern include polynuclear aromatic hydrocarbons, antimony, arsenic and components of gunshot residue (Ground Corp, 2018).

5.2 RISK ASSESSMENT OUTCOMES

The unmitigated risk evaluation for the KEVs for this project is shown in Table 6. Environmental management and mitigation strategies were developed to reduce the risk to as low as reasonably practical (ALARP).

The residual risk to each KEV for this project is shown in Table 7. The Environmental Risk Assessment is attached at Appendix I.

Table 6 Unmitigated risk evaluation outcomes for the project.

			Activity / Work Package			
	KEV	Environmental Factor	Construction of the shot curtain, retaining wall and noise barrier wall	Construction and establishment of the future clubhouse.	Shooting (use of lead shot)	Site rehabilitation
Environmental Factors	Land	Soils (eg contamination)				
		Flora and vegetation				
		Fauna				
		Weeds and Pests				
		Flooding				
		Sedimentation and Erosion				
		Waste Generation				
	Air Quality	Noise				
		Dust				
		Emissions				
		Odour				
		Lighting				
	Water	Surface water quality				
		Groundwater quality				
		Aquatic ecology / wetlands				
	Social	Tourism				
		Amenity				
		Traffic				
		Indigenous heritage				
		European heritage				

Legend:

	Very low impact
	Low impact
	Moderate impact
	Significant impact
	High impact
	Extreme impact

Table 7 Residual risk evaluation outcomes for the Project.

			Activity / Work Package			
	KEV	Environmental Factor	Construction of the shot curtain, retaining wall and noise barrier wall	Construction and establishment of the future clubhouse.	Shooting (use of lead shot)	Site rehabilitation
Environmental Factors	Land	Soils (eg contamination)				
		Flora and vegetation				
		Fauna				
		Weeds and Pests				
		Flooding				
		Sedimentation and Erosion				
		Waste Generation				
	Air Quality	Noise				
		Dust				
		Emissions				
		Odour				
		Lighting				
	Water	Surface water quality				
		Groundwater quality				
		Aquatic ecology / wetlands				
	Social	Tourism				
		Amenity				
		Traffic				
		Indigenous heritage				
		European heritage				

Legend:

	Very low impact
	Low impact
	Moderate impact
	Significant impact
	High impact
	Extreme impact

The potential environmental impacts associated with this project can be considered direct and / or indirect. The potential impacts have been summarised in Table 9.

Table 8 Identified key potential direct and indirect impacts

Description	Potential Impact
Direct	Loss of vegetation within the designation area
	Loss of fauna / fauna habitat
	Contamination of soils by lead shot
Indirect	Noise pollution to surrounding sensitive receptors (adjacent residences)
	Contamination of offsite soils and surface water through the movement of lead transported offsite
	Change to surface hydrology concentrating surface water flows and mobilising sediment (that may or may not be contaminated with lead) that is deposited in the creek.

The direct impacts associated with the construction and use of the facility are associated with both the construction of the expanded clay target facility, and also the ongoing use of lead shot and the actions proposed to assist in the management and containment of lead within the Infrastructure Designation Area.

Lead shot and clay targets have the potential to result in contamination of soils and surface water. While the contaminants of concern (lead) is not generally in a soluble or mobile form, over time degradation of the lead pellets and clay targets has the potential to increase levels above background resulting in a contaminated site and potential for elevated levels to migrate offsite. It is estimated that, depending on level of use, lead levels in the soils will exceed the nominated site specific trigger values within a few years of operation (Ground Corp, 2018).

The majority of the vegetation proposed to be removed is considered either “Of Concern” or “Endangered” REs that support NJKHTs. While no koalas were observed during the surveys, evidence of their presence was observed. Given no koalas were observed during the multiple surveys it is considered the population in the area using the area proposed to be cleared is relatively low. The area proposed to be cleared is approximately 1.4% of the vegetation within Lot 1 (5.4 ha proposed to be cleared of approximately 360 ha of vegetation). Vegetation clearing has been minimised where possible through the inclusion of uncleared operational areas and modelling to understand the areas impacted as a result of lead deposition. Additionally, although

it is assumed the surrounding vegetation will provide sufficient habitat to support koalas in the area, it is proposed to offset the area proposed to be cleared by rehabilitating the Brisbane Gun Club clay target facility in the north-west area of the site.

Indirect impacts associated with the permanent use of the facility include noise impacts to adjacent sensitive land uses, mobilisation of sediment and soils as a result of changes to surface water flows and management that result in the deposit of sediments into the adjacent downstream watercourse, and the potential for contamination of soils and surface water associated with the use of lead shot and clay targets.

The ongoing and permanent use of the clay target facility has the potential to impact the amenity of the residents immediately adjacent to the north boundary (ASK Consulting, 2017).

Mobilisation of sediments during construction or from permanently altered hydrology has the potential to cause sedimentation of the adjacent overland flow path. Although there have been no conservation significant flora species identified within or adjacent to the area, the overland flow path is identified as local waterway corridor. Sedimentation of the waterway has the potential to change the ecology and alter vegetation.

6.0 MANAGEMENT AND MITIGATION

Direct and indirect impacts can be minimised through the implementation of management and mitigation strategies, some of these have already been included into the design of the existing infrastructure for the temporary works.

Due to the proposed clearing for the overshoot area, it is expected offsets will be required for the approximate 903 trees likely to be removed, and at a ratio of 3:1 require an offset of approximately 2,709 trees to be planted. At approximately 10 m^2 per tree this will require an area of approximately 2.7 ha. A number of locations have been identified around the Belmont Shooting Complex where this can be accommodated (Figure 7). All areas increase connectivity, are connected to existing areas of vegetation or are part of the long term planning for the site. Additionally, offset trees were planted for an earlier project. An extra 1,142 trees were planted in preparation for this potential project, requiring a further 1,567 trees to be planted to offset the trees removed for this project. This equates to an area of approximately 1.6 ha required to plant 1,567 trees.

Other management and mitigation opportunities are described in Table 9.

Table 9 Management and mitigation opportunities for extension activities proposed for the range to become permanent use.

Potential Impact	Activity	Potential Opportunity	Management and Mitigation Opportunity
Reduction of vegetation	Shot curtain extension	Minimise area to be cleared	Develop construction methodology to minimise clearing footprint. Potential offset areas identified within Belmont Shooting Complex (Figure 7).
	Fourth skeet position and four DTL positions		Design to minimise clearing required and area impacted by lead shot (e.g. utilise retaining wall rather than battered slope on edge of fill areas, direction of positions to minimise shot spread). Potential offset areas identified within Belmont Shooting Complex (Figure 7).
	Noise attenuation wall		Build on or adjacent to already cleared areas. Utilise future buildings as part of noise attenuation to minimise the size of the noise attenuation wall required. This will include prototype testing to confirm the wall height required.
	Relocation of two archery lanes		If possible, take advantage of previously cleared lanes or look for opportunities to modify existing lanes.

Potential Impact	Activity	Potential Opportunity	Management and Mitigation Opportunity
	Rehabilitation of overshoot area at end of lease		Detailed site contamination assessment to map clearly where areas of contamination exist to ensure only areas required to be cleared for remediation are cleared. Preference to have offset areas planted immediately following approval. Offset areas will be mature by the end of lease providing an immediate benefit. The offset area to be planted will be determined by modelling of the likely contamination areas within the deposition area. Potential offset areas identified within Belmont Shooting Complex (Figure 7).
Increased noise	Shooting	Reduce noise at the sensitive receptors	Design and construct a noise attenuation wall.
Sedimentation of the creek	Construction	Stop sediments from entering the creek	Develop and implement a sediment and erosion control plan during construction activities.
	Operation	Stop sediments from entering the creek	Design stormwater discharge points to diffuse surface water flow. Prepare and implement stormwater management plan that details surface water management. Develop and implement an erosion and sediment control plan for any ongoing lead remediation activities that involve disturbance of the soil.
Contamination of soils and surface water	Use of range by lead shot and clay targets	Reduce potential for lead shot and clay targets to results in contamination of the facility	Develop methods and implement practices to regularly collect lead shot. Use gross pollution traps to restrict debris from leaving the site. Operational area design to ensure all surface water is captured and discharged through controlled points for water quality management. entering overland flow areas from the isolated shot area within shot curtain zone. Prepare and implement stormwater management plan that details ongoing surface water management, including during remediation activities.
			Develop and implement strategies to reduce the use of lead shot and plan to move from lead shot use to other less contaminating shot materials. This is a long term consideration that is subject to changes to International Shooting Federation rule changes allowing the use of lead alternatives in relevant competitions.

Potential Impact	Activity	Potential Opportunity	Management and Mitigation Opportunity
			Unless specific clay targets are required for competition purposes there is the potential to utilise clay targets that do not contain contaminating materials.

7.0 REFERENCES

ASK Consulting (2018) *Clay Target Facility Noise Impact Assessment*. Brisbane, QLD.

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Ground Corp (2018)*Clay Target Facility, Belmont Shooting Complex – Ministerial Infrastructure Designation, Contamination (June 2016)*. Brisbane, QLD.

Lambert & Rehbein (2016) Terrestrial Ecology Survey Report – Belmont Clay *Target Shooting Range*. Brisbane, QLD.

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Lambert & Rehbein (2018) *Flora, Vegetation and Koala Tree Survey – Clay Target Range Overshoot and Safety Buffer Areas, Belmont Rifle Range*. Brisbane Queensland

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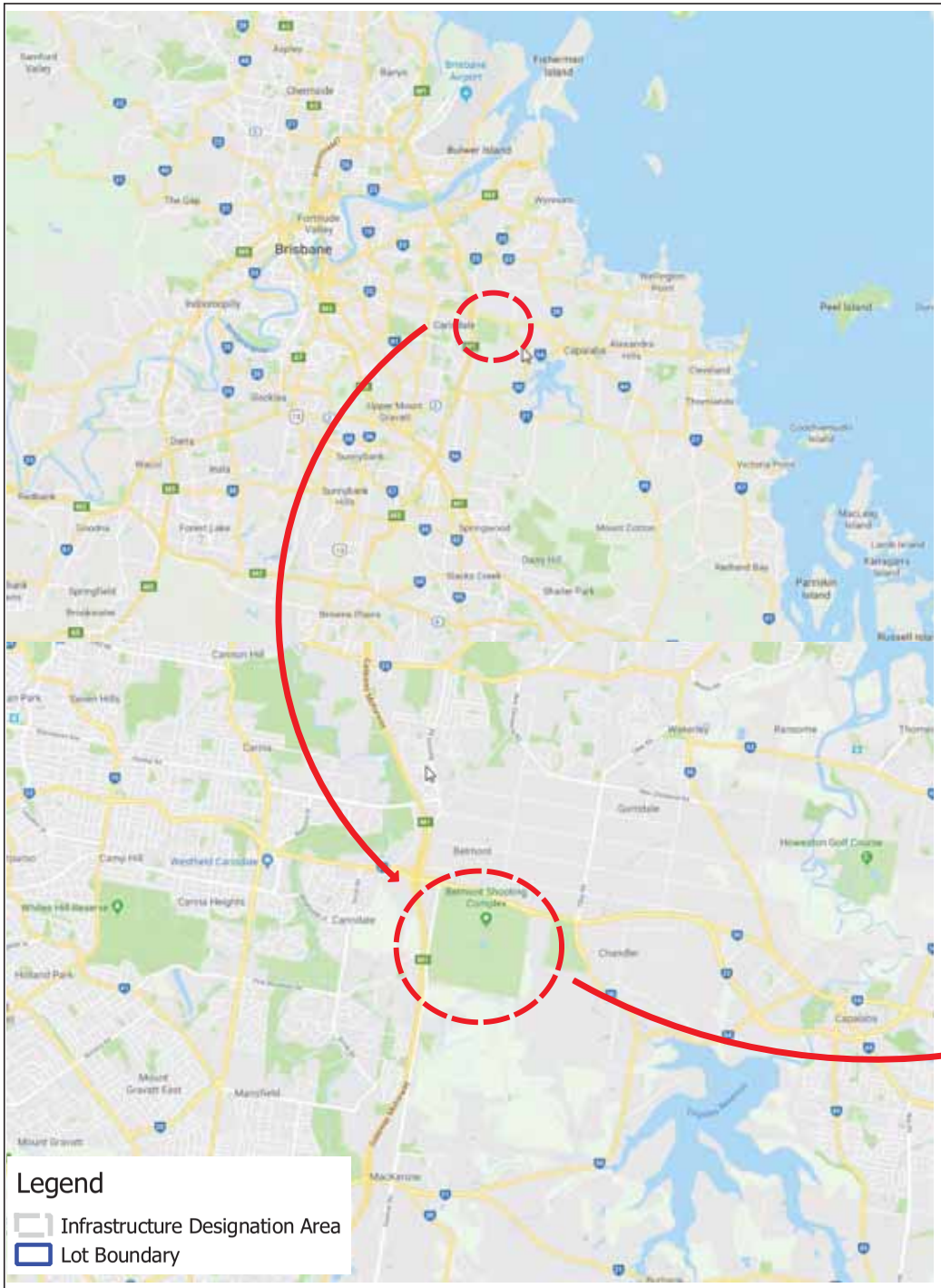
FIGURES



Project **Clay Target Ministerial Infrastructure Designation** **Environmental Assessment Report**	Client: Mode Design Title Site Location	Drawn J.T Checked S.M Approved J.T	LAMBERT & REHBEIN ENGINEERS • MANAGERS • SCIENTISTS CBD HOUSE LEVEL 3, 120 WICKHAM STREET FORTITUDE VALLEY QLD 4006 P.O. BOX 112 FORTITUDE VALLEY QLD 4006 TELEPHONE (07) 3250 9000 FACSIMILE (07) 3250 9001 EMAIL mail@lar.net.au A.C.N. 010 451 902 The Association of Consulting Engineers Australia

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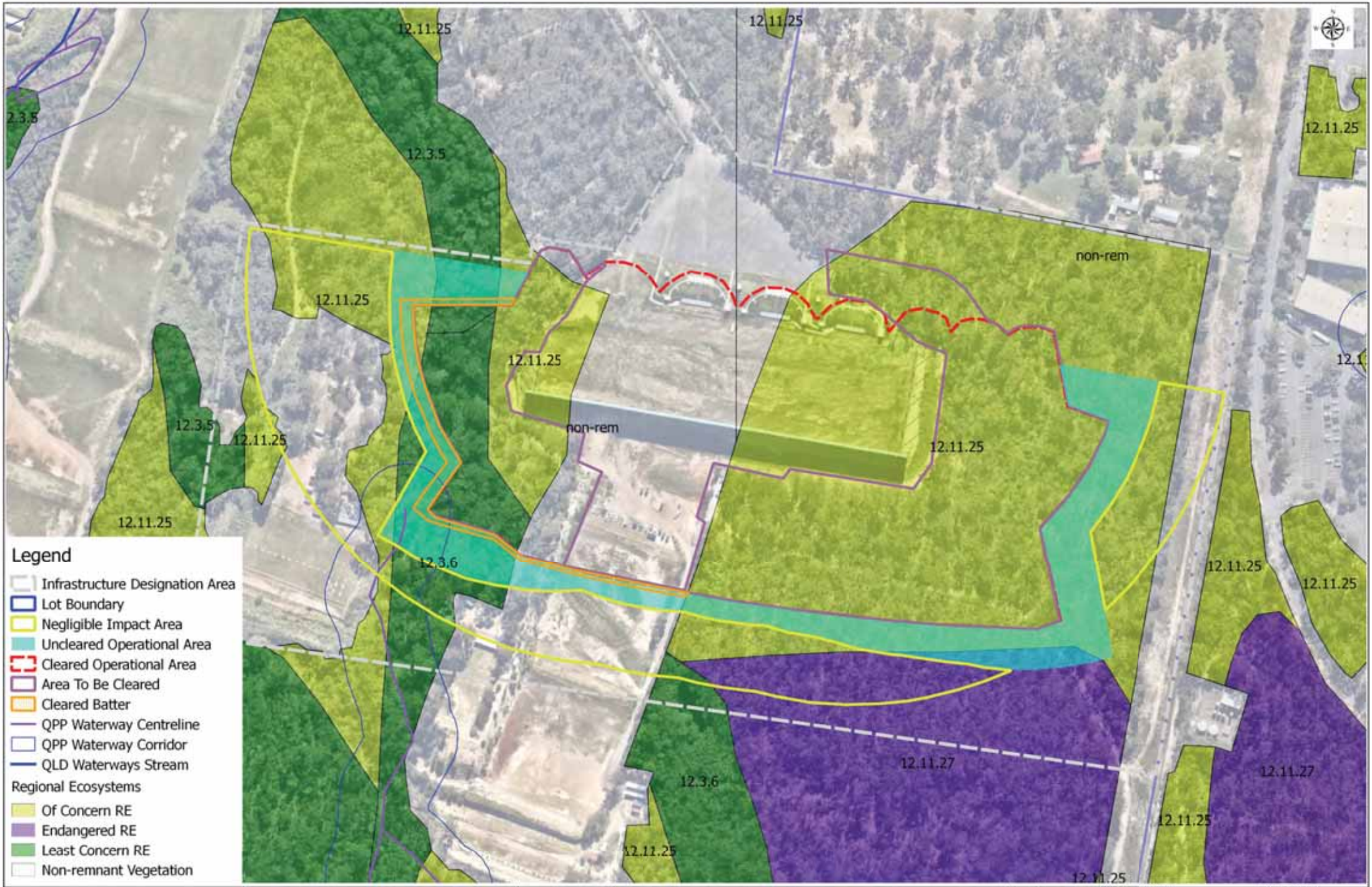
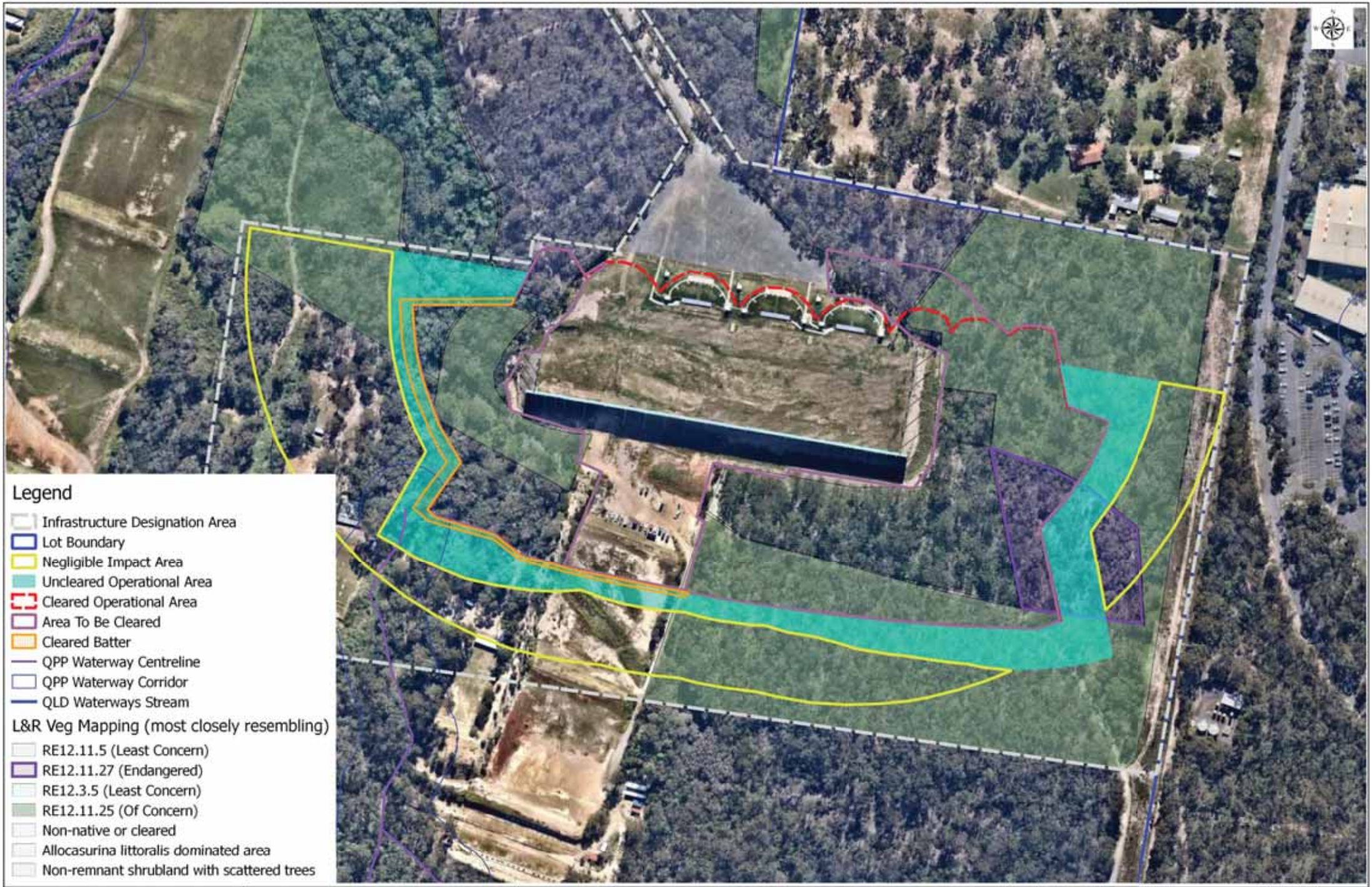


Project **Clay Target Ministerial Infrastructure Designation** **Environmental Assessment Report**	Client: Mode Design Title Vegetation Mapping (QLD Gov RE Mapping)	Drawn J.T Checked S.M Approved J.T	LAMBERT & REHBEIN ENGINEERS • MANAGERS • SCIENTISTS CBD HOUSE LEVEL 3, 120 WICKHAM STREET FORTITUDE VALLEY QLD 4006	REV	DATE	Figure No: AS SHOWN Figure 2 Scale: NTS File Ref: A3 Sheet size



Project **Clay Target Ministerial Infrastructure Designation** **Environmental Assessment Report**	Client: Mode Design Title Vegetation Mapping (L&R investigations)	Drawn J.T Checked S.M Approved J.T	LAMBERT & REHBEIN ENGINEERS • MANAGERS • SCIENTISTS CBD HOUSE LEVEL 3, 129 WICKHAM STREET FORTITUDE VALLEY QLD 4006 TELEPHONE (07) 3250 9000 FACSIMILE (07) 3250 9001 EMAIL mail@lar.net.au A.C.N. 010 451 902 The Association of Consulting Engineers Australia	REV / DATE	Figure No: AS SHOWN Figure 3 Scale: NTS File Ref: A3 Sheet size

Project
Clay Target Ministerial Infrastructure Designation
Environmental Assessment Report

Client: Mode Design

Title
Fauna Survey Area (L&R, 2016)

Drawn J.T
Checked S.M
Approved J.T

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ENGINEERS • MANAGERS • SCIENTISTS
CBD HOUSE
LEVEL 3, 109 WICKHAM STREET
FORTITUDE VALLEY QLD 4006
TELEPHONE (07) 3250 9000
FACSIMILE (07) 3250 9001
EMAIL mail@lr.net.au
A.C.N. 010 451 902
The Association of Consulting Engineers Australia

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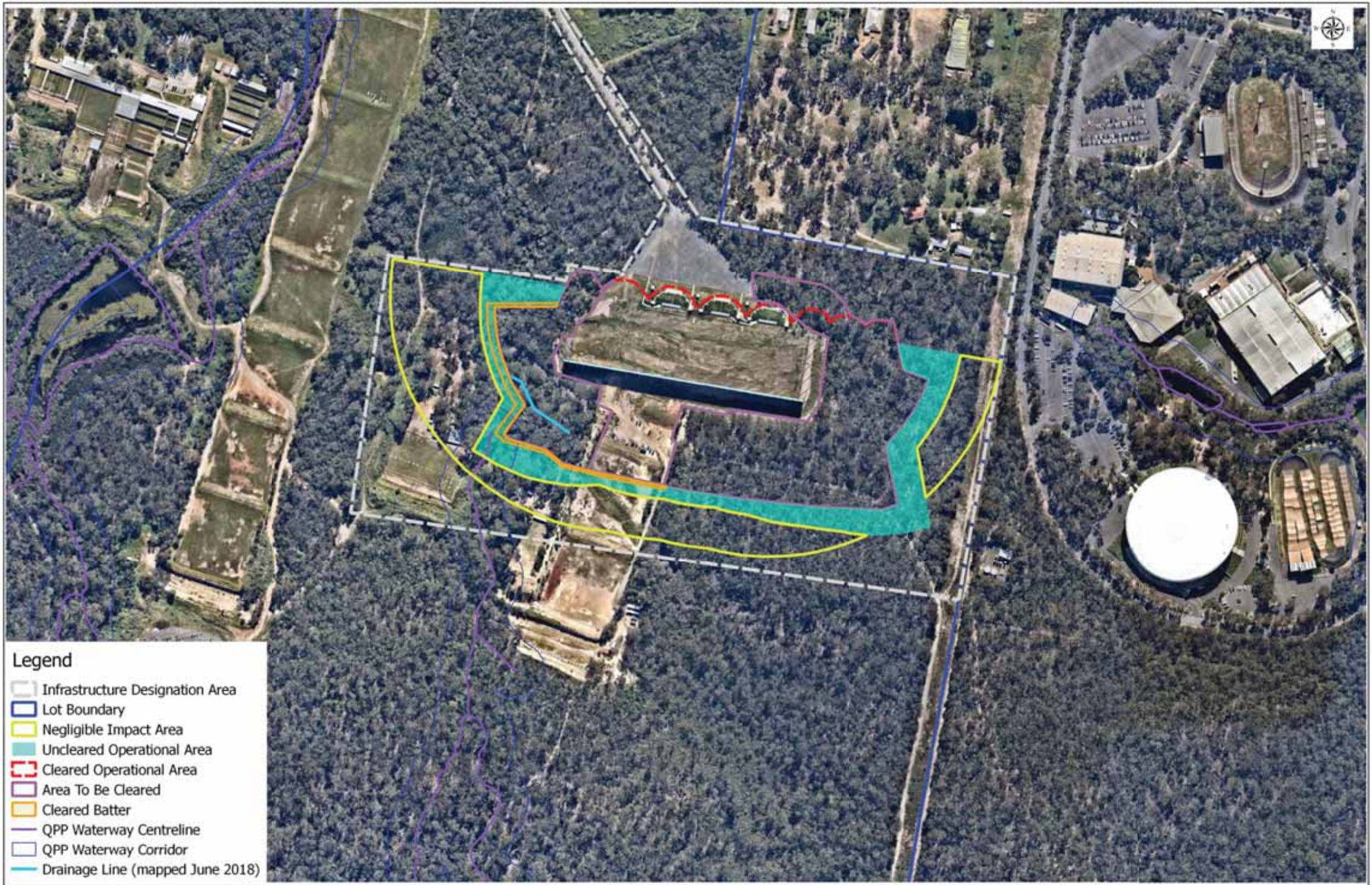
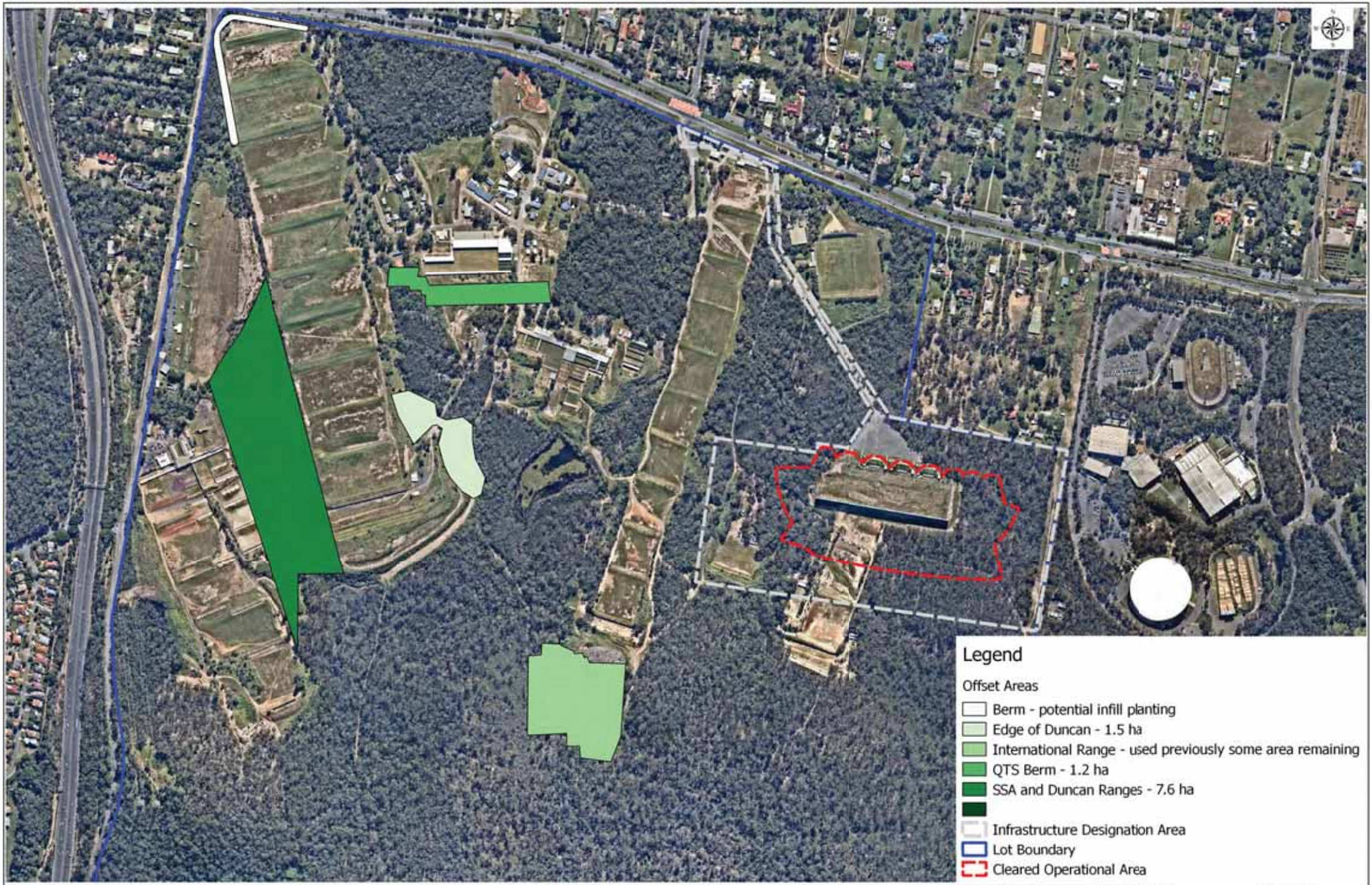
Project **Clay Target Ministerial Infrastructure Designation** **Environmental Assessment Report**	Client: Mode Design Title Koala Habitat Trees	Drawn J.T Checked S.M Approved J.T	LAMBERT & REHBEIN ENGINEERS • MANAGERS • SCIENTISTS CBD HOUSE LEVEL 3, 109 WICKHAM STREET FORTITUDE VALLEY QLD 4006 TELEPHONE (07) 3250 9000 FACSIMILE (07) 3250 9001 EMAIL mail@lr.net.au A.C.N. 010 451 902 The Association of Consulting Engineers Australia	REV / DATE	Figure No: AS SHOWN Figure 5 Scale: NTS File Ref:	A3 Sheet size



Project **Clay Target Ministerial Infrastructure Designation** **Environmental Assessment Report**	Client: Mode Design Title Mapped Drainage Lines	Drawn J.T Checked S.M Approved J.T	LAMBERT & REHBEIN ENGINEERS • MANAGERS • SCIENTISTS CBD HOUSE LEVEL 3, 129 WICKHAM STREET FORTITUDE VALLEY QLD 4006 TELEPHONE (07) 3250 9000 FACSIMILE (07) 3250 9001 EMAIL mail@lar.net.au A.C.N. 010 451 902 The Association of Consulting Engineers Australia	REV	DATE	Figure No: AS SHOWN Figure 6 Scale: NTS File Ref: A3 Sheet size



Project **Clay Target Ministerial Infrastructure Designation** **Environmental Assessment Report**	Client: Mode Design Title Potential Offset Areas	Drawn J.T Checked S.M Approved J.T	LAMBERT & REHBEIN ENGINEERS • MANAGERS • SCIENTISTS CBD HOUSE LEVEL 3, 129 WICKHAM STREET FORTITUDE VALLEY QLD 4006 TELEPHONE (07) 3250 9000 FACSIMILE (07) 3250 9001 EMAIL mail@lr.net.au A.C.N. 010 451 902 The Association of Consulting Engineers Australia	REV / DATE	Figure No: AS SHOWN Figure 7 Scale: NTS File Ref:

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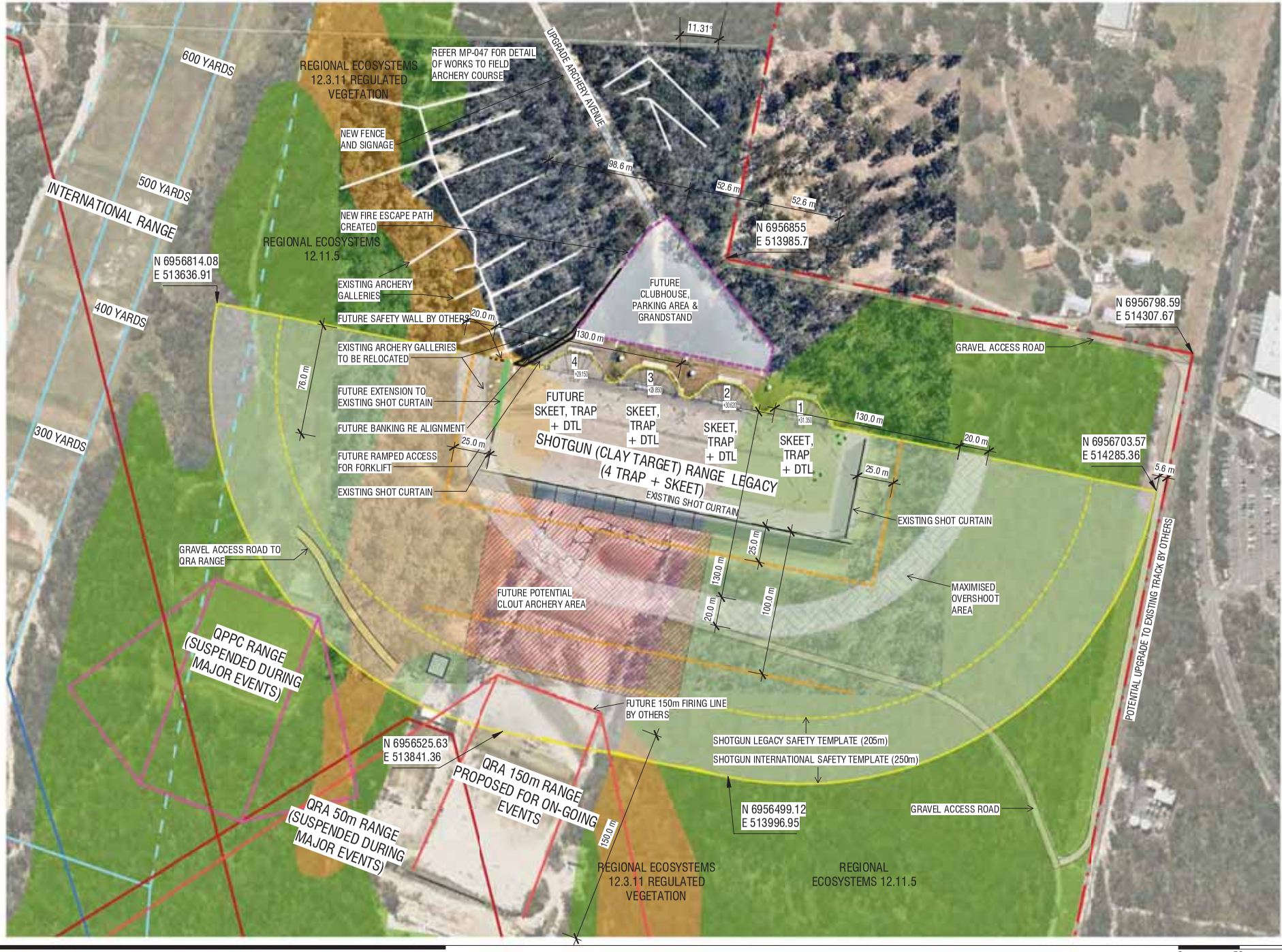
APPENDIX A

EXISTING FACILITY



BRISBANE
Plaza Level, Mosaic
826 Ann St
Fortitude Valley QLD 4006
T +61 7 3846 0877
bne@modedesign.au

DEPARTMENT OF STATE DEVELOPMENT

BELMONT SHOOTING CENTRE SHOTGUN ID
1485 OLD CLEVELAND ROAD, BELMONT QLD

Infrastructure Designation

SHOTGUN (CLAY TARGET) LEGACY

0 50 100 150

Project No: 14479BNE
Date: 08/01/18
Scale: 1 : 2500@ A3
Drawn / Check: AutChecker

MP - 044

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APPENDIX B

VEGETATION MANAGEMENT PROPERTY REPORT

Department of Natural Resources, Mines and Energy

Vegetation management report

For Lot: 1 Plan: RP169229

Current as at 18/07/2018

Queensland Government

This publication has been compiled by Operations Support, Department of Natural Resources, Mines and Energy.

Recent changes

New vegetation clearing laws

New vegetation management laws were passed by the Queensland Parliament on 3 May 2018 and may affect the clearing you can undertake on your property.

For more information, read about the new vegetation management laws (https://www.dnrme.qld.gov.au/land-water/initiatives/vegetation-management-laws/) or call 135VEG (13 58 34) between 8.30am and 4.30pm Monday to Friday.

Updated mapping

The Regulated Vegetation Management Map and Supporting Map was updated in March 2018 to reflect the most up to date information available in relation to regional ecosystems, essential habitat and wetland mapping (Version 10).

Overview

Based on the lot on plan details you have supplied, this report provides the following detailed information:

- *Vegetation management framework* - an explanation of the application of the framework.
- *Property details* - information about the specified Lot on Plan, lot size, local government area, bioregion(s), subregion(s), catchment(s), coastal or non coastal status, and any applicable area management plans associated with your property.
- *Vegetation management details for the specified Lot on Plan* - specific information about your property including vegetation categories, regional ecosystems, watercourses, wetlands, essential habitat, and protected plants.
- *Contact information.*
- *Maps* - a series of colour maps to assist in identifying regulated vegetation on your property.
- *Other legislation contact information.*

This information will assist you to determine your options for managing vegetation, which may include:

- exempt clearing work
- accepted development vegetation clearing code
- an area management plan
- a development approval.

Other laws

The clearing of native vegetation is regulated by both Queensland and Australian legislation, and some local governments also regulate native vegetation clearing. You may need to obtain an approval or permit under another Act, such as Queensland's Protected Plants framework or the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Section 6 of this guide provides contact details of other agencies you should confirm requirements with, before commencing vegetation clearing.

Table of Contents

1. Vegetation management framework

The *Vegetation Management Act 1999* (VMA), the Vegetation Management Regulation 2012, the *Planning Act 2016* and the Planning Regulation 2017, in conjunction with associated policies and codes, form the Vegetation Management Framework.

The VMA does not apply to all land tenures or vegetation types. State forests, national parks, forest reserves and some tenures under the *Forestry Act 1959* and *Nature Conservation Act 1992* are not regulated by the VMA. Managing or clearing vegetation on these tenures may require approvals under these laws.

The following native vegetation is not regulated under the VMA but may require permit(s) under other laws:

- grass or non-woody herbage;
- a plant within a grassland regional ecosystem prescribed under Schedule 5 of the Vegetation Management Regulation 2012; and
- a mangrove.

1.1 Exempt clearing work

Exempt clearing work is an activity for which you do not need to notify DNRME or obtain an approval. Exempt clearing work was previously known as exemptions.

In areas that are mapped as Category X (white in colour) on the regulated vegetation management map (see section 5.1), and where the land tenure is freehold, indigenous land and leasehold land for agriculture and grazing purposes, the clearing of vegetation is considered exempt clearing work and does not require notification or development approval. For all other land tenures, contact DNRME before commencing clearing to ensure that the proposed activity is exempt clearing work.

A range of routine property management activities are considered exempt clearing work. A list of exempt clearing work is available at
https://www.qld.gov.au/environment/land/vegetation/exemptions/.

Exempt clearing work may be affected if the proposed clearing area is subject to development approval conditions, a covenant, an environmental offset, an exchange area, a restoration notice, or an area mapped as Category A. Contact DNRME prior to clearing in any of these areas.

1.2 Accepted development vegetation clearing codes

Some clearing activities can be undertaken under an accepted development vegetation clearing code. The codes can be downloaded at
https://www.qld.gov.au/environment/land/vegetation/codes/

If you intend to clear vegetation under an accepted development vegetation clearing code, you must notify DNRME before commencing. The information in this report will assist you to complete the online notification form.

You can complete the online form at
https://apps.dnrm.qld.gov.au/vegetation/

1.3 Area management plans

Area Management Plans (AMP) provide an alternative approval system for vegetation clearing. They list the purposes and clearing conditions that have been approved for the areas covered by the plan. It is not necessary to use an AMP, even when an AMP applies to your property.

As a result of the new laws, AMPs for fodder harvesting, managing thickened vegetation and managing encroachment will continue for 2 years. New notifications cannot be made for these AMPs.

New notifications can be made for all other AMPs. These will continue to apply until their nominated end date.

If an area management plan applies to your property for which you can make a new notification, it will be listed in Section 2.2 of this report. Before clearing under one of these AMPs, you must first notify the DNRME and then follow the conditions and requirements listed in the AMP.
https://www.qld.gov.au/environment/land/vegetation/area-plans/

1.4 Development approvals

If your proposed clearing is not exempt clearing work, or is not permitted under an accepted development vegetation clearing code, or an AMP, you may be able to apply for a development approval. Information on how to apply for a development approval is available at
https://www.qld.gov.au/environment/land/vegetation/applying/

2. Property details

2.1 Tenure

All of the lot, plan and tenure information associated with property Lot: 1 Plan: RP169229, including links to relevant Smart Maps, are listed in Table 1. The tenure of the property (whether it is freehold, leasehold, or other) may be viewed by clicking on the Smart Map link(s) provided.

Table 1: Lot, plan and tenure information for the property

Lot	Plan	Tenure	Link to property on SmartMap
1	RP169229	Freehold	http://globe.information.qld.gov.au/cgi-bin/SmartMapgen.py?q=1\RP169229
E	SP242313	Easement	http://globe.information.qld.gov.au/cgi-bin/SmartMapgen.py?q=E\SP242313
G	SP242313	Easement	http://globe.information.qld.gov.au/cgi-bin/SmartMapgen.py?q=G\SP242313
AA	SP246243	Easement	http://globe.information.qld.gov.au/cgi-bin/SmartMapgen.py?q=AA\SP246243
B	RP170328	Easement	http://globe.information.qld.gov.au/cgi-bin/SmartMapgen.py?q=B\RP170328
A	RP171885	Easement	http://globe.information.qld.gov.au/cgi-bin/SmartMapgen.py?q=A\RP171885
F	SP242313	Easement	http://globe.information.qld.gov.au/cgi-bin/SmartMapgen.py?q=F\SP242313
P	SP163158	Easement	http://globe.information.qld.gov.au/cgi-bin/SmartMapgen.py?q=P\SP163158

The tenure of the land may affect whether clearing is considered exempt clearing work or may be carried out under an accepted development vegetation clearing code.

2.2 Property location

Table 2 provides a summary of the locations for property Lot: 1 Plan: RP169229, in relation to natural and administrative boundaries.

Table 2: Property location details

Local Government(s)
Brisbane City

Bioregion(s)	Subregion(s)
Southeast Queensland	Burringbar - Conondale Ranges

Catchment(s)
Logan-Albert
Brisbane

For the purposes of the accepted development vegetation clearing codes and the State Development Assessment Provisions (SDAP), this property is regarded as*
Coastal

*See also Map 5.4

Area Management Plan(s): Nil

3. Vegetation management details for Lot: 1 Plan: RP169229

3.1 Vegetation categories

Vegetation categories are shown on the regulated vegetation management map in section 5.1 of this report. A summary of vegetation categories on the subject lot are listed in Table 3. Descriptions for these categories are shown in Table 4.

Table 3: Vegetation categories for subject property. Total area: 501.72ha

Vegetation category	Area (ha)
Category B	359.3
Category C	5.37
Category Water	2.15
Category X	134.9

Table 4

Category	Colour on Map	Description	Requirements / options
A	red	Compliance areas, environmental offset areas and voluntary declaration areas	Special conditions apply to Category A areas. Before clearing, contact DNRME to confirm any requirements in a Category A area.
B	dark blue	Remnant vegetation areas	Exempt clearing work, or notification and compliance with accepted development vegetation clearing codes, area management plans or development approval.
C	light blue	High-value regrowth areas	Exempt clearing work, or notification and compliance with managing Category C regrowth vegetation accepted development vegetation clearing code.
R	yellow	Regrowth within 50m of a watercourse or drainage feature in the Great Barrier Reef catchment areas	Exempt clearing work, or notification and compliance with managing Category R regrowth accepted development vegetation clearing code or area management plans.
X	white	Clearing is considered accepted development on freehold land, indigenous land and leasehold land for agriculture and grazing purposes. Contact DNRME to clarify whether a development approval is required for other State land tenures.	No permit or notification required on freehold land, indigenous land and leasehold land for agriculture and grazing. A development approval may be required for some State land tenures.

Property Map of Assessable Vegetation (PMAV)

This report does not confirm if a Property Map of Assessable Vegetation (PMAV) exists on a lot. To confirm whether or not a PMAV exists on a lot, please check the PMAV layer on the Queensland Globe2, or contact DNRME on 135VEG (135 834).

3.2 Regional ecosystems

The endangered, of concern and least concern regional ecosystems on your property are shown on the vegetation management supporting map in section 5.2 and are listed in Table 5.

A description of regional ecosystems can be accessed online at
https://www.qld.gov.au/environment/plants-animals/plants/ecosystems/descriptions/

Table 5: Regional ecosystems present on subject property

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
12.11.24	Least concern	B	87.78	Eucalyptus carnea, E. tindaliae, Corymbia intermedia +/- E. siderophloia or E. crebra woodland on metamorphics +/- interbedded volcanics	Sparse
12.11.25	Of concern	B	80.20	Corymbia henryi and/or Eucalyptus fibrosa subsp. fibrosa +/- E. crebra, E. carnea, E. tindaliae woodland on metamorphics +/- interbedded volcanics	Sparse
12.11.25	Of concern	C	5.05	Corymbia henryi and/or Eucalyptus fibrosa subsp. fibrosa +/- E. crebra, E. carnea, E. tindaliae woodland on metamorphics +/- interbedded volcanics	Sparse
12.11.27	Endangered	B	90.53	Eucalyptus racemosa subsp. racemosa and/or E. seeana and Corymbia intermedia woodland on metamorphics +/- interbedded volcanics	Sparse
12.11.3	Least concern	B	18.78	Eucalyptus siderophloia, E. propinqua +/- E. microcorys, Lophostemon confertus, Corymbia intermedia, E. acmenoides open forest on metamorphics +/- interbedded volcanics	Mid-dense
12.11.5	Least concern	B	51.33	Corymbia citriodora subsp. variegata woodland to open forest +/- Eucalyptus siderophloia/E. crebra, E. carnea, E. acmenoides, E. propinqua on metamorphics +/- interbedded volcanics	Mid-dense
12.3.11	Of concern	B	3.84	Eucalyptus tereticornis +/- Eucalyptus siderophloia, Corymbia intermedia open forest on alluvial plains usually near coast	Mid-dense
12.3.5	Least concern	B	6.36	Melaleuca quinquenervia open forest on coastal alluvium	Mid-dense
12.3.5	Least concern	C	0.15	Melaleuca quinquenervia open forest on coastal alluvium	Mid-dense
12.3.6	Least concern	B	16.97	Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest on coastal alluvial plains	Mid-dense
12.3.6	Least concern	C	0.12	Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest on coastal alluvial plains	Mid-dense
12.9-10.4	Least concern	B	3.51	Eucalyptus racemosa subsp. racemosa woodland on sedimentary rocks	Sparse
non-rem	None	X	134.90	None	None
water	None	C	0.05	None	None

Regional Ecosystem	VMA Status	Category	Area (Ha)	Short Description	Structure Category
water	None	Water	2.15	None	None

Please note:

1. All area and area derived figures included in this table have been calculated via reprojecting relevant spatial features to Albers equal-area conic projection (central meridian = 146, datum Geocentric Datum of Australia 1994). As a result, area figures may differ slightly if calculated for the same features using a different co-ordinate system.

2. If Table 5 contains a Category 'plant', please be aware that this refers to 'plantations' such as forestry, and these areas are considered non-remnant under the VMA.

The VMA status of the regional ecosystem (whether it is endangered, of concern or least concern) also determines if any of the following are applicable:

- exempt clearing work
- accepted development vegetation clearing codes
- performance outcomes in State Development Assessment Provisions (SDAP).

3.3 Watercourses

Vegetation management watercourses and drainage features for this property are shown on the vegetation management supporting map in section 5.2.

3.4 Wetlands

There are no vegetation management wetlands present on this property.

3.5 Essential habitat

Protected wildlife is native wildlife prescribed under the *Nature Conservation Act 1992* (NCA), and includes endangered, vulnerable or near-threatened wildlife.

Essential habitat for protected wildlife includes suitable habitat on the lot, or where a species has been known to occur up to 1.1 kilometres from a lot on which there is assessable vegetation. These important habitat areas are protected under the VMA.

Any essential habitat on this property will be shown as blue hatching on the vegetation supporting map in section 5.2.

If essential habitat is identified on the lot, information about the protected wildlife species is provided in Table 6 below. The numeric labels on the vegetation management supporting map can be cross referenced with Table 6 to outline the essential habitat factors for that particular species. There may be essential habitat for more than one species on each lot, and areas of Category A, Category B and Category C can be mapped as Essential Habitat.

Essential habitat is compiled from a combination of species habitat models and buffered species records. Regional ecosystem is a mandatory essential habitat factor, unless otherwise stated. Essential habitat, for protected wildlife, means an area of vegetation shown on the Regulated Vegetation Management Map as assessable vegetation -

1) that has at least 3 essential habitat factors for the protected wildlife that must include any essential habitat factors that are stated as mandatory for the protected wildlife in the essential habitat database. Essential habitat factors are comprised of - regional ecosystem (mandatory for most species), vegetation community, altitude, soils, position in landscape; or

2) in which the protected wildlife, at any stage of its life cycle, is located.

If there is no essential habitat mapping shown on the vegetation management supporting map for this lot, and there is no table in the sections below, it confirms that there is no essential habitat on the lot.

Category A and/or Category B and/or Category C

Table 6: Essential habitat in Category A and/or Category B and/or Category C

Label	Scientific Name	Common Name	NCA Status	Vegetation Community	Altitude	Soils	Position in Landscape
686	Crinia tinnula	wallum froglet	V	Vegetation community is a mandatory essential habitat factor for this species. Permanent to ephemeral acidic (pH 4.3 - 5.2), soft freshwater in Melaleuca (e.g. M. quinquenervia) swamps, sedgeland, wet and dry heathland (e.g. Banksia robur, Xanthorrhoea) and wallum (Banksia aemula shrubland/woodland) areas coastal lowlands on sand or sandstone, occasionally in adjacent open forest/woodland (e.g. Eucalyptus racemosa, Corymbia citriodora) with heathy understorey; known to persist in small remnants (<10ha); may be found well away from water.	Sea level to 150m.	Sandy and sandy-alluvial substrates.	None
860	Phascolarctos cinereus	koala	V	SEQ: Open eucalypt forest and woodland that has: a) multiple strata layers containing Eucalyptus, Corymbia, Angophora, Lophostemon or Melaleuca trees that-at 1.3 metres above the ground-have a diameter both greater and less than 30 centimetres; and b) at least 1 of the following species: Eucalyptus tereticornis, E. fibrosa, E. propinqua; E. umbra, E. grandis, E. microcorys, E. tindaliae, E. resinifera, E. populnea, E. robusta, E. nigra, E. racemosa, E. crebra, E. exserta, E. seeana, Lophostemon confertus, L. suaveolens, Melaleuca quinquenervia. Outside SEQ: Open eucalypt forest and woodland that contains Eucalyptus &/or Corymbia spp. Tree species used for food varies across State and can include Eucalyptus tereticornis, E. camaldulensis, E. coolabah; E. drepanophylla, E. platyphylla, E. orgadophilla, E. thozetiana, E. melanophloia, E. populnea, E. melliodora, E. dealbata, E. microtheca, E. crebra, E. exserta, E. blakelyi, E. papuana, Corymbia tessellaris, C. citriodora, Melaleuca quinquenervia, M. leucadendra.	Sea level to 1000m.	None	Riparian areas, plains and hill/escarpment slopes.
848	Petauroides volans	greater glider	V	Tall mature open wet and dry eucalypt forest (Eucalyptus &/or Corymbia spp.) to low open eucalypt woodland; presence of hollow-bearing trees.	Sea level to 1300m.	Usually on soils of relatively high fertility.	None
1107	Ninox strenua	powerful owl	V	Wet and dry tall open eucalypt forest (Eucalyptus pilularis, E. acmenoides, E. tereticornis, E. camaldulensis, E. crebra, E. melliodora, Corymbia citriodora & C. intermedia), including mountain forest gullies/gorges; forests aged 60+ years (large & old) on fertile soils with suitable hollows; roosting in dense foliage of closed forest (occasionally caves) and foraging in open forest and woodland including areas adjacent to urban/rural development. Nest in large hollows (45-75cm diameter, 50-180cm deep) 6-45m above ground, in large (>100cm dbh) old eucalypts on the side or at the head of heavily wooded gully.	Sea level to 1000m.	None	Gully.
1478	Anthochaera phrygia	regent honeyeater	E	Dry eucalypt woodland and open forest, woodland, rural and urban areas with mature eucalypts; favours box-ironbark associations including Eucalyptus sideroxylon, E. albens, E. melliodora, E. moluccana, E. robusta, E. caliginosa, E. maculata occasionally with Angophora leiocarpa, and Casuarina cunninghamiana in riparian forest; generally comprise large/mature trees that are reliable nectar producers (both in timing and quantity) with tall shrub layer on moist fertile sites (lower foothills/river valleys/creeklines). Nest in mistletoe, usually on horizontal branch or in vertical fork of rough-barked tree 1-30m above ground.	Sea level to 550m.	None	None
3235	Zieria furfuracea subsp. gymnocarpa	None	E	open forest of Lophostemon confertus, Eucalyptus crebra, Eucalyptus carnea, Acacia disparrima, or Eucalyptus propinqua, E. microcorys, Corymbia intermedia, or Eucalyptus propinqua, E. crebra, E. umbra, Corymbia intermedia, or Eucalyptus acmenoides, E. drepanophylla, E. propinqua, E.microcorys; open eucalypt forest with occasional rainforest elements; woodland of Eucalyptus crebra, Acacia disparrima and Mallotus philippensis	0 to 200 m	None	gully or hill slope

Label	Regional Ecosystem (mandatory unless otherwise specified)
686	12.2.5, 12.2.7, 12.2.9, 12.2.10, 12.2.12, 12.2.15, 12.3.4, 12.3.5, 12.3.6, 12.3.12, 12.3.14, 12.3.20, 12.5.2, 12.5.10. These regional ecosystems are not a mandatory essential habitat factor for this species.
860	SEQ: 11.3.2, 11.3.4, 11.3.25, 11.3.26, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.9.9, 12.2.5, 12.2.6, 12.2.7, 12.2.8, 12.2.10, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.6, 12.3.7, 12.3.9, 12.3.10, 12.3.11, 12.3.14, 12.3.18, 12.3.19, 12.3.20, 12.5.1, 12.5.2, 12.5.3, 12.5.4, 12.5.6, 12.5.7, 12.5.10, 12.5.12, 12.8.1, 12.8.8, 12.8.9, 12.8.11, 12.8.12, 12.8.14, 12.8.16, 12.8.17, 12.8.20, 12.8.24, 12.8.25, 12.9-10.1, 12.9-10.2, 12.9-10.3, 12.9-10.4, 12.9-10.5, 12.9-10.7, 12.9-10.8, 12.9-10.11, 12.9-10.12, 12.9-10.14, 12.9-10.17, 12.9-10.18, 12.9-10.19, 12.9-10.21, 12.9-10.25, 12.9-10.26, 12.9-10.27, 12.9-10.28, 12.9-10.29, 12.11.2, 12.11.3, 12.11.5, 12.11.6, 12.11.7, 12.11.8, 12.11.9, 12.11.14, 12.11.16, 12.11.17, 12.11.18, 12.11.22, 12.11.23, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.2, 12.12.3, 12.12.5, 12.12.6, 12.12.7, 12.12.8, 12.12.9, 12.12.11, 12.12.12, 12.12.14, 12.12.15, 12.12.23, 12.12.24, 12.12.25, 12.12.28. Outside SEQ: 4.3.1, 4.3.2, 4.3.3, 4.3.4, 4.3.5, 4.3.6, 4.3.8, 4.3.10, 4.3.11, 4.4.1, 4.5.3, 4.5.5, 4.5.6, 4.5.8, 4.5.9, 4.7.1, 4.7.7, 4.7.8, 4.9.6, 4.9.10, 4.9.12, 4.9.17, 6.3.1, 6.3.2, 6.3.3, 6.3.4, 6.3.5, 6.3.7, 6.3.8, 6.3.9, 6.3.11, 6.3.12, 6.3.17, 6.3.18, 6.3.22, 6.3.24, 6.3.25, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.5.1, 6.5.2, 6.5.3, 6.5.5, 6.5.6, 6.5.7, 6.5.8, 6.5.9, 6.5.10, 6.5.11, 6.5.13, 6.5.14, 6.5.15, 6.5.16, 6.5.17, 6.5.18, 6.5.19, 6.6.2, 6.7.1, 6.7.2, 6.7.5, 6.7.6, 6.7.7, 6.7.9, 6.7.11, 6.7.12, 6.7.13, 6.7.14, 6.7.17, 6.9.3, 7.2.3, 7.2.4, 7.2.7, 7.2.11, 7.3.7, 7.3.8, 7.3.9, 7.3.12, 7.3.13, 7.3.14, 7.3.16, 7.3.19, 7.3.20, 7.3.21, 7.3.25, 7.3.26, 7.3.39, 7.3.40, 7.3.42, 7.3.43, 7.3.44, 7.3.45, 7.3.47, 7.3.48, 7.3.50, 7.5.1, 7.5.2, 7.5.3, 7.5.4, 7.8.7, 7.8.8, 7.8.10, 7.8.15, 7.8.16, 7.8.17, 7.8.18, 7.8.19, 7.8.19, 7.11.5, 7.11.6, 7.11.13, 7.11.14, 7.11.16, 7.11.18, 7.11.19, 7.11.20, 7.11.20, 7.11.21, 7.11.31, 7.11.32, 7.11.33, 7.11.34, 7.11.35, 7.11.37, 7.11.41, 7.11.42, 7.11.43, 7.11.44, 7.11.45, 7.11.46, 7.11.47, 7.11.48, 7.11.49, 7.11.50, 7.11.51, 7.12.4, 7.12.5, 7.12.17, 7.12.21, 7.12.22, 7.12.23, 7.12.24, 7.12.25, 7.12.26, 7.12.27, 7.12.28, 7.12.29, 7.12.30, 7.12.33, 7.12.34, 7.12.35, 7.12.51, 7.12.52, 7.12.53, 7.12.54, 7.12.55, 7.12.56, 7.12.58, 7.12.59, 7.12.60, 7.12.61, 7.12.62, 7.12.63, 7.12.65, 7.12.66, 7.12.69, 8.1.5, 8.2.3, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.12, 8.2.13, 8.2.14, 8.3.1, 8.3.2, 8.3.3, 8.3.5, 8.3.6, 8.3.8, 8.3.10, 8.3.11, 8.3.13, 8.5.1, 8.5.2, 8.5.3, 8.5.5, 8.5.6, 8.5.7, 8.9.1, 8.10.1, 8.11.1, 8.11.3, 8.11.4, 8.11.5, 8.11.6, 8.11.8, 8.11.10, 8.11.12, 8.12.4, 8.12.5, 8.12.6, 8.12.7, 8.12.8, 8.12.9, 8.12.12, 8.12.14, 8.12.20, 8.12.22, 8.12.23, 8.12.25, 8.12.26, 8.12.27, 8.12.29, 8.12.31, 8.12.32, 9.3.1, 9.3.2, 9.3.3, 9.3.4, 9.3.5, 9.3.6, 9.3.7, 9.3.8, 9.3.10, 9.3.11, 9.3.13, 9.3.14, 9.3.15, 9.3.16, 9.3.17, 9.3.19, 9.3.20, 9.3.21, 9.3.22, 9.3.27, 9.4.1, 9.4.2, 9.4.3, 9.5.1, 9.5.3, 9.5.4, 9.5.5, 9.5.6, 9.5.7, 9.5.8, 9.5.9, 9.5.10, 9.5.11, 9.5.12, 9.5.15, 9.5.16, 9.5.17, 9.7.1, 9.7.2, 9.7.3, 9.7.4, 9.7.5, 9.7.6, 9.8.1, 9.8.2, 9.8.3, 9.8.4, 9.8.5, 9.8.9, 9.8.10, 9.8.11, 9.8.13, 9.10.1, 9.10.3, 9.10.4, 9.10.5, 9.10.7, 9.10.8, 9.11.1, 9.11.2, 9.11.3, 9.11.4, 9.11.5, 9.11.7, 9.11.10, 9.11.12, 9.11.13, 9.11.14, 9.11.15, 9.11.16, 9.11.17, 9.11.18, 9.11.19, 9.11.21, 9.11.22, 9.11.23, 9.11.24, 9.11.25, 9.11.26, 9.11.28, 9.11.29, 9.11.30, 9.11.31, 9.11.32, 9.12.1, 9.12.2, 9.12.3, 9.12.4, 9.12.5, 9.12.6, 9.12.7, 9.12.10, 9.12.11, 9.12.12, 9.12.13, 9.12.14, 9.12.15, 9.12.16, 9.12.17, 9.12.18, 9.12.19, 9.12.20, 9.12.21, 9.12.22, 9.12.23, 9.12.24, 9.12.25, 9.12.26, 9.12.27, 9.12.28, 9.12.29, 9.12.30, 9.12.31, 9.12.32, 9.12.33, 9.12.35, 9.12.36, 9.12.37, 9.12.38, 9.12.39, 9.12.44, 10.3.2, 10.3.3, 10.3.5, 10.3.6, 10.3.9, 10.3.10, 10.3.11, 10.3.12, 10.3.13, 10.3.14, 10.3.15, 10.3.17, 10.3.20, 10.3.27, 10.3.28, 10.4.3, 10.4.9, 10.5.1, 10.5.2, 10.5.4, 10.5.5, 10.5.7, 10.5.8, 10.5.9, 10.5.10, 10.5.11, 10.5.12, 10.7.1, 10.7.2, 10.7.3, 10.7.4, 10.7.5, 10.7.9, 10.7.10, 10.7.11, 10.7.12, 10.9.2, 10.9.3, 10.9.5, 10.10.1, 10.10.3, 10.10.4, 10.10.5, 10.10.7, 11.2.1, 11.2.5, 11.3.1, 11.3.2, 11.3.3, 11.3.4, 11.3.5, 11.3.6, 11.3.7, 11.3.9, 11.3.10, 11.3.12, 11.3.13, 11.3.14, 11.3.15, 11.3.16, 11.3.17, 11.3.18, 11.3.19, 11.3.21, 11.3.23, 11.3.25, 11.3.26, 11.3.27, 11.3.28, 11.3.29, 11.3.30, 11.3.32, 11.3.33, 11.3.35, 11.3.36, 11.3.37, 11.3.38, 11.3.39, 11.4.2, 11.4.3, 11.4.7, 11.4.8, 11.4.9, 11.4.10, 11.4.12, 11.4.13, 11.5.1, 11.5.2, 11.5.3, 11.5.4, 11.5.5, 11.5.7, 11.5.8, 11.5.9, 11.5.12, 11.5.13, 11.5.14, 11.5.17, 11.5.18, 11.5.20, 11.5.21, 11.7.1, 11.7.2, 11.7.3, 11.7.4, 11.7.6, 11.7.7, 11.8.1, 11.8.2, 11.8.4, 11.8.5, 11.8.8, 11.8.11, 11.8.12, 11.8.14, 11.8.15, 11.9.1, 11.9.2, 11.9.3, 11.9.5, 11.9.6, 11.9.7, 11.9.9, 11.9.10, 11.9.11, 11.9.13, 11.9.14, 11.10.1, 11.10.2, 11.10.3, 11.10.4, 11.10.5, 11.10.6, 11.10.7, 11.10.9, 11.10.11, 11.10.12, 11.10.13, 11.11.1, 11.11.2, 11.11.3, 11.11.4, 11.11.6, 11.11.7, 11.11.8, 11.11.9, 11.11.10, 11.11.11, 11.11.12, 11.11.13, 11.11.14, 11.11.15, 11.11.16, 11.11.17, 11.11.19, 11.11.20, 11.12.1, 11.12.2, 11.12.3, 11.12.5, 11.12.6, 11.12.7, 11.12.8, 11.12.9, 11.12.10, 11.12.13, 11.12.14, 11.12.15, 11.12.16, 11.12.17, 11.12.19, 11.12.20, 13.3.1, 13.3.2, 13.3.3, 13.3.4, 13.3.5, 13.3.7, 13.9.2, 13.11.1, 13.11.2, 13.11.3, 13.11.4, 13.11.5, 13.11.6, 13.11.8, 13.11.9, 13.12.1, 13.12.2, 13.12.3, 13.12.4, 13.12.5, 13.12.6, 13.12.8, 13.12.9, 13.12.10.
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Label	Regional Ecosystem (mandatory unless otherwise specified)
1107	8.2.2, 8.2.3, 8.2.4, 8.2.5, 8.2.6, 8.2.7, 8.2.8, 8.2.11, 8.2.13, 8.2.14, 8.3.1, 8.3.3, 8.3.6, 8.3.8, 8.3.9, 8.3.10, 8.3.11, 8.5.1, 8.8.1, 8.10.1, 8.11.2, 8.11.3, 8.11.5, 8.12.1, 8.12.2, 8.12.3, 8.12.4, 8.12.5, 8.12.7, 8.12.8, 8.12.11, 8.12.12, 8.12.14, 8.12.16, 8.12.17, 8.12.18, 8.12.19, 8.12.26, 8.12.27, 8.12.28, 8.12.29, 8.12.30, 8.12.31, 8.12.32, 11.2.2, 11.2.3, 11.3.1, 11.3.11, 11.3.12, 11.3.25, 11.3.26, 11.3.40, 11.4.1, 11.4.3, 11.4.7, 11.4.9, 11.5.7, 11.5.16, 11.8.1, 11.8.13, 11.9.1, 11.9.4, 11.9.5, 11.9.6, 11.9.10, 11.9.13, 11.10.1, 11.10.2, 11.10.5, 11.10.8, 11.10.9, 11.10.13, 11.11.3, 11.11.5, 11.11.13, 11.11.14, 11.11.18, 11.12.4, 11.12.13, 11.12.19, 11.12.21, 12.2.1, 12.2.2, 12.2.3, 12.2.4, 12.2.5, 12.2.7, 12.2.8, 12.3.1, 12.3.2, 12.3.3, 12.3.4, 12.3.5, 12.3.7, 12.3.9, 12.3.10, 12.3.11, 12.3.15, 12.3.16, 12.3.17, 12.3.18, 12.3.19, 12.3.20, 12.3.21, 12.5.1, 12.5.3, 12.5.6, 12.5.7, 12.5.13, 12.8.1, 12.8.2, 12.8.3, 12.8.4, 12.8.5, 12.8.6, 12.8.7, 12.8.8, 12.8.9, 12.8.10, 12.8.11, 12.8.12, 12.8.13, 12.8.14, 12.8.18, 12.8.21, 12.8.22, 12.8.23, 12.8.24, 12.8.25, 12.8.26, 12.9-10.1, 12.9-10.2, 12.9-10.3, 12.9-10.4, 12.9-10.5, 12.9-10.6, 12.9-10.14, 12.9-10.16, 12.9-10.17, 12.9-10.18, 12.9-10.19, 12.9-10.20, 12.9-10.21, 12.9-10.23, 12.9-10.24, 12.9-10.25, 12.9-10.26, 12.9-10.29, 12.11.1, 12.11.2, 12.11.3, 12.11.4, 12.11.5, 12.11.6, 12.11.9, 12.11.10, 12.11.11, 12.11.12, 12.11.13, 12.11.16, 12.11.17, 12.11.18, 12.11.19, 12.11.23, 12.11.24, 12.11.25, 12.11.26, 12.11.27, 12.11.28, 12.12.1, 12.12.2, 12.12.3, 12.12.4, 12.12.5, 12.12.6, 12.12.11, 12.12.13, 12.12.15, 12.12.16, 12.12.17, 12.12.18, 12.12.20, 12.12.26, 12.12.28, 13.3.2, 13.3.3, 13.3.5, 13.9.2, 13.11.2, 13.11.5, 13.11.6, 13.11.7, 13.12.1, 13.12.4, 13.12.11
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3235	12.11.5

3.6 Protected plants (administered by the Department of Environment and Science (DES))

In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992* (NCA), with clearing of protected plants in the wild regulated by the Nature Conservation (Wildlife Management) Regulation 2006. These requirements apply irrespective of the classification of the vegetation under the *Vegetation Management Act 1999*.

Prior to clearing, if the plants proposed to be cleared are in the wild (see Operational policy: When a protected plant in Queensland is considered to be 'in the wild') and the exemptions under the Nature Conservation (Wildlife Management) Regulation 2006 are not applicable to the proposed clearing, you must check the flora survey trigger map to determine if any part of the area to be cleared is within a high risk area. The trigger map for this property is provided in section 5.5. The exemptions relate to:

- imminent risk of death or serious injury (refer s261A)
- imminent risk of serious damage to a building or other structure on land, or to personal property (refer s261B)
- *Fire and Emergency Service Act 1990* (refer 261C)
- previously cleared areas (refer s261ZB)
- maintenance activities (refer s261ZC)
- firebreak or fire management line (refer s261ZD)
- accepted development vegetation clearing code (refer s261ZE)
- conservation purposes (refer s261ZG)
- authorised in particular circumstances (refer s385).

Some exemptions under the NCA are the same as exempt clearing work (formerly known as exemptions) from the *Vegetation Management Act 1999* (i.e. listed in the Planning Regulations 2017) while some are different.

If the proposed area to be cleared is shown as blue (i.e. high risk) on the flora survey trigger map, a flora survey of the clearing impact area must be undertaken in accordance with the flora survey guidelines. The main objective of a flora survey is to locate any endangered, vulnerable or near threatened plants (EVNT plants) that may be present in the clearing impact

area.

If a flora survey identifies that EVNT plants are not present within the clearing impact area or clearing within 100m of EVNT plants can be avoided, the clearing activity is exempt from a permit. An exempt clearing notification form must be submitted to the Department of Environment and Science, with a copy of the flora survey report, at least one week prior to clearing. The clearing must be conducted within two years after the flora survey report was submitted.

If a flora survey identifies that EVNT plants are present in, or within 100m of, the area to be cleared, a clearing permit is required before any clearing is undertaken. The flora survey report, as well as an impact management report, must be submitted with the application form clearing permit.

In an area other than a high risk area, a clearing permit is only required where a person is, or becomes aware that EVNT plants are present in, or within 100m of, the area to be cleared. You must keep a copy of the flora survey trigger map for the area subject to clearing for five years from the day the clearing starts. If you do not clear within the 12 month period that the flora survey trigger map was printed, you need to print and check a new flora survey trigger map.

Further information on protected plants is available at
http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/

For assistance on the protected plants flora survey trigger map for this property, please contact the Department of Environment and Science at palm@des.qld.gov.au.

3.7 Emissions Reduction Fund (ERF)

The ERF is an Australian Government scheme which offers incentives for businesses and communities across the economy to reduce emissions.

Under the ERF, landholders can earn money from activities such as planting (and keeping) trees, managing regrowth vegetation and adopting more sustainable agricultural practices.

The purpose of a project is to remove greenhouse gases from the atmosphere. Each project will provide new economic opportunities for farmers, forest growers and land managers.

Further information on ERF is available at https://www.qld.gov.au/environment/land/state/use/carbon-rights/.

4. Contact information for DNRME

For further information on vegetation management:
Phone 135VEG (135 834)
Email vegetation@dnrme.qld.gov.au
Visit www.dnrme.qld.gov.au/our-department/contact-us/vegetation-contacts to submit an online enquiry.

For contact details for other State and Commonwealth agencies, please see Section 6.

5. Maps

The maps included in this report may also be requested individually at:

https://www.dnrme.qld.gov.au/qld/environment/land/vegetation/vegetation-map-request-form
and
http://www.ehp.qld.gov.au/licences-permits/plants-animals/protected-plants/map-request.php

Regulated vegetation management map

The regulated vegetation management map shows vegetation categories needed to determine clearing requirements. These maps are updated monthly to show new property maps of assessable vegetation (PMAV).

Vegetation management supporting map

The vegetation management supporting map provides information on regional ecosystems, wetlands, watercourses and essential habitat.

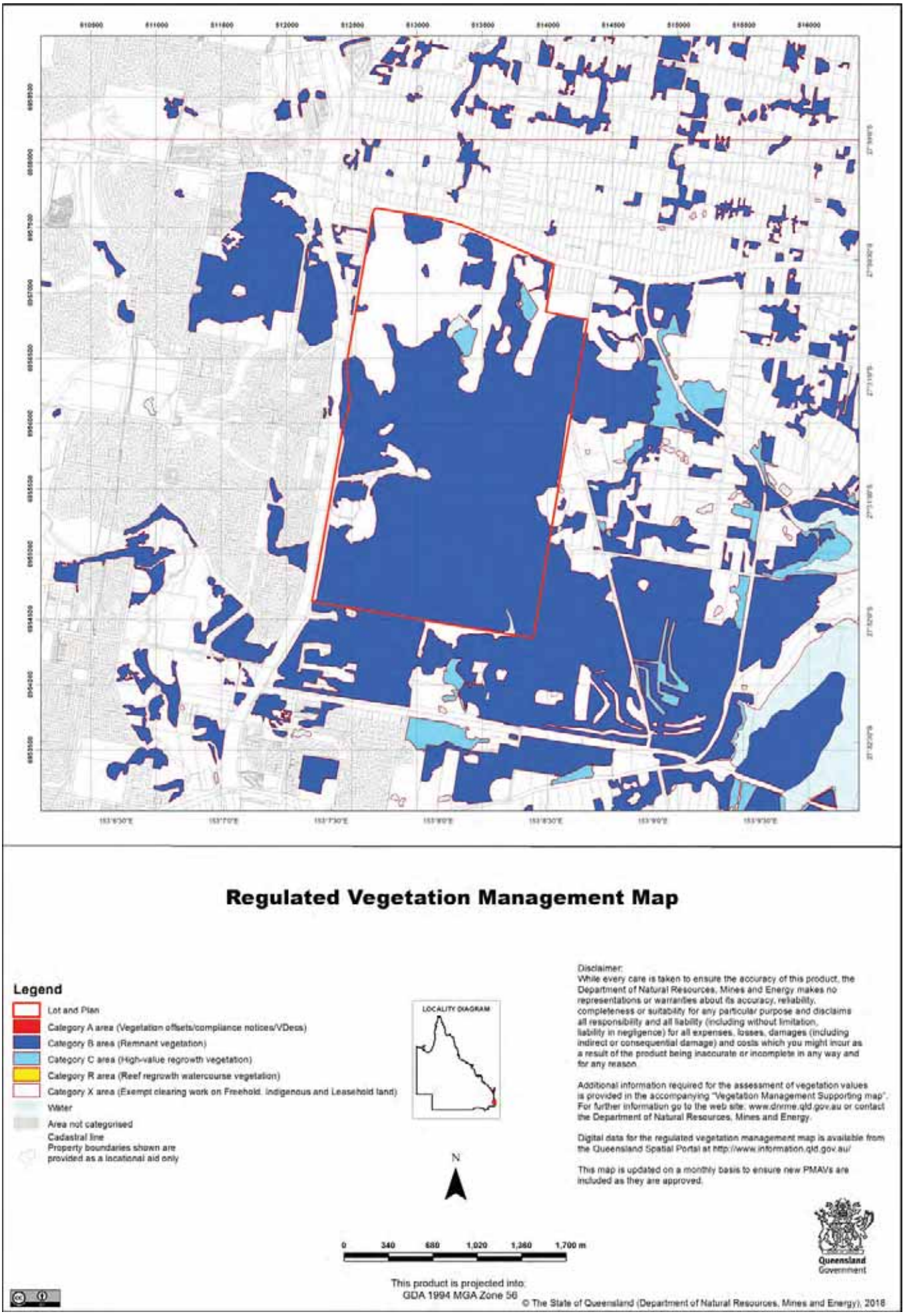
Coastal/non coastal map

The coastal/non-coastal map confirms whether the lot, or which parts of the lot, are considered coastal or non-coastal for the purposes of the accepted development vegetation clearing codes and the State Development Assessment Provisions (SDAP).

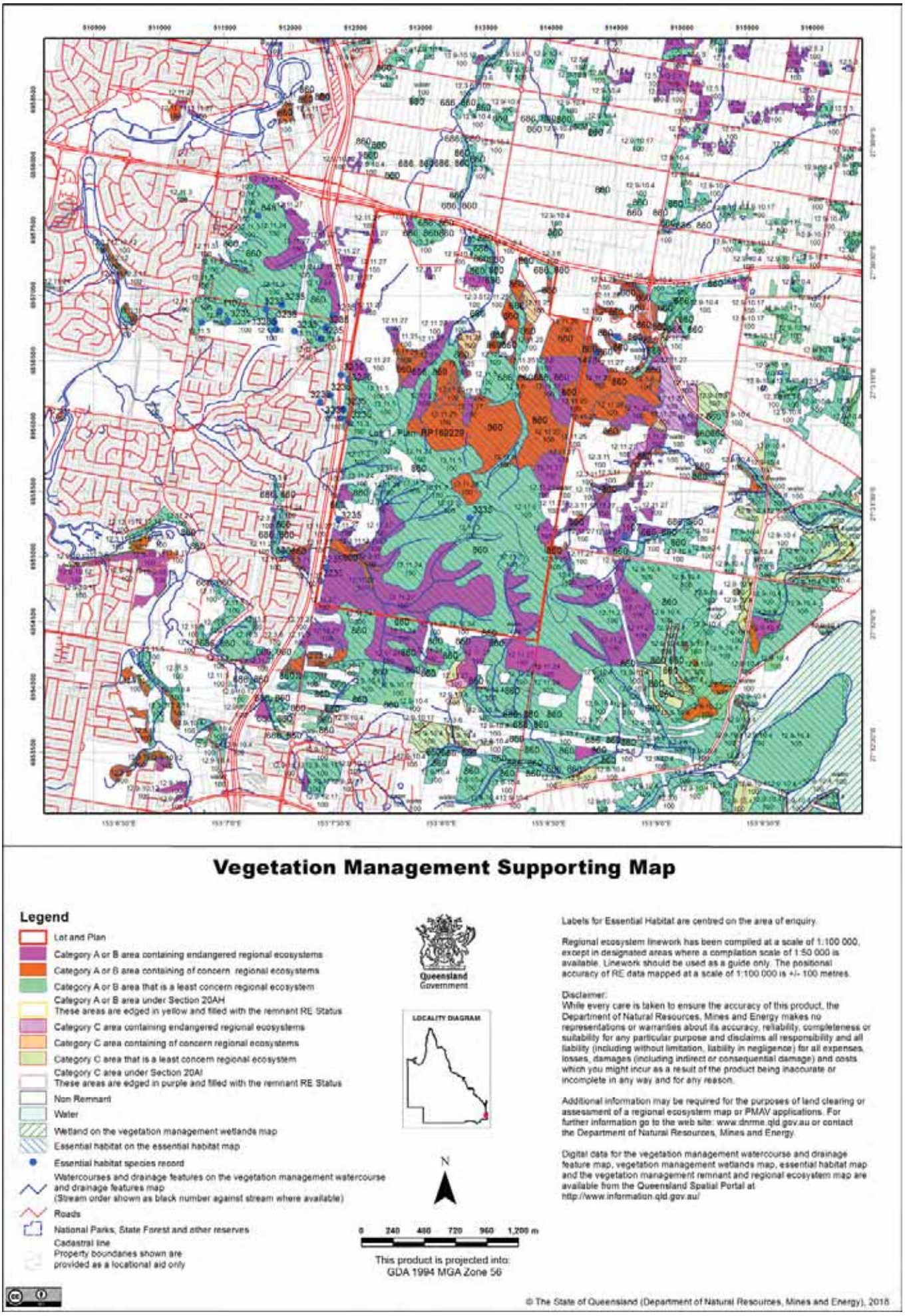
Protected plants map

The protected plants map shows areas where particular provisions of the *Nature Conservation Act 1992* apply to the clearing of protected plants.

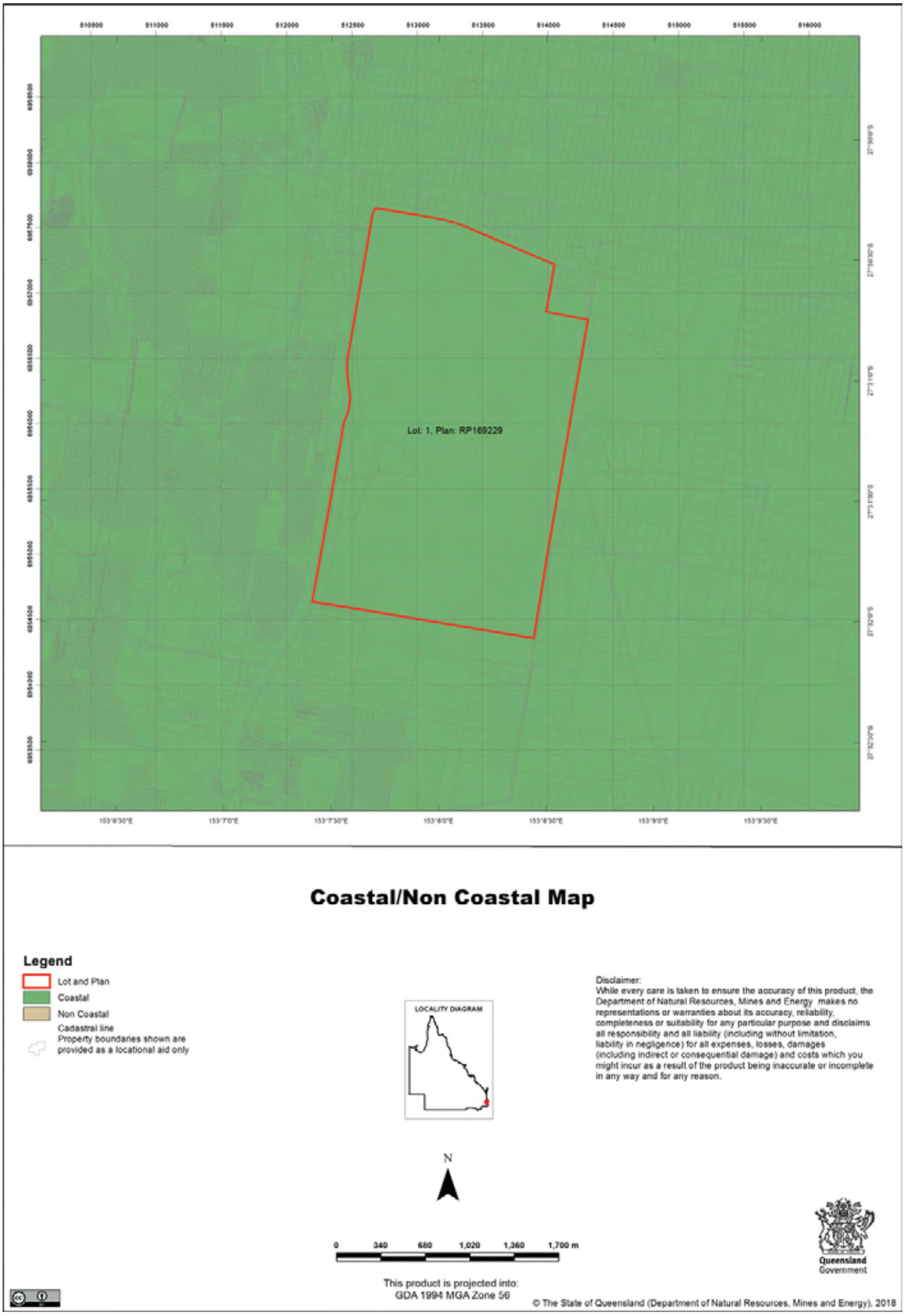
5.1 Regulated vegetation management map



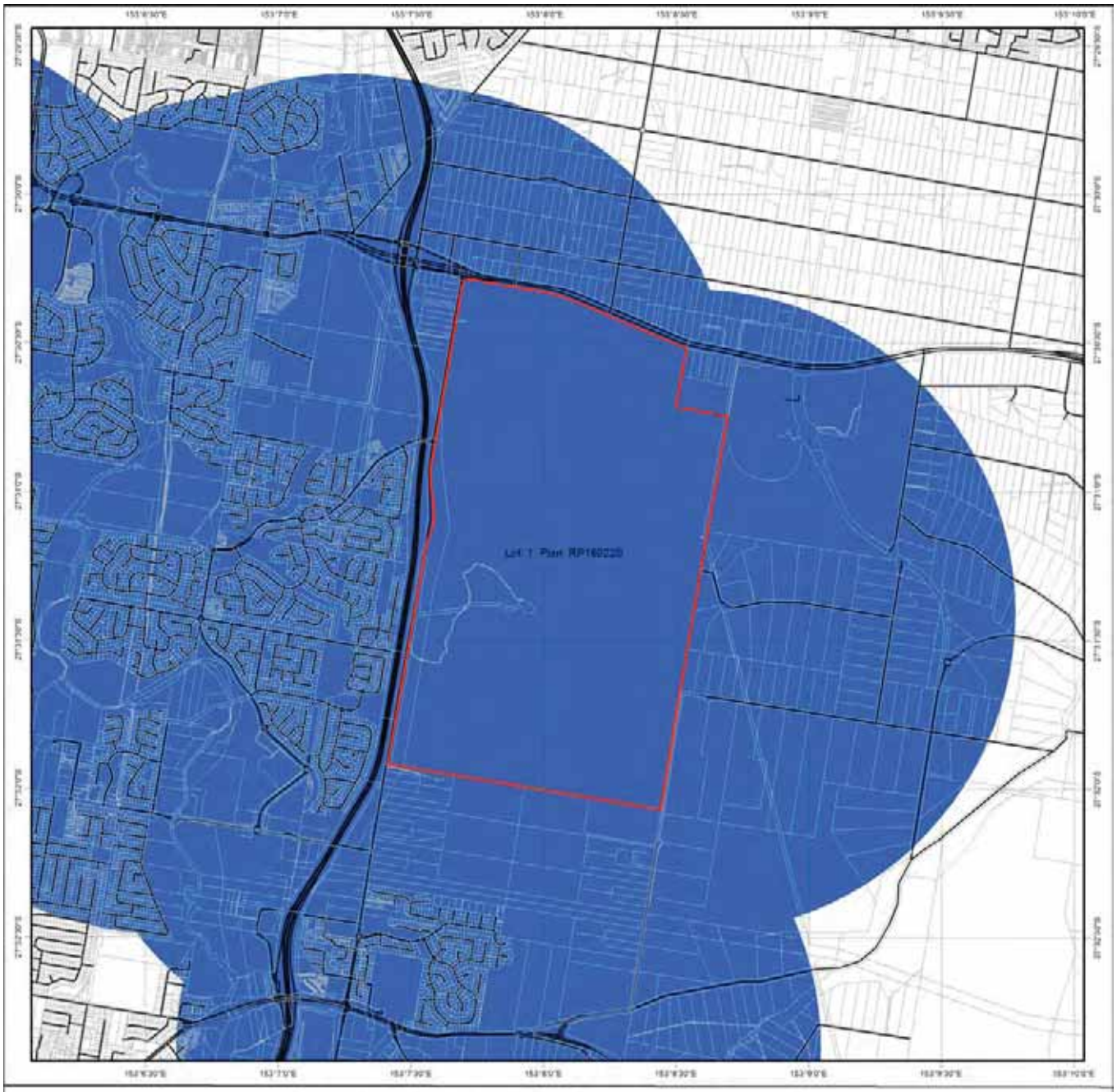
5.2 Vegetation management supporting map



5.3 Coastal/non coastal map



5.4 Protected plants map administered by DES



Protected Plants Flora Survey Trigger Map

Legend

- Lot and Plan
- High risk area
- Cadastral line
  Property boundaries shown are provided as a locational aid only
- Freeways / motorways / highways
- Secondary roads / streets

LOCALITY DIAGRAM

This map shows areas where particular provisions of the Nature Conservation Act 1992 apply to the clearing of protected plants.

This map is produced at a scale relevant to the size of the area selected and should be printed as A4 size in portrait orientation.

For further information or assistance with interpretation of this product, please contact the Department of Environment and Science at palm@ehp.qld.gov.au

N

0 240 480 720 960 1,200 m

This product is projected into:
GDA 1994 MGA Zone 56

Disclaimer:
While every care is taken to ensure the accuracy of the data used to generate this product, the Queensland Government makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaim all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damages) and costs which might be incurred as a consequence of reliance on the data, or as a result of the data being inaccurate or incomplete in any way and for any reason.

6. Other relevant legislation contacts list

Activity	Legislation	Agency	Contact details
Interference with overland flow Earthworks, significant disturbance	*Water Act 2000* *Soil Conservation Act 1986*	Department of Natural Resources, Mines and Energy (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dnrme.qld.gov.au
Indigenous Cultural Heritage	*Aboriginal Cultural Heritage Act 2003* *Torres Strait Islander Cultural Heritage Act 2003*	Department of Aboriginal and Torres Strait Islander Partnerships (Queensland Government)	Ph: 13 QGOV (13 74 68) www.datsip.qld.gov.au
Mining and environmentally relevant activities Infrastructure development (coastal) Heritage issues Protected plants and protected areas[1]	*Environmental Protection Act 1994* *Coastal Protection and Management Act 1995* *Queensland Heritage Act 1992* *Nature Conservation Act 1992*	Department of Environment and Science (Queensland Government)	Ph: 13 QGOV (13 74 68) www.des.qld.gov.au
Interference with fish passage in a watercourse, mangroves Forestry activities[2]	*Fisheries Act 1994* *Forestry Act 1959*	Department of Agriculture and Fisheries (Queensland Government)	Ph: 13 QGOV (13 74 68) www.daf.qld.gov.au
Matters of National Environmental Significance including listed threatened species and ecological communities	*Environment Protection and Biodiversity Conservation Act 1999*	Department of the Environment (Australian Government)	Ph: 1800 803 772 www.environment.gov.au
Development and planning processes	*Planning Act 2016* *State Development and Public Works Organisation Act 1971*	Department of State Development, Manufacturing, Infrastructure and Planning (Queensland Government)	Ph: 13 QGOV (13 74 68) www.dsdmip.qld.gov.au
Local government requirements	*Local Government Act 2009*	Department of Local Government, Racing and Multicultural Affairs (Queensland Government)	Ph: 13 QGOV (13 74 68) Your relevant local government office

1. In Queensland, all plants that are native to Australia are protected plants under the *Nature Conservation Act 1992*, which endeavours to ensure that protected plants (whether whole plants or protected plants parts) are not illegally removed from the wild, or illegally traded. Prior to clearing, you should check the flora survey trigger map to determine if the clearing is within a high-risk area by visiting www.des.qld.gov.au. For further information or assistance on the protected plants flora survey trigger map for your property, please contact the Department of Environment and Science on 13QGOV (13 74 68) or email palm@des.qld.gov.au.

2. Contact the Department of Agriculture and Fisheries before clearing:

- Any sandalwood on state-owned land (including leasehold land)
- On freehold land in a 'forest consent area'
- More than five hectares on state-owned land (including leasehold land) containing commercial timber species listed in parts 2 or 3 of Schedule 6 of the Vegetation Management Regulation 2012 and located within any of the following local government management areas-Banana, Bundaberg Regional, Fraser Coast Regional, Gladstone Regional, Isaac Regional, North Burnett Regional, Somerset Regional, South Burnett Regional, Southern Downs Regional, Tablelands Regional, Toowoomba Regional, Western Downs Regional.

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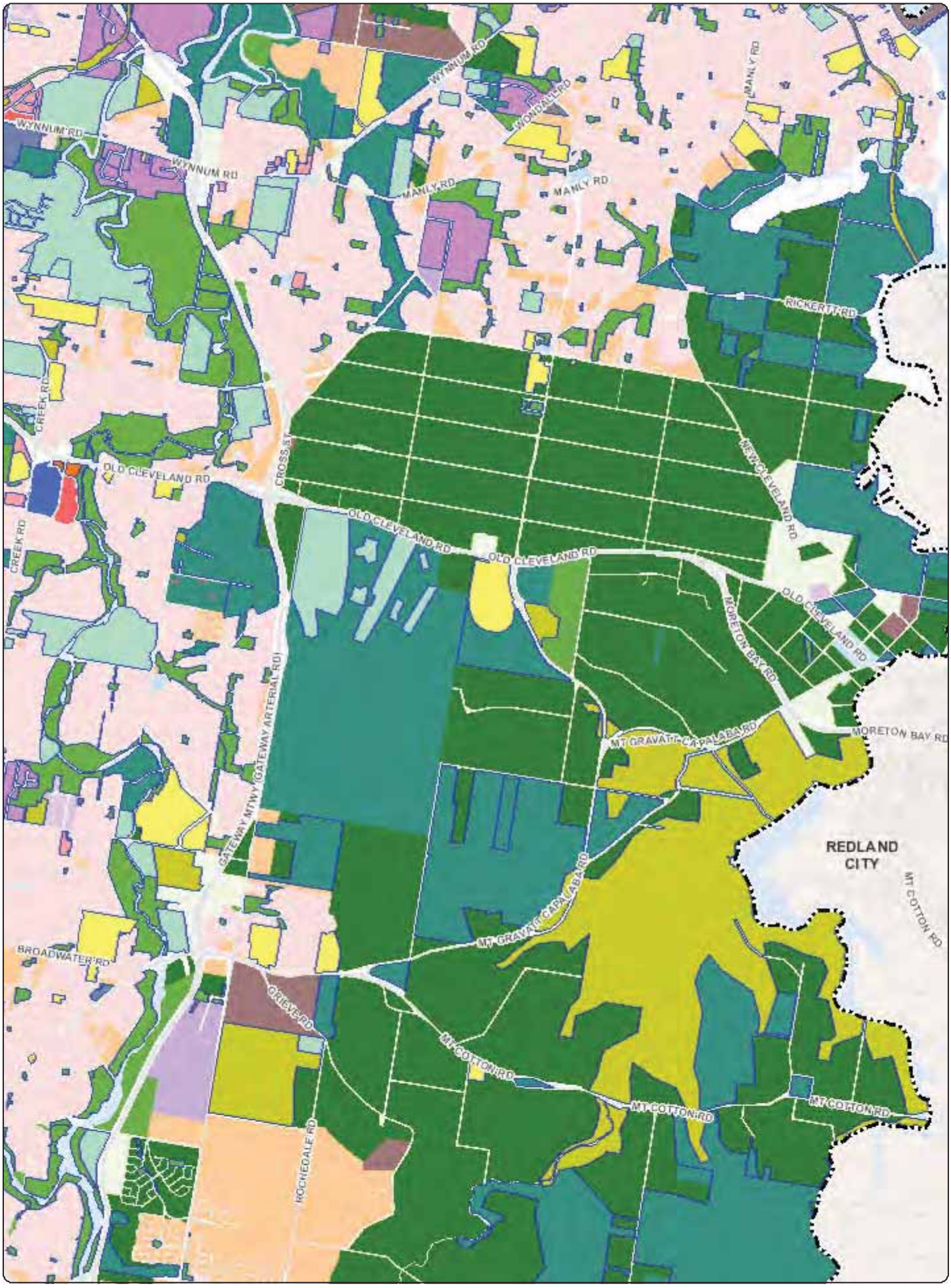
APPENDIX C

BRISBANE CITY COUNCIL ZONONG MAP



Brisbane City Plan 2014

BRISBANE CITY
Planning Scheme

NOTES

This map is notional only and should not be used for interpreting City Plan provisions relating to specific sites. To properly interpret the maps, the planning scheme must be referred to. The Digital Cadastre Database (supplied by State of Queensland - Department of Natural Resources and Mines) will be updated from time to time.

Mapping adopted by Council, effective 18 September 2015.

Projection: Map Grid of Australia, Zone 56
Horizontal Datum: Geocentric Datum of Australia 1994

Approximate Scale @ A4 1:50,000

0 1,800

Metres

Date: 20/07/2018

Legend

- LGA Name
- LGA Boundary
- Labels - Major_Road - StreetPro
- LDR Low density residential
- CR1 Character residential (Character)
- CR2 Character residential (Infill housing)
- LMR1 Low-medium density residential (2 storey mix)
- LMR2 Low-medium density residential (2 or 3 storey mix)
- LMR3 Low-medium density residential (Up to 3 storeys)
- MDR Medium density residential
- HDR1 High density residential (Up to 8 storeys)
- HDR2 High density residential (Up to 15 storeys)
- TA Tourist accommodati...
- NC Neighbourhood centre
- DC1 District centre (District)
- DC2 District centre (Corridor)
- MC Major centre
- PC1 Principal centre (City centre)
- PC2 Principal centre (Regional centre)
- LII Low impact industry
- IN1 General industry A
- IN2 General industry B
- IN3 General industry C
- SI Special industry
- II Industry investigation
- SR Sport and recreation
- SR1 Sport and recreation (Local)
- SR2 Sport and recreation (District)
- SR3 Sport and recreation (Metropolitan)
- OS Open space
- OS1 Open space (Local)
- OS2 Open space (District)
- OS3 Open space (Metropolitan)
- EM Environmental management
- CN Conservation
- CN1 Conservation (Local)
- CN2 Conservation (District)
- CN3 Conservation (Metropolitan)
- EC Emerging community
- EI Extractive industry
- MU1 Mixed use (Inner city)
- MU2 Mixed use (Centre frame)
- MU3 Mixed use (Corridor)
- RU Rural
- RR Rural residential
- T Township
- Refer to Part 10 of the planning scheme
- CF1 Community facilities (Major health care)
- CF2 Community facilities (Major sports venue)
- CF3 Community facilities (Cemetery)
- CF4 Community facilities (Community purposes)
- CF5 Community facilities (Education purposes)
- CF6 Community facilities (Emergency services)
- CF7 Community facilities (Health care purposes)
- SC1 Specialised centre (Major education and research facility)
- SC2 Specialised centre (Entertainment and conference centre)
- SC3 Specialised centre (Brisbane Markets)
- SC4 Specialised centre (Large format retail)
- SC5 Specialised centre (Mixed industry and business)
- SC6 Specialised centre (Marina)
- SP1 Special purpose (Defence)
- SP2 Special purpose (Detention facility)
- SP3 Special purpose (Transport infrastructure)
- SP4 Special purpose (Utility services)
- SP5 Special purpose (Airport)
- SP6 Special purpose (Port)
- Railway Line
- Freeway, Highway
- Arterial Road
- Freeway, Arterial Road (Tunnels)
- Connector
- Local, Private Roads
- Airport Roads
- Waterbody
- Brisbane River, Creek
- Drainage Regions
- Drainage Centrelines (BCC Masked)
- Drainageline

Brisbane City Plan 2014

BRISBANE CITY Planning Scheme

NOTES

This map is notional only and should not be used for interpreting City Plan provisions relating to specific sites. To properly interpret the maps, the planning scheme must be referred to. The Digital Cadastre Database (supplied by State of Queensland - Department of Natural Resources and Mines) will be updated from time to time.

Mapping adopted by Council, effective 18 September 2015.

Projection: Map Grid of Australia, Zone 56
Horizontal Datum: Geocentric Datum of Australia 1994

Date: 20/07/2018

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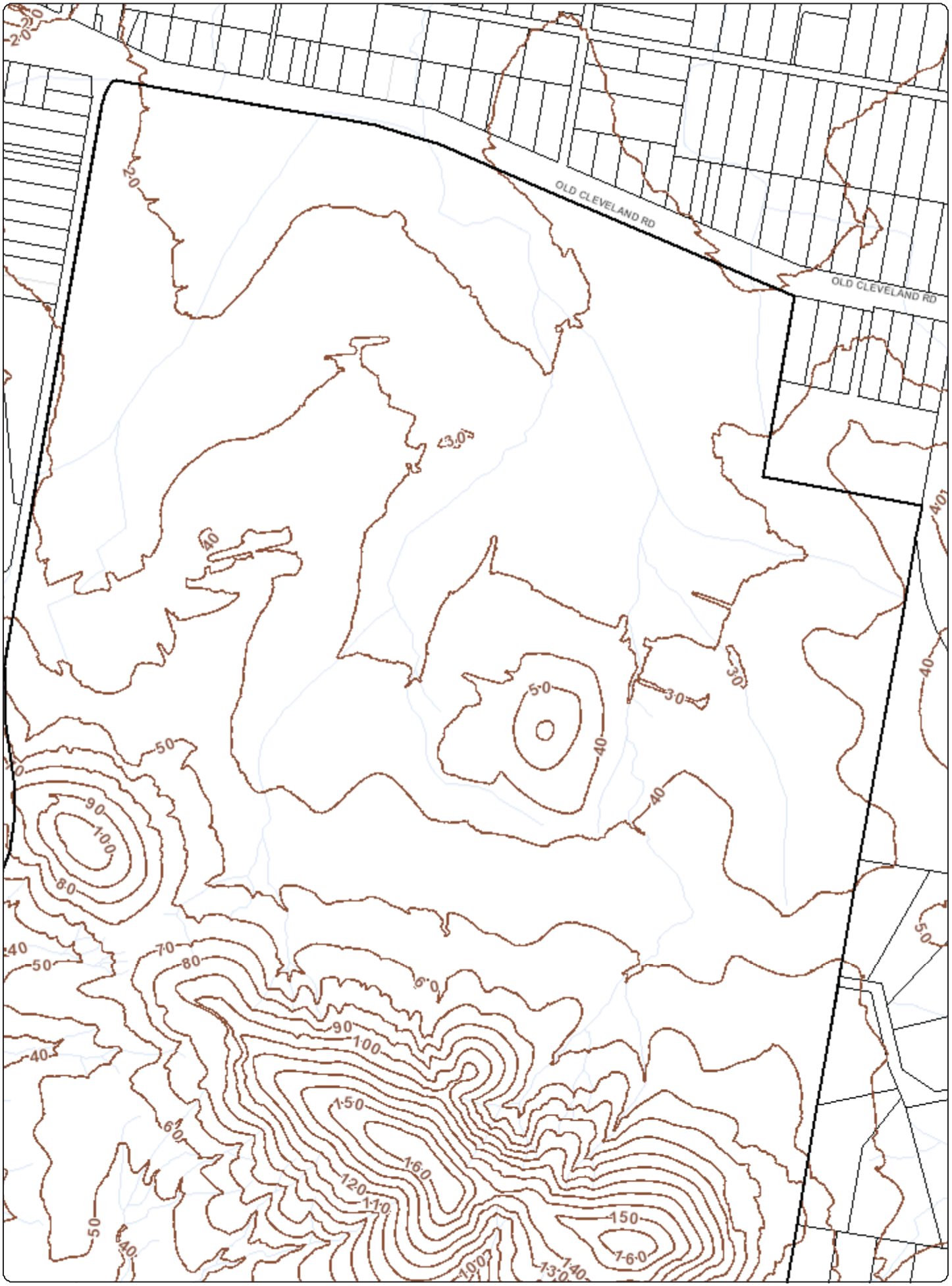
APPENDIX D

SITE TOPOGRAPHY



Brisbane City Plan 2014

BRISBANE CITY
Planning Scheme

NOTES

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Mapping adopted by Council, effective 18 September 2015.

Projection: Map Grid of Australia, Zone 56
Horizontal Datum: Geocentric Datum of Australia 1994

Approximate Scale @ A4 1:10,000

0 375

Metres

Date: 25/07/2018

Legend

- LGA Name
- LGA Boundary
- Labels - Major_Road - StreetPro
- Contours 10m
- Contours 5m
- Railway Line
- Airport Roads
- Waterbody
- Brisbane River, Creek
- Drainage Regions
- Drainage Centrelines (BCC Masked)
- Drainageline

Brisbane City Plan 2014

BRISBANE CITY Planning Scheme

NOTES

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Mapping adopted by Council, effective 18 September 2015.

Projection: Map Grid of Australia, Zone 56
Horizontal Datum: Geocentric Datum of Australia 1994

Date: 25/07/2018

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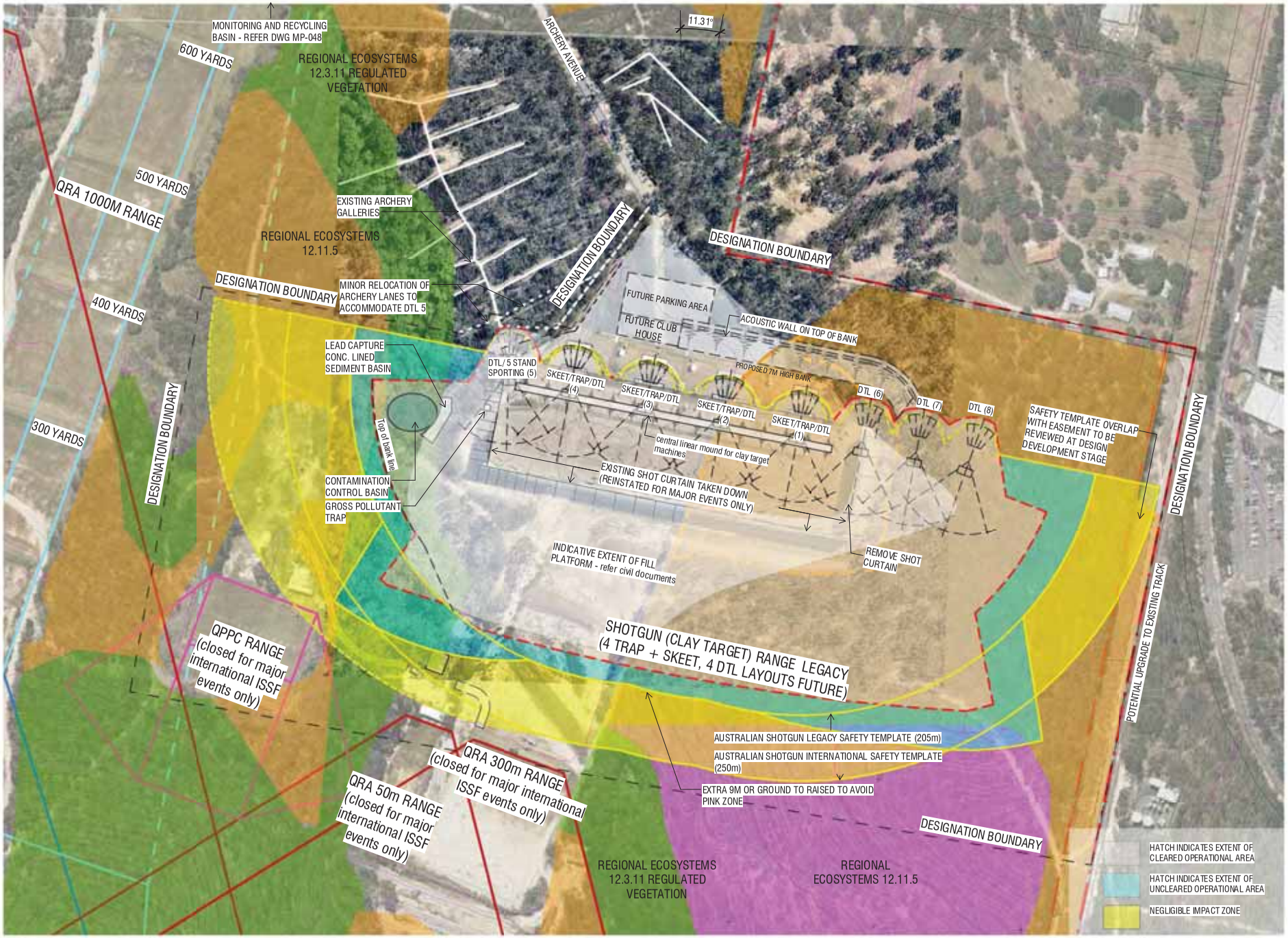
APPENDIX E

PROPOSED PERMANENT USE CLAY TARGET FACILITY



BRISBANE
Plaza Level, Mosaic
826 Ann St
Fortitude Valley QLD 4006
T +61 7 3846 0877
bne@modedesign.com.au

DEPARTMENT OF STATE DEVELOPMENT, MANUFACTURING INFRASTRUCTURE & PLANNING

BELMONT SHOOTING COMPLEX
1485 OLD CLEVELAND ROAD, BELMONT QLD

Ministerial Infrastructure Designation

Do not scale off this drawing

PROPOSED PERMANENT CLAY TARGET RANGE

0 20 40 60 80 100

Project No: 14479BNE
Date:
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APPENDIX F

WILDLIFE ONLINE EXTRACT

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: All
Records: All
Date: All
Latitude: -27.5118
Longitude: 153.1410
Distance: 5
Email: joseph.t@lar.net.au
Date submitted: Monday 11 Dec 2017 09:14:58
Date extracted: Monday 11 Dec 2017 09:20:45

The number of records retrieved = 834

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Bufonidae	*Rhinella marina*	cane toad	Y			22
animals	amphibians	Hylidae	*Litoria rubella*	ruddy treefrog		C		2
animals	amphibians	Hylidae	*Litoria caerulea*	common green treefrog		C		9
animals	amphibians	Hylidae	*Litoria wilcoxii*	eastern stony creek frog		C		1
animals	amphibians	Hylidae	*Litoria gracilenta*	graceful treefrog		C		6
animals	amphibians	Hylidae	*Litoria latopalmata*	broad palmed rocketfrog		C		1
animals	amphibians	Hylidae	*Litoria fallax*	eastern sedgefrog		C		19
animals	amphibians	Hylidae	*Litoria nasuta*	striped rocketfrog		C		4
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		1
animals	amphibians	Limnodynastidae	*Limnodynastes peronii*	striped marshfrog		C		13
animals	amphibians	Limnodynastidae	*Platyplectrum ornatum*	ornate burrowing frog		C		4
animals	amphibians	Limnodynastidae	*Limnodynastes tasmaniensis*	spotted grassfrog		C		1
animals	amphibians	Myobatrachidae	*Crinia signifera*	clicking froglet		C		7
animals	amphibians	Myobatrachidae	*Pseudophryne major*	great brown broodfrog		C		4/1
animals	amphibians	Myobatrachidae	*Pseudophryne raveni*	copper backed broodfrog		C		3
animals	amphibians	Myobatrachidae	*Crinia parinsignifera*	beeping froglet		C		9
animals	birds	Acanthizidae	*Smicrornis brevirostris*	weebill		C		29
animals	birds	Acanthizidae	*Chthonicola sagittata*	speckled warbler		C		4
animals	birds	Acanthizidae	*Acanthiza chrysorrhoa*	yellow-rumped thornbill		C		4
animals	birds	Acanthizidae	*Acanthiza nana*	yellow thornbill		C		2
animals	birds	Acanthizidae	*Sericornis frontalis*	white-browed scrubwren		C		25
animals	birds	Acanthizidae	*Acanthiza pusilla*	brown thornbill		C		7
animals	birds	Acanthizidae	*Gerygone olivacea*	white-throated gerygone		C		61
animals	birds	Acanthizidae	*Gerygone levigaster*	mangrove gerygone		C		9
animals	birds	Acanthizidae	*Acanthiza reguloides*	buff-rumped thornbill		C		2
animals	birds	Acanthizidae	*Gerygone mouki*	brown gerygone		C		2
animals	birds	Accipitridae	*Aquila audax*	wedge-tailed eagle		C		7
animals	birds	Accipitridae	*Accipiter novaehollandiae*	grey goshawk		C		8
animals	birds	Accipitridae	*Accipiter cirrocephalus*	collared sparrowhawk		C		29
animals	birds	Accipitridae	*Hieraaetus morphnoides*	little eagle		C		8
animals	birds	Accipitridae	*Haliastur indus*	brahminy kite		C		25
animals	birds	Accipitridae	*Circus assimilis*	spotted harrier		C		1
animals	birds	Accipitridae	*Elanus axillaris*	black-shouldered kite		C		50
animals	birds	Accipitridae	*Pandion cristatus*	eastern osprey		SL		10
animals	birds	Accipitridae	*Circus approximans*	swamp harrier		C		3
animals	birds	Accipitridae	*Accipiter fasciatus*	brown goshawk		C		25
animals	birds	Accipitridae	*Aviceda subcristata*	Pacific baza		C		27
animals	birds	Accipitridae	*Haliastur sphenurus*	whistling kite		C		24
animals	birds	Accipitridae	*Haliaeetus leucogaster*	white-bellied sea-eagle		C		12
animals	birds	Acrocephalidae	*Acrocephalus australis*	Australian reed-warbler		C		106
animals	birds	Acrocephalidae	*Acrocephalus orientalis*	oriental reed-warbler		SL		1
animals	birds	Aegothelidae	*Aegotheles cristatus*	Australian owlet-nightjar		C		6
animals	birds	Alaudidae	*Mirafra javanica*	Horsfield's bushlark		C		2
animals	birds	Alcedinidae	*Ceyx azureus*	azure kingfisher		C		18
animals	birds	Anatidae	*Anas sp.*					2
animals	birds	Anatidae	*Malacorhynchus membranaceus*	pink-eared duck		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Anatidae	*Nettapus coromandelianus*	cotton pygmy-goose		C		1
animals	birds	Anatidae	*Tadorna tadornoides*	Australian shelduck		C		1
animals	birds	Anatidae	*Dendrocygna arcuata*	wandering whistling-duck		C		9
animals	birds	Anatidae	*Anas platyrhynchos*	northern mallard	Y			31
animals	birds	Anatidae	*Chenonetta jubata*	Australian wood duck		C		249
animals	birds	Anatidae	*Anas superciliosa*	Pacific black duck		C		371
animals	birds	Anatidae	*Aythya australis*	hardhead		C		35
animals	birds	Anatidae	*Anas rhynchotis*	Australasian shoveler		C		1
animals	birds	Anatidae	*Cygnus atratus*	black swan		C		19
animals	birds	Anatidae	*Biziura lobata*	musk duck		C		3
animals	birds	Anatidae	*Anas gracilis*	grey teal		C		19
animals	birds	Anatidae	*Anas castanea*	chestnut teal		C		23
animals	birds	Anhingidae	*Anhinga novaehollandiae*	Australasian darter		C		87
animals	birds	Anseranatidae	*Anseranas semipalmata*	magpie goose		C		16
animals	birds	Apodidae	*Apus pacificus*	fork-tailed swift		SL		2
animals	birds	Apodidae	*Hirundapus caudacutus*	white-throated needletail		SL		29
animals	birds	Ardeidae	*Butorides striata*	striated heron		C		6
animals	birds	Ardeidae	*Egretta garzetta*	little egret		C		24
animals	birds	Ardeidae	*Ardea intermedia*	intermediate egret		C		120
animals	birds	Ardeidae	*Ardea pacifica*	white-necked heron		C		20
animals	birds	Ardeidae	*Egretta sacra*	eastern reef egret		C		1
animals	birds	Ardeidae	*Bubulcus ibis*	cattle egret		C		199
animals	birds	Ardeidae	*Ixobrychus dubius*	Australian little bittern		C		4
animals	birds	Ardeidae	*Ardea alba modesta*	eastern great egret		C		67
animals	birds	Ardeidae	*Ixobrychus flavicollis*	black bittern		C		1
animals	birds	Ardeidae	*Egretta novaehollandiae*	white-faced heron		C		171
animals	birds	Ardeidae	*Nycticorax caledonicus*	nankeen night-heron		C		31
animals	birds	Artamidae	*Artamus superciliosus*	white-browed woodswallow		C		2
animals	birds	Artamidae	*Cracticus nigrogularis*	pied butcherbird		C		425
animals	birds	Artamidae	*Artamus minor*	little woodswallow		C		3
animals	birds	Artamidae	*Cracticus sp.*					3
animals	birds	Artamidae	*Cracticus tibicen*	Australian magpie		C		556
animals	birds	Artamidae	*Strepera graculina*	pied currawong		C		12
animals	birds	Artamidae	*Artamus cyanopterus*	dusky woodswallow		C		1
animals	birds	Artamidae	*Cracticus torquatus*	grey butcherbird		C		452
animals	birds	Artamidae	*Artamus leucorynchus*	white-breasted woodswallow		C		108
animals	birds	Burhinidae	*Burhinus grallarius*	bush stone-curlew		C		9
animals	birds	Cacatuidae	*Cacatua sp.*					3
animals	birds	Cacatuidae	*Cacatua galerita*	sulphur-crested cockatoo		C		368
animals	birds	Cacatuidae	*Cacatua sanguinea*	little corella		C		15
animals	birds	Cacatuidae	*Cacatua tenuirostris*	long-billed corella	Y	C		1
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V		2
animals	birds	Cacatuidae	*Calyptorhynchus banksii*	red-tailed black-cockatoo		C		1
animals	birds	Cacatuidae	*Nymphicus hollandicus*	cockatiel		C		1
animals	birds	Cacatuidae	*Eolophus roseicapilla*	galah		C		293
animals	birds	Campephagidae	*Coracina novaehollandiae*	black-faced cuckoo-shrike		C		572

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Campephagidae	*Coracina tenuirostris*	cicadabird		C		25
animals	birds	Campephagidae	*Lalage leucomela*	varied triller		C		15
animals	birds	Campephagidae	*Coracina maxima*	ground cuckoo-shrike		C		1
animals	birds	Campephagidae	*Lalage tricolor*	white-winged triller		C		2
animals	birds	Charadriidae	*Charadrius bicinctus*	double-banded plover		SL		9
animals	birds	Charadriidae	*Charadrius ruficapillus*	red-capped plover		C		27
animals	birds	Charadriidae	*Charadrius leschenaultii*	greater sand plover		V	V	18
animals	birds	Charadriidae	*Vanellus miles novaehollandiae*	masked lapwing (southern subspecies)		C		220
animals	birds	Charadriidae	*Elseyornis melanops*	black-fronted dotterel		C		25
animals	birds	Charadriidae	*Erythrogonys cinctus*	red-kneed dotterel		C		5
animals	birds	Charadriidae	*Charadrius mongolus*	lesser sand plover		E	E	23
animals	birds	Charadriidae	*Charadrius veredus*	oriental plover		SL		1
animals	birds	Charadriidae	*Pluvialis fulva*	Pacific golden plover		SL		18
animals	birds	Charadriidae	*Vanellus miles*	masked lapwing		C		211
animals	birds	Ciconiidae	*Ephippiorhynchus asiaticus*	black-necked stork		C		3
animals	birds	Cisticolidae	*Cisticola exilis*	golden-headed cisticola		C		168
animals	birds	Climacteridae	*Cormobates leucophaea metastasis*	white-throated treecreeper (southern)		C		19
animals	birds	Climacteridae	*Cormobates leucophaea*	white-throated treecreeper		C		5
animals	birds	Columbidae	*Columba livia*	rock dove	Y			38
animals	birds	Columbidae	*Geopelia striata*	peaceful dove		C		79
animals	birds	Columbidae	*Columba leucomela*	white-headed pigeon		C		2
animals	birds	Columbidae	*Ocyphaps lophotes*	crested pigeon		C		460
animals	birds	Columbidae	*Phaps chalcoptera*	common bronzewing		C		6
animals	birds	Columbidae	*Geopelia humeralis*	bar-shouldered dove		C		126
animals	birds	Columbidae	*Macropygia amboinensis*	brown cuckoo-dove		C		2
animals	birds	Columbidae	*Streptopelia chinensis*	spotted dove	Y			568
animals	birds	Columbidae	*Lopholaimus antarcticus*	topknot pigeon		C		1
animals	birds	Coraciidae	*Eurystomus orientalis*	dollarbird		C		190
animals	birds	Corvidae	*Corvus orru*	Torresian crow		C		736
animals	birds	Corvidae	*Corvus coronoides*	Australian raven		C		2
animals	birds	Cuculidae	*Cacomantis variolosus*	brush cuckoo		C		85
animals	birds	Cuculidae	*Centropus phasianinus*	pheasant coucal		C		97
animals	birds	Cuculidae	*Cacomantis flabelliformis*	fan-tailed cuckoo		C		55
animals	birds	Cuculidae	*Scythrops novaehollandiae*	channel-billed cuckoo		C		70
animals	birds	Cuculidae	*Chalcites minutillus barnardi*	little bronze-cuckoo		C		12
animals	birds	Cuculidae	*Cuculus optatus*	oriental cuckoo		SL		2
animals	birds	Cuculidae	*Chalcites basalis*	Horsfield's bronze-cuckoo		C		9
animals	birds	Cuculidae	*Chalcites lucidus*	shining bronze-cuckoo		C		20
animals	birds	Cuculidae	*Chalcites osculans*	black-eared cuckoo		C		1
animals	birds	Cuculidae	*Cacomantis pallidus*	pallid cuckoo		C		12
animals	birds	Cuculidae	*Eudynamys orientalis*	eastern koel		C		136
animals	birds	Dicruridae	*Dicrurus bracteatus bracteatus*	spangled drongo (eastern Australia)		C		1
animals	birds	Dicruridae	*Dicrurus bracteatus*	spangled drongo		C		336
animals	birds	Estrildidae	*Taeniopygia guttata*	zebra finch		C		1
animals	birds	Estrildidae	*Lonchura punctulata*	nutmeg mannikin	Y			9
animals	birds	Estrildidae	*Neochmia temporalis*	red-browed finch		C		48

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Estrildidae	*Lonchura castaneothorax*	chestnut-breasted mannikin		C		46
animals	birds	Estrildidae	*Stagonopleura guttata*	diamond firetail		C		1
animals	birds	Estrildidae	*Taeniopygia bichenovii*	double-barred finch		C		99
animals	birds	Eurostopodidae	*Eurostopodus mystacalis*	white-throated nightjar		C		8
animals	birds	Falconidae	*Falco berigora*	brown falcon		C		7
animals	birds	Falconidae	*Falco subniger*	black falcon		C		2
animals	birds	Falconidae	*Falco longipennis*	Australian hobby		C		6
animals	birds	Falconidae	*Falco cenchroides*	nankeen kestrel		C		6
animals	birds	Falconidae	*Falco peregrinus*	peregrine falcon		C		6
animals	birds	Haematopodidae	*Haematopus longirostris*	Australian pied oystercatcher		C		30
animals	birds	Haematopodidae	*Haematopus fuliginosus*	sooty oystercatcher		C		1
animals	birds	Halcyonidae	*Todiramphus macleayii*	forest kingfisher		C		177
animals	birds	Halcyonidae	*Dacelo novaeguineae*	laughing kookaburra		C		543
animals	birds	Halcyonidae	*Todiramphus sp.*					1
animals	birds	Halcyonidae	*Dacelo leachii*	blue-winged kookaburra		C		1
animals	birds	Halcyonidae	*Todiramphus sanctus*	sacred kingfisher		C		263
animals	birds	Halcyonidae	*Todiramphus sordidus*	Torresian kingfisher		C		10
animals	birds	Hirundinidae	*Petrochelidon ariel*	fairy martin		C		109
animals	birds	Hirundinidae	*Hirundo neoxena*	welcome swallow		C		322
animals	birds	Hirundinidae	*Petrochelidon nigricans*	tree martin		C		33
animals	birds	Hirundinidae	*Cheramoeca leucosterna*	white-backed swallow		C		2
animals	birds	Jacanidae	*Irediparra gallinacea*	comb-crested jacana		C		56
animals	birds	Laridae	*Sterna hirundo*	common tern		SL		4
animals	birds	Laridae	*Thalasseus bergii*	crested tern		SL		17
animals	birds	Laridae	*Chlidonias hybrida*	whiskered tern		C		1
animals	birds	Laridae	*Chroicocephalus novaehollandiae*	silver gull		C		32
animals	birds	Laridae	*Sternula albifrons*	little tern		SL		6
animals	birds	Laridae	*Gelochelidon nilotica*	gull-billed tern		SL		13
animals	birds	Laridae	*Thalasseus bengalensis*	lesser crested tern		C		12
animals	birds	Laridae	*Hydroprogne caspia*	Caspian tern		SL		20
animals	birds	Maluridae	*Malurus sp.*					1
animals	birds	Maluridae	*Malurus cyaneus*	superb fairy-wren		C		84
animals	birds	Maluridae	*Malurus lamberti*	variegated fairy-wren		C		197
animals	birds	Maluridae	*Malurus melanocephalus*	red-backed fairy-wren		C		250
animals	birds	Megaluridae	*Megalurus timoriensis*	tawny grassbird		C		106
animals	birds	Megaluridae	*Megalurus gramineus*	little grassbird		C		6
animals	birds	Megapodiidae	*Alectura lathami*	Australian brush-turkey		C		10
animals	birds	Meliphagidae	*Philemon corniculatus*	noisy friarbird		C		202
animals	birds	Meliphagidae	*Ptilotula penicillata*	white-plumed honeyeater		C		1
animals	birds	Meliphagidae	*Manorina melanocephala*	noisy miner		C		609
animals	birds	Meliphagidae	*Myzomela sanguinolenta*	scarlet honeyeater		C		183/1
animals	birds	Meliphagidae	*Philemon citreogularis*	little friarbird		C		88
animals	birds	Meliphagidae	*Anthochaera carunculata*	red wattlebird		C		1
animals	birds	Meliphagidae	*Anthochaera chrysoptera*	little wattlebird		C		6
animals	birds	Meliphagidae	*Gavicalis fasciogularis*	mangrove honeyeater		C		7
animals	birds	Meliphagidae	*Melithreptus albogularis*	white-throated honeyeater		C		110

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Meliphagidae	*Plectorhyncha lanceolata*	striped honeyeater		C		38
animals	birds	Meliphagidae	*Acanthorhynchus tenuirostris*	eastern spinebill		C		31
animals	birds	Meliphagidae	*Melithreptus lunatus*	white-naped honeyeater		C		8
animals	birds	Meliphagidae	*Manorina melanophrys*	bell miner		C		3
animals	birds	Meliphagidae	*Lichmera indistincta*	brown honeyeater		C		356
animals	birds	Meliphagidae	*Anthochaera phrygia*	regent honeyeater		E	CE	1
animals	birds	Meliphagidae	*Entomyzon cyanotis*	blue-faced honeyeater		C		138
animals	birds	Meliphagidae	*Caligavis chrysops*	yellow-faced honeyeater		C		210
animals	birds	Meliphagidae	*Meliphaga lewinii*	Lewin's honeyeater		C		62
animals	birds	Meliphagidae	*Myzomela obscura*	dusky honeyeater		C		2
animals	birds	Meropidae	*Merops ornatus*	rainbow bee-eater		C		157
animals	birds	Monarchidae	*Monarcha melanopsis*	black-faced monarch		SL		19
animals	birds	Monarchidae	*Carterornis leucotis*	white-eared monarch		C		1
animals	birds	Monarchidae	*Symposiachrus trivirgatus*	spectacled monarch		SL		5
animals	birds	Monarchidae	*Myiagra cyanoleuca*	satin flycatcher		SL		1
animals	birds	Monarchidae	*Myiagra inquieta*	restless flycatcher		C		4
animals	birds	Monarchidae	*Grallina cyanoleuca*	magpie-lark		C		614
animals	birds	Monarchidae	*Myiagra rubecula*	leaden flycatcher		C		31
animals	birds	Motacillidae	*Anthus novaeseelandiae*	Australasian pipit		C		8
animals	birds	Nectariniidae	*Dicaeum hirundinaceum*	mistletoebird		C		64
animals	birds	Neosittidae	*Daphoenositta chrysoptera*	varied sittella		C		12
animals	birds	Oriolidae	*Sphecotheres vieilloti*	Australasian figbird		C		204
animals	birds	Oriolidae	*Oriolus sagittatus*	olive-backed oriole		C		202
animals	birds	Pachycephalidae	*Colluricincla megarhyncha*	little shrike-thrush		C		8
animals	birds	Pachycephalidae	*Pachycephala pectoralis youngi*	golden whistler (south-eastern Australia)		C		1
animals	birds	Pachycephalidae	*Pachycephala rufiventris*	rufous whistler		C		213
animals	birds	Pachycephalidae	*Pachycephala pectoralis*	golden whistler		C		80
animals	birds	Pachycephalidae	*Colluricincla harmonica*	grey shrike-thrush		C		450
animals	birds	Pardalotidae	*Pardalotus punctatus*	spotted pardalote		C		40
animals	birds	Pardalotidae	*Pardalotus striatus*	striated pardalote		C		400
animals	birds	Passeridae	*Passer domesticus*	house sparrow	Y			19
animals	birds	Pelecanidae	*Pelecanus conspicillatus*	Australian pelican		C		77
animals	birds	Petroicidae	*Microeca fascinans*	jacky winter		C		1
animals	birds	Petroicidae	*Eopsaltria australis*	eastern yellow robin		C		31
animals	birds	Petroicidae	*Tregellasia capito*	pale-yellow robin		C		2
animals	birds	Petroicidae	*Petroica rosea*	rose robin		C		26
animals	birds	Phalacrocoracidae	*Phalacrocorax varius*	pied cormorant		C		25
animals	birds	Phalacrocoracidae	*Microcarbo melanoleucos*	little pied cormorant		C		158
animals	birds	Phalacrocoracidae	*Phalacrocorax carbo*	great cormorant		C		26
animals	birds	Phalacrocoracidae	*Phalacrocorax sulcirostris*	little black cormorant		C		140
animals	birds	Phasianidae	*Coturnix ypsilophora*	brown quail		C		18
animals	birds	Phasianidae	*Coturnix pectoralis*	stubble quail		C		1
animals	birds	Phasianidae	*Pavo cristatus*	Indian peafowl	Y			1
animals	birds	Pittidae	*Pitta versicolor*	noisy pitta		C		1
animals	birds	Podargidae	*Podargus strigoides*	tawny frogmouth		C		63

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Podicipedidae	*Poliocephalus poliocephalus*	hoary-headed grebe		C		1
animals	birds	Podicipedidae	*Tachybaptus novaehollandiae*	Australasian grebe		C		85
animals	birds	Pomatostomidae	*Pomatostomus temporalis*	grey-crowned babbler		C		3
animals	birds	Psittacidae	*Trichoglossus haematodus moluccanus*	rainbow lorikeet		C		721
animals	birds	Psittacidae	*Platycercus adscitus palliceps*	pale-headed rosella (southern form)		C		3
animals	birds	Psittacidae	*Trichoglossus chlorolepidotus*	scaly-breasted lorikeet		C		136
animals	birds	Psittacidae	*Psephotus haematonotus*	red-rumped parrot		C		3
animals	birds	Psittacidae	*Platycercus adscitus*	pale-headed rosella		C		411
animals	birds	Psittacidae	*Alisterus scapularis*	Australian king-parrot		C		3
animals	birds	Psittacidae	*Platycercus eximius*	eastern rosella		C		6
animals	birds	Psittacidae	*Parvipsitta pusilla*	little lorikeet		C		48
animals	birds	Psittacidae	*Platycercus elegans*	crimson rosella		C		5
animals	birds	Psophodidae	*Psophodes olivaceus*	eastern whipbird		C		43
animals	birds	Ptilonorhynchidae	*Sericulus chrysocephalus*	regent bowerbird		C		1
animals	birds	Rallidae	*Fulica atra*	Eurasian coot		C		33
animals	birds	Rallidae	*Amaurornis moluccana*	pale-vented bush-hen		C		40
animals	birds	Rallidae	*Porphyrio melanotus*	purple swamphen		C		267
animals	birds	Rallidae	*Gallinula tenebrosa*	dusky moorhen		C		219
animals	birds	Rallidae	*Lewinia pectoralis*	Lewin's rail		C		5
animals	birds	Rallidae	*Porzana tabuensis*	spotless crake		C		2
animals	birds	Rallidae	*Porzana pusilla*	Baillon's crake		C		6
animals	birds	Rallidae	*Gallirallus philippensis*	buff-banded rail		C		55
animals	birds	Recurvirostridae	*Recurvirostra novaehollandiae*	red-necked avocet		C		6
animals	birds	Recurvirostridae	*Himantopus himantopus*	black-winged stilt		C		60
animals	birds	Rhipiduridae	*Rhipidura leucophrys leucophrys*	willie wagtail (southern)		C		1
animals	birds	Rhipiduridae	*Rhipidura rufiventris*	northern fantail		C		1
animals	birds	Rhipiduridae	*Rhipidura leucophrys*	willie wagtail		C		515
animals	birds	Rhipiduridae	*Rhipidura rufifrons*	rufous fantail		SL		15
animals	birds	Rhipiduridae	*Rhipidura albiscapa*	grey fantail		C		225
animals	birds	Scolopacidae	*Limosa limosa*	black-tailed godwit		SL		4
animals	birds	Scolopacidae	*Tringa incana*	wandering tattler		SL		1
animals	birds	Scolopacidae	*Numenius madagascariensis*	eastern curlew		E	CE	38
animals	birds	Scolopacidae	*Limosa lapponica baueri*	Western Alaskan bar-tailed godwit		V	V	46
animals	birds	Scolopacidae	*Calidris tenuirostris*	great knot		E	CE	26
animals	birds	Scolopacidae	*Gallinago hardwickii*	Latham's snipe		SL		30
animals	birds	Scolopacidae	*Calidris ruficollis*	red-necked stint		SL		26
animals	birds	Scolopacidae	*Xenus cinereus*	terek sandpiper		SL		25
animals	birds	Scolopacidae	*Tringa brevipes*	grey-tailed tattler		SL		34
animals	birds	Scolopacidae	*Calidris canutus*	red knot		E	E	18
animals	birds	Scolopacidae	*Tringa nebularia*	common greenshank		SL		22
animals	birds	Scolopacidae	*Numenius phaeopus*	whimbrel		SL		51
animals	birds	Scolopacidae	*Arenaria interpres*	ruddy turnstone		SL		31
animals	birds	Scolopacidae	*Calidris acuminata*	sharp-tailed sandpiper		SL		21
animals	birds	Scolopacidae	*Tringa stagnatilis*	marsh sandpiper		SL		1
animals	birds	Scolopacidae	*Calidris ferruginea*	curlew sandpiper		E	CE	32
animals	birds	Strigidae	*Ninox boobook*	southern boobook		C		26

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Strigidae	*Ninox connivens*	barking owl		C		2
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		3
animals	birds	Sturnidae	*Acridotheres tristis*	common myna	Y			314
animals	birds	Sturnidae	*Sturnus vulgaris*	common starling	Y			82
animals	birds	Sulidae	*Morus serrator*	Australasian gannet		C		1
animals	birds	Threskiornithidae	*Platalea regia*	royal spoonbill		C		90
animals	birds	Threskiornithidae	*Platalea flavipes*	yellow-billed spoonbill		C		7
animals	birds	Threskiornithidae	*Plegadis falcinellus*	glossy ibis		SL		11
animals	birds	Threskiornithidae	*Threskiornis molucca*	Australian white ibis		C		415
animals	birds	Threskiornithidae	*Threskiornis spinicollis*	straw-necked ibis		C		146
animals	birds	Timaliidae	*Zosterops lateralis*	silvereye		C		309
animals	birds	Timaliidae	*Zosterops lateralis cornwalli*	silvereye (eastern)		C		1
animals	birds	Turdidae	*Zoothera lunulata*	Bassian thrush		C		1
animals	birds	Turnicidae	*Turnix varius*	painted button-quail		C		1
animals	birds	Tytonidae	*Tyto delicatula*	eastern barn owl		C		2
animals	insects	Hesperiidae	*Hasora khoda haslia*	narrow-banded awl				1
animals	insects	Hesperiidae	*Telicota sp.*					1
animals	insects	Hesperiidae	*Trapezites eliena*	orange ochre				1
animals	insects	Hesperiidae	*Trapezites maheta*	northern silver ochre				1
animals	insects	Hesperiidae	*Cephrenes augiades sperthias*	orange palm-dart				1
animals	insects	Hesperiidae	*Suniana sp.*					1
animals	insects	Lycaenidae	*Psychonotis caelius taygetus*	small green-banded blue				1
animals	insects	Lycaenidae	*Prosotas felderi*	short-tailed line-blue				1
animals	insects	Lycaenidae	*Candalides absimilis*	common pencilled-blue				1
animals	insects	Lycaenidae	*Nacaduba berenice berenice*	large purple line-blue				1
animals	insects	Nymphalidae	*Hypocysta irius*	orange-streaked ringlet				1
animals	insects	Nymphalidae	*Euploea corinna*	common crow				3
animals	insects	Nymphalidae	*Danaus petilia*	lesser wanderer				1
animals	insects	Nymphalidae	*Melanitis leda bankia*	evening brown				3
animals	insects	Nymphalidae	*Tirumala hamata hamata*	blue tiger				3
animals	insects	Nymphalidae	*Junonia villida villida*	meadow argus				2
animals	insects	Nymphalidae	*Danaus plexippus*	monarch				3
animals	insects	Nymphalidae	*Phaedyma shepherdi shepherdi*	white-banded plane (southern subspecies)				1
animals	insects	Nymphalidae	*Hypolimnas bolina nerina*	varied eggfly				3
animals	insects	Papilionidae	*Papilio aegeus aegeus*	orchard swallowtail (Australian subspecies)				1
animals	insects	Papilionidae	*Graphium eurypylus lycaon*	pale triangle				1
animals	insects	Papilionidae	*Graphium choredon*	blue triangle				2
animals	insects	Pieridae	*Delias nigrina*	black jezebel				1
animals	insects	Pieridae	*Pieris rapae*	cabbage white				1
animals	insects	Pieridae	*Catopsilia pomona*	lemon migrant				1
animals	insects	Pieridae	*Appias paulina ega*	yellow albatross				1
animals	insects	Pieridae	*Cepora perimale scyllara*	caper gull (Australian subspecies)				1
animals	mammals	Acrobatidae	*Acrobates pygmaeus*	feathertail glider		C		1/1
animals	mammals	Canidae	*Vulpes vulpes*	red fox	Y			7

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Dasyuridae	*Sminthopsis murina*	common dunnart		C		1
animals	mammals	Felidae	*Felis catus*	cat	Y			1
animals	mammals	Leporidae	*Lepus europaeus*	European brown hare	Y			13
animals	mammals	Macropodidae	*Wallabia bicolor*	swamp wallaby		C		6
animals	mammals	Macropodidae	*Macropus rufogriseus*	red-necked wallaby		C		2/1
animals	mammals	Miniopteridae	*Miniopterus australis*	little bent-wing bat		C		1
animals	mammals	Molossidae	*Mormopterus sp.*					1
animals	mammals	Molossidae	*Tadarida australis*	white-striped freetail bat		C		7
animals	mammals	Muridae	*Rattus rattus*	black rat	Y			5
animals	mammals	Muridae	*Rattus lutreolus*	swamp rat		C		2
animals	mammals	Muridae	*Hydromys chrysogaster*	water rat		C		1
animals	mammals	Muridae	*Mus musculus*	house mouse	Y			4
animals	mammals	Peramelidae	*Perameles nasuta*	long-nosed bandicoot		C		1
animals	mammals	Peramelidae	*Isoodon macrourus*	northern brown bandicoot		C		9
animals	mammals	Petauridae	*Petaurus australis australis*	yellow-bellied glider (southern subspecies)		C		1/1
animals	mammals	Petauridae	*Petaurus norfolcensis*	squirrel glider		C		12
animals	mammals	Petauridae	*Petaurus breviceps*	sugar glider		C		2
animals	mammals	Phalangeridae	*Trichosurus vulpecula*	common brushtail possum		C		11
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	2252
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		V	V	1
animals	mammals	Pseudocheiridae	*Pseudocheirus peregrinus*	common ringtail possum		C		16
animals	mammals	Pteropodidae	*Pteropus poliocephalus*	grey-headed flying-fox		C	V	2
animals	mammals	Pteropodidae	*Pteropus alecto*	black flying-fox		C		6
animals	mammals	Pteropodidae	*Pteropus scapulatus*	little red flying-fox		C		1
animals	mammals	Pteropodidae	*Pteropus sp.*					2
animals	mammals	Tachyglossidae	*Tachyglossus aculeatus*	short-beaked echidna		SL		2
animals	mammals	Vespertilionidae	*Scoteanax rueppellii*	greater broad-nosed bat		C		1
animals	mammals	Vespertilionidae	*Myotis macropus*	large-footed myotis		C		1
animals	mammals	Vespertilionidae	*Chalinolobus morio*	chocolate wattled bat		C		1
animals	mammals	Vespertilionidae	*Nyctophilus gouldi*	Gould's long-eared bat		C		2
animals	mammals	Vespertilionidae	*Chalinolobus gouldii*	Gould's wattled bat		C		2
animals	mammals	Vespertilionidae	*Scotorepens greyii*	little broad-nosed bat		C		2
animals	ray-finned fishes	Anguillidae	*Anguilla australis*	southern shortfin eel				7
animals	ray-finned fishes	Anguillidae	*Anguilla reinhardtii*	longfin eel				24
animals	ray-finned fishes	Cichlidae	*Oreochromis mossambica*	Mozambique mouthbrooder	Y			10
animals	ray-finned fishes	Clupeidae	*Nematalosa erebi*	bony bream				2
animals	ray-finned fishes	Eleotridae	*Gobiomorphus australis*	striped gudgeon				12
animals	ray-finned fishes	Eleotridae	*Hypseleotris compressa*	empire gudgeon				18
animals	ray-finned fishes	Eleotridae	*Hypseleotris klunzingeri*	western carp gudgeon				16
animals	ray-finned fishes	Eleotridae	*Mogurnda adspersa*	southern purplespotted gudgeon				6
animals	ray-finned fishes	Eleotridae	*Hypseleotris galii*	firetail gudgeon				18
animals	ray-finned fishes	Melanotaeniidae	*Rhadinocentrus ornatus*	ornate rainbowfish				1
animals	ray-finned fishes	Melanotaeniidae	*Melanotaenia duboulayi*	crimsonspotted rainbowfish				23
animals	ray-finned fishes	Mugilidae	*Mugil cephalus*	sea mullet				17
animals	ray-finned fishes	Plotosidae	*Tandanus tandanus*	freshwater catfish				24

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	ray-finned fishes	Poeciliidae	*Xiphophorus maculatus*	platy	Y			14
animals	ray-finned fishes	Poeciliidae	*Gambusia holbrooki*	mosquitofish	Y			30
animals	ray-finned fishes	Poeciliidae	*Xiphophorus hellerii*	swordtail	Y			23
animals	ray-finned fishes	Pseudomugilidae	*Pseudomugil signifer*	Pacific blue eye				1
animals	ray-finned fishes	Retropinnidae	*Retropinna semoni*	Australian smelt				1
animals	ray-finned fishes	Terapontidae	*Leiopotherapon unicolor*	spangled perch				1
animals	reptiles	Agamidae	*Pogona barbata*	bearded dragon		C		19
animals	reptiles	Agamidae	*Pogona vitticeps*	central bearded dragon		C		1
animals	reptiles	Agamidae	*Diporiphora australis*	tommy roundhead		C		2
animals	reptiles	Agamidae	*Intellagama lesueurii*	eastern water dragon		C		11
animals	reptiles	Boidae	*Morelia spilota*	carpet python		C		34
animals	reptiles	Chelidae	*Chelodina expansa*	broad-shelled river turtle		C		3
animals	reptiles	Chelidae	*Chelodina longicollis*	eastern snake-necked turtle		C		1
animals	reptiles	Chelidae	*Emydura macquarii macquarii*	Murray turtle		C		3
animals	reptiles	Colubridae	*Dendrelaphis punctulatus*	green tree snake		C		23
animals	reptiles	Colubridae	*Tropidonophis mairii*	freshwater snake		C		6
animals	reptiles	Colubridae	*Boiga irregularis*	brown tree snake		C		3
animals	reptiles	Diplodactylidae	*Nebulifera robusta*	robust velvet gecko		C		1
animals	reptiles	Diplodactylidae	*Amalosia rhombifer*	zig-zag gecko		C		1
animals	reptiles	Elapidae	*Cacophis squamulosus*	golden crowned snake		C		1
animals	reptiles	Elapidae	*Demansia vestigiata*	lesser black whipsnake		C		1/1
animals	reptiles	Elapidae	*Cryptophis nigrescens*	eastern small-eyed snake		C		3
animals	reptiles	Elapidae	*Tropidechis carinatus*	rough-scaled snake		C		1
animals	reptiles	Elapidae	*Pseudechis porphyriacus*	red-bellied black snake		C		8/1
animals	reptiles	Elapidae	*Pseudechis australis*	king brown snake		C		1
animals	reptiles	Elapidae	*Pseudonaja textilis*	eastern brown snake		C		2
animals	reptiles	Elapidae	*Hemiaspis signata*	black-bellied swamp snake		C		1
animals	reptiles	Elapidae	*Cacophis harriettae*	white-crowned snake		C		1/1
animals	reptiles	Elapidae	*Demansia psammophis*	yellow-faced whipsnake		C		7
animals	reptiles	Gekkonidae	*Gehyra dubia*	dubious dtella		C		8
animals	reptiles	Gekkonidae	*Hemidactylus frenatus*	house gecko	Y			1
animals	reptiles	Pygopodidae	*Lialis burtonis*	Burton's legless lizard		C		4
animals	reptiles	Scincidae	*Anomalopus verreauxii*	three-clawed worm-skink		C		4
animals	reptiles	Scincidae	*Lampropholis delicata*	dark-flecked garden sunskink		C		14
animals	reptiles	Scincidae	*Calyptotis scutirostrum*	scute-snouted calyptotis		C		2
animals	reptiles	Scincidae	*Cryptoblepharus pulcher pulcher*	elegant snake-eyed skink		C		7
animals	reptiles	Scincidae	*Ctenotus taeniolatus*	copper-tailed skink		C		3/1
animals	reptiles	Scincidae	*Carlia vivax*	tussock rainbow-skink		C		4
animals	reptiles	Scincidae	*Tiliqua scincoides*	eastern blue-tongued lizard		C		12
animals	reptiles	Scincidae	*Lygisaurus foliorum*	tree-base litter-skink		C		2
animals	reptiles	Scincidae	*Ctenotus sp.*					1
animals	reptiles	Scincidae	*Eulamprus quoyii*	eastern water skink		C		4
animals	reptiles	Scincidae	*Ctenotus spaldingi*	straight-browed ctenotus		C		3
animals	reptiles	Scincidae	*Concinnia martini*	dark bar-sided skink		C		1
animals	reptiles	Typhlopidae	*Anilios ligatus*	robust blind snake		C		1/1
animals	reptiles	Varanidae	*Varanus varius*	lace monitor		C		1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	uncertain	Indeterminate	*Indeterminate*	Unknown or Code Pending		C		1
fungi	club fungi	Basidiomycota	*Tylopilus*			C		5/5
fungi	club fungi	Basidiomycota	*Stropharia rugosoannulata*			C		1/1
fungi	club fungi	Basidiomycota	*Leucoagaricus fimetarius*			C		1/1
fungi	club fungi	Basidiomycota	*Strobilomyces velutipes*			C		1/1
fungi	club fungi	Basidiomycota	*Panaeolus sphinctrinus*			C		1/1
fungi	club fungi	Basidiomycota	*Panus*			C		1/1
fungi	club fungi	Basidiomycota	*Amanita*			C		2/2
fungi	club fungi	Basidiomycota	*Boletus*			C		2/2
fungi	club fungi	Basidiomycota	*Lepiota*			C		2/2
fungi	club fungi	Basidiomycota	*Agaricus*			C		1/1
fungi	club fungi	Basidiomycota	*Conocybe*			C		1/1
fungi	club fungi	Basidiomycota	*Panaeolus*			C		1/1
fungi	club fungi	Basidiomycota	*Gymnopilus*			C		1/1
fungi	club fungi	Basidiomycota	*Leucocoprinus*			C		1/1
fungi	club fungi	Basidiomycota	*Pulveroboletus*			C		1/1
fungi	club fungi	Basidiomycota	*Suillus cothurnatus*			C		1/1
fungi	sac fungi	Arthoniaceae	*Arthonia*			C		1/1
fungi	sac fungi	Arthoniaceae	*Arthonia amoena*			C		1/1
fungi	sac fungi	Arthoniaceae	*Arthonia radiata*			C		1/1
fungi	sac fungi	Arthoniaceae	*Asteroporum punctuliforme*			C		1/1
fungi	sac fungi	Brigantiaeaceae	*Brigantiaea tricolor*			C		1/1
fungi	sac fungi	Candelariaceae	*Candelaria concolor*			C		1/1
fungi	sac fungi	Cladiaceae	*Cladia muelleri*			C		1/1
fungi	sac fungi	Cladoniaceae	*Cladonia rigida var. rigida*			C		1/1
fungi	sac fungi	Cladoniaceae	*Thysanothecium scutellatum*			C		1/1
fungi	sac fungi	Graphidaceae	*Ocellularia bicuspidata*			C		1/1
fungi	sac fungi	Graphidaceae	*Dictyographa*			C		2/2
fungi	sac fungi	Graphidaceae	*Ocellularia kalbii*			C		1/1
fungi	sac fungi	Graphidaceae	*Phaeographis*			C		3/3
fungi	sac fungi	Graphidaceae	*Graphis*			C		1/1
fungi	sac fungi	Graphidaceae	*Phaeographis lindigiana*			C		1/1
fungi	sac fungi	Graphidaceae	*Platythecium pertenellum*			C		1/1
fungi	sac fungi	Graphidaceae	*Asteristion leucophthalmum*			C		1/1
fungi	sac fungi	Graphidaceae	*Thelotrema subtile*			C		1/1
fungi	sac fungi	Haematommaceae	*Haematomma persoonii*			C		2/2
fungi	sac fungi	Lecanactidaceae	*Schismatomma shirleyanum*			C		1/1
fungi	sac fungi	Lecanoraceae	*Lecanora caesiorubella*			C		3/3
fungi	sac fungi	Lecanoraceae	*Lecanora argentata*			C		5/5
fungi	sac fungi	Lecanoraceae	*Lecanora helva*			C		1/1
fungi	sac fungi	Lecanoraceae	*Lecanora*			C		1/1
fungi	sac fungi	Lecideaceae	*Malcolmiella*			C		2/2
fungi	sac fungi	Lecideaceae	*Lecidea phaeocarpa*			C		1/1
fungi	sac fungi	Lichen	*Lichen*			C		1/1
fungi	sac fungi	Lobariaceae	*Crocodia aurata*			C		1/1
fungi	sac fungi	Lopadiaceae	*Lopadium brisbanense*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
fungi	sac fungi	Micareaceae	*Micarea*			C		4/4
fungi	sac fungi	Mycocaliciaceae	*Stenocybe*			C		2/2
fungi	sac fungi	Parmeliaceae	*Bulbothrix apophysata*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema reticulatum*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema norsticticatum*			C		1/1
fungi	sac fungi	Parmeliaceae	*Austroparmelina conlabrosa*			C		3/3
fungi	sac fungi	Parmeliaceae	*Parmotrema crinitum*			C		1/1
fungi	sac fungi	Parmeliaceae	*Canoparmelia texana*			C		2/2
fungi	sac fungi	Parmeliaceae	*Bulbothrix tabacina*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema*			C		1/1
fungi	sac fungi	Parmeliaceae	*Parmotrema tinctorum*			C		11/11
fungi	sac fungi	Pertusariaceae	*Pertusaria*			C		2/2
fungi	sac fungi	Pertusariaceae	*Pertusaria undulata*			C		1/1
fungi	sac fungi	Pertusariaceae	*Pertusaria pertusella*			C		1/1
fungi	sac fungi	Pertusariaceae	*Pertusaria leioplacella*			C		2/2
fungi	sac fungi	Pertusariaceae	*Ochrolechia subpallescens*			C		3/3
fungi	sac fungi	Pertusariaceae	*Pertusaria elliptica var. elliptica*			C		1/1
fungi	sac fungi	Physciaceae	*Physcia minor*			C		3/3
fungi	sac fungi	Physciaceae	*Hyperphyscia adglutinata*			C		2/2
fungi	sac fungi	Physciaceae	*Dirinaria subconfluens*			C		1/1
fungi	sac fungi	Physciaceae	*Buellia sanguinariella*			C		1/1
fungi	sac fungi	Physciaceae	*Heterodermia speciosa*			C		6/6
fungi	sac fungi	Physciaceae	*Buellia subcallispora*			C		3/3
fungi	sac fungi	Physciaceae	*Physcia tribacoides*			C		2/2
fungi	sac fungi	Physciaceae	*Dirinaria sekikaica*			C		11/11
fungi	sac fungi	Physciaceae	*Dirinaria confluens*			C		3/3
fungi	sac fungi	Physciaceae	*Dirinaria applanata*			C		15/15
fungi	sac fungi	Physciaceae	*Buellia*			C		2/2
fungi	sac fungi	Physciaceae	*Physcia*			C		1/1
fungi	sac fungi	Physciaceae	*Heterodermia*			C		2/2
fungi	sac fungi	Physciaceae	*Buellia dissa*			C		5/5
fungi	sac fungi	Physciaceae	*Buellia dialyta*			C		1/1
fungi	sac fungi	Physciaceae	*Buellia curatellae*			C		3/3
fungi	sac fungi	Physciaceae	*Cratiria subtropica*			C		1/1
fungi	sac fungi	Physciaceae	*Dirinaria aegialita*			C		2/2
fungi	sac fungi	Ramalinaceae	*Ramalina inflata subsp. perpusilla*			C		1/1
fungi	sac fungi	Teloschistaceae	*Caloplaca*			C		1/1
fungi	sac fungi	Teloschistaceae	*Protoblastenia*			C		1/1
fungi	sac fungi	Trichotheliaceae	*Porina*			C		1/1
fungi	sac fungi	Trichotheliaceae	*Porina eminentior*			C		1/1
fungi	sac fungi	Trichotheliaceae	*Porina mastoidea*			C		1/1
fungi	sac fungi	Usneaceae	*Usnea*			C		1/1
fungi	sac fungi	Usneaceae	*Usnea dasaea*			C		1/1
fungi	sac fungi	Usneaceae	*Usnea baileyi*			C		1/1
fungi	uncertain	Ascomycota	*Julella lactea*			C		1/1
plants	ferns	Adiantaceae	*Pellaea nana*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	ferns	Adiantaceae	*Pellaea paradoxa*	heart fern		C		1
plants	ferns	Adiantaceae	*Adiantum formosum*			C		1/1
plants	ferns	Adiantaceae	*Adiantum hispidulum*			C		1
plants	ferns	Adiantaceae	*Adiantum hispidulum var. hispidulum*			C		1/1
plants	ferns	Adiantaceae	*Pityrogramma calomelanos var. austroamericana*		Y			1/1
plants	ferns	Aspleniaceae	*Asplenium flabellifolium*	necklace fern		C		1/1
plants	ferns	Blechnaceae	*Doodia media*			C		1
plants	ferns	Blechnaceae	*Doodia caudata*			C		1/1
plants	ferns	Dennstaedtiaceae	*Pteridium esculentum*	common bracken		C		1
plants	ferns	Dicksoniaceae	*Calochlaena dubia*			C		1
plants	ferns	Gleicheniaceae	*Gleichenia dicarpa*	pouched coral fern		C		2/2
plants	ferns	Lindsaeaceae	*Lindsaea linearis*	screw fern		C		1/1
plants	ferns	Lindsaeaceae	*Lindsaea ensifolia*			C		2/1
plants	ferns	Lindsaeaceae	*Lindsaea ensifolia subsp. agatii x L.microphylla*			C		1/1
plants	ferns	Lindsaeaceae	*Lindsaea*			C		2/2
plants	ferns	Lindsaeaceae	*Lindsaea fraseri*			C		1/1
plants	ferns	Lindsaeaceae	*Lindsaea incisa*			C		1
plants	ferns	Lindsaeaceae	*Lindsaea ensifolia subsp. agatii*			C		1/1
plants	ferns	Marsileaceae	*Marsilea hirsuta*	hairy nardoo		C		1/1
plants	ferns	Salviniaceae	*Salvinia molesta*	salvinia	Y			3/3
plants	ferns	Schizaeaceae	*Lygodium japonicum*		Y			1/1
plants	ferns	Schizaeaceae	*Schizaea dichotoma*	branched comb fern		C		1/1
plants	ferns	Thelypteridaceae	*Christella dentata*	creek fern		C		1
plants	higher dicots	Acanthaceae	*Thunbergia fragrans*		Y			1/1
plants	higher dicots	Acanthaceae	*Harnieria hygrophiloides*	white karambal		C		1/1
plants	higher dicots	Acanthaceae	*Dyschoriste depressa*		Y			1/1
plants	higher dicots	Acanthaceae	*Hypoestes aristata*		Y			1/1
plants	higher dicots	Amaranthaceae	*Deeringia amaranthoides*	redberry		C		1/1
plants	higher dicots	Apiaceae	*Platysace ericoides*	heath platysace		C		2/2
plants	higher dicots	Apocynaceae	*Alyxia ruscifolia*			C		2/2
plants	higher dicots	Apocynaceae	*Parsonsia leichhardtii*	black silkpod		C		1/1
plants	higher dicots	Apocynaceae	*Parsonsia longipetiolata*			C		1/1
plants	higher dicots	Apocynaceae	*Hoya australis subsp. australis*			C		1/1
plants	higher dicots	Apocynaceae	*Parsonsia brisbanensis*	broad-leaved monkey vine		C		2/2
plants	higher dicots	Apocynaceae	*Carissa ovata*	currantbush		C		1/1
plants	higher dicots	Apocynaceae	*Parsonsia straminea*	monkey rope		C		1
plants	higher dicots	Araliaceae	*Hydrocotyle tripartita*			C		1/1
plants	higher dicots	Araliaceae	*Schefflera arboricola*		Y			1/1
plants	higher dicots	Araliaceae	*Astrotricha longifolia*	star hair bush		C		1/1
plants	higher dicots	Araliaceae	*Astrotricha umbrosa*			C		4/4
plants	higher dicots	Araliaceae	*Trachymene incisa subsp. incisa*			C		2/2
plants	higher dicots	Asteraceae	*Ageratina riparia*	mistflower	Y			1/1
plants	higher dicots	Asteraceae	*Solidago altissima subsp. altissima*	goldenrod	Y			1/1
plants	higher dicots	Asteraceae	*Crassocephalum crepidioides*	thickhead	Y			1/1
plants	higher dicots	Asteraceae	*Calotis cuneifolia*	burr daisy		C		1/1
plants	higher dicots	Asteraceae	*Picris angustifolia subsp. carolorum-henricorum*			C		1/1

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plants	higher dicots	Asteraceae	*Thymophylla tenuiloba var. tenuiloba*		Y			1/1
plants	higher dicots	Asteraceae	*Ageratina adenophora*	crofton weed	Y			1/1
plants	higher dicots	Asteraceae	*Ageratum houstonianum*	blue billygoat weed	Y			1/1
plants	higher dicots	Basellaceae	*Anredera cordifolia*	Madeira vine	Y			1/1
plants	higher dicots	Bignoniaceae	*Pandorea floribunda*			C		1/1
plants	higher dicots	Bignoniaceae	*Pandorea pandorana*	wonga vine		C		1
plants	higher dicots	Byttneriaceae	*Commersonia dasyphylla*			C		5/5
plants	higher dicots	Cactaceae	*Opuntia tomentosa*	velvety tree pear	Y			1
plants	higher dicots	Caesalpiniaceae	*Chamaecrista nomame var. nomame*			C		1/1
plants	higher dicots	Campanulaceae	*Lobelia stenophylla*			C		1/1
plants	higher dicots	Campanulaceae	*Wahlenbergia communis*	tufted bluebell		C		1/1
plants	higher dicots	Campanulaceae	*Lobelia gibbosa var. gibbosa*			C		2/2
plants	higher dicots	Capparaceae	*Capparis sarmentosa*	scrambling caper		C		1/1
plants	higher dicots	Capparaceae	*Capparis arborea*	brush caper berry		C		1/1
plants	higher dicots	Casuarinaceae	*Casuarina glauca*	swamp she-oak		C		1/1
plants	higher dicots	Celastraceae	*Denhamia celastroides*	broad-leaved boxwood		C		1/1
plants	higher dicots	Celastraceae	*Denhamia silvestris*			C		1/1
plants	higher dicots	Chenopodiaceae	*Suaeda australis*			C		1/1
plants	higher dicots	Chenopodiaceae	*Chenopodium album*	fat-hen	Y			1/1
plants	higher dicots	Chenopodiaceae	*Enchylaena tomentosa var. glabra*			C		1/1
plants	higher dicots	Convolvulaceae	*Polymeria calycina*	pink bindweed		C		2/2
plants	higher dicots	Cornaceae	*Alangium villosum subsp. tomentosum*			C		1/1
plants	higher dicots	Crassulaceae	*Bryophyllum proliferum*		Y			1/1
plants	higher dicots	Cucurbitaceae	*Momordica charantia*	balsam pear	Y			1/1
plants	higher dicots	Dilleniaceae	*Hibbertia diffusa*			C		3/3
plants	higher dicots	Dilleniaceae	*Hibbertia vestita*			C		1/1
plants	higher dicots	Dilleniaceae	*Hibbertia vestita var. vestita*			C		1/1
plants	higher dicots	Dilleniaceae	*Hibbertia aspera*			C		1/1
plants	higher dicots	Elaeocarpaceae	*Elaeocarpus obovatus*	blueberry ash		C		1/1
plants	higher dicots	Ericaceae	*Melichrus procumbens*	jam tarts		C		1/1
plants	higher dicots	Ericaceae	*Leucopogon biflorus*			C		1/1
plants	higher dicots	Euphorbiaceae	*Croton insularis*	Queensland cascarilla		C		2/2
plants	higher dicots	Euphorbiaceae	*Acalypha eremorum*	soft acalypha		C		1/1
plants	higher dicots	Euphorbiaceae	*Tragia novae-hollandiae*	stinging-vine		C		1/1
plants	higher dicots	Fabaceae	*Vicia hirsuta*	hairy vetch	Y			1/1
plants	higher dicots	Fabaceae	*Derris involuta*	native derris		C		1/1
plants	higher dicots	Fabaceae	*Hovea acutifolia*			C		8/8
plants	higher dicots	Fabaceae	*Pultenaea retusa*			C		1/1
plants	higher dicots	Fabaceae	*Crotalaria brevis*			C		1/1
plants	higher dicots	Fabaceae	*Dillwynia retorta*			C		1/1
plants	higher dicots	Fabaceae	*Dillwynia sieberi*			C		1/1
plants	higher dicots	Fabaceae	*Pultenaea euchila*	orange pultenaea		C		2/2
plants	higher dicots	Fabaceae	*Pultenaea villosa*	hairy bush pea		C		2/2
plants	higher dicots	Fabaceae	*Daviesia villifera*	prickly daviesia		C		1/1
plants	higher dicots	Fabaceae	*Hovea heterophylla*			C		3/3
plants	higher dicots	Fabaceae	*Jacksonia scoparia*			C		1/1

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plants	higher dicots	Fabaceae	*Kennedia rubicunda*	red Kennedy pea		C		1/1
plants	higher dicots	Fabaceae	*Pultenaea paleacea*			C		2/2
plants	higher dicots	Fabaceae	*Callerya megasperma*	native wisteria		C		1
plants	higher dicots	Fabaceae	*Podolobium scandens*			C		2/2
plants	higher dicots	Fabaceae	*Pultenaea myrtoides*			C		2/2
plants	higher dicots	Fabaceae	*Daviesia umbellulata*			C		1/1
plants	higher dicots	Fabaceae	*Isotropis filicaulis*			C		1/1
plants	higher dicots	Fabaceae	*Phyllota phylicoides*	yellow peabush		C		4/4
plants	higher dicots	Fabaceae	*Pultenaea petiolaris*			C		2/2
plants	higher dicots	Fabaceae	*Crotalaria grahamiana*		Y			1/1
plants	higher dicots	Fabaceae	*Indigofera circinella*		Y			1/1
plants	higher dicots	Fabaceae	*Pultenaea cunninghamii*	prickly pea		C		1/1
plants	higher dicots	Fabaceae	*Gompholobium latifolium*	broad wedge pea		C		1/1
plants	higher dicots	Fabaceae	*Podolobium aciculiferum*			C		1/1
plants	higher dicots	Fabaceae	*Crotalaria pallida var. obovata*		Y			1/1
plants	higher dicots	Fabaceae	*Galactia tenuiflora var. lucida*			C		1/1
plants	higher dicots	Fabaceae	*Macrotyloma axillare var. axillare*		Y			1/1
plants	higher dicots	Fabaceae	*Indigofera australis subsp. australis*			C		2/2
plants	higher dicots	Fabaceae	*Daviesia ulicifolia subsp. stenophylla*			C		3/3
plants	higher dicots	Goodeniaceae	*Velleia spathulata*	wild pansies		C		1/1
plants	higher dicots	Goodeniaceae	*Goodenia bellidifolia subsp. argentea*			C		2/2
plants	higher dicots	Goodeniaceae	*Dampiera sylvestris*	blue dampiera		C		1/1
plants	higher dicots	Gyrostemonaceae	*Codonocarpus attenuatus*			C		1/1
plants	higher dicots	Haloragaceae	*Myriophyllum gracile var. gracile*			C		2/2
plants	higher dicots	Haloragaceae	*Haloragis heterophylla*	rough raspweed		C		1/1
plants	higher dicots	Lamiaceae	*Clerodendrum tomentosum*			C		1/1
plants	higher dicots	Lamiaceae	*Plectranthus verticillatus*		Y			1/1
plants	higher dicots	Lamiaceae	*Plectranthus amboinicus*	allspice	Y			1/1
plants	higher dicots	Lamiaceae	*Callicarpa pedunculata*	velvet leaf		C		2/2
plants	higher dicots	Lamiaceae	*Chloanthes parviflora*			C		1/1
plants	higher dicots	Lamiaceae	*Westringia eremicola*	slender westringia		C		8/8
plants	higher dicots	Lamiaceae	*Anisomeles moschata*			C		1/1
plants	higher dicots	Lamiaceae	*Gmelina leichhardtii*	white beech		C		1/1
plants	higher dicots	Loganiaceae	*Mitrasacme paludosa*			C		1/1
plants	higher dicots	Loganiaceae	*Orianthera pusilla*			C		2/2
plants	higher dicots	Loranthaceae	*Amyema congener subsp. congener*			C		2/2
plants	higher dicots	Loranthaceae	*Dendrophthoe vitellina*	long-flowered mistletoe		C		2/2
plants	higher dicots	Loranthaceae	*Amyema congener subsp. rotundifolia*			C		1/1
plants	higher dicots	Lythraceae	*Cuphea carthagenensis*		Y			1/1
plants	higher dicots	Malvaceae	*Hibiscus heterophyllus*			C		1/1
plants	higher dicots	Meliaceae	*Melia azedarach*	white cedar		C		1/1
plants	higher dicots	Menyanthaceae	*Nymphoides indica*	water snowflake		C		1
plants	higher dicots	Mimosaceae	*Acacia hispidula*			C		9/9
plants	higher dicots	Mimosaceae	*Acacia fimbriata*	Brisbane golden wattle		C		7/7
plants	higher dicots	Mimosaceae	*Acacia conferta*			C		1/1
plants	higher dicots	Mimosaceae	*Acacia complanata*	flatstem wattle		C		1/1

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plants	higher dicots	Mimosaceae	*Acacia aulacocarpa*			C		1
plants	higher dicots	Mimosaceae	*Acacia juncifolia*			C		6/6
plants	higher dicots	Mimosaceae	*Acacia concurrens*			C		2/2
plants	higher dicots	Mimosaceae	*Acacia leiocalyx subsp. leiocalyx*			C		2/2
plants	higher dicots	Mimosaceae	*Acacia falcata*	sickle wattle		C		2/2
plants	higher dicots	Molluginaceae	*Mollugo verticillata*		Y			1/1
plants	higher dicots	Myrsinaceae	*Myrsine howittiana*			C		1/1
plants	higher dicots	Myrsinaceae	*Ardisia crenata*		Y			1/1
plants	higher dicots	Myrtaceae	*Eucalyptus siderophloia*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus tereticornis*			C		1
plants	higher dicots	Myrtaceae	*Melaleuca quinquenervia*	swamp paperbark		C		3/1
plants	higher dicots	Myrtaceae	*Leptospermum juniperinum*	prickly tea-tree		C		1/1
plants	higher dicots	Myrtaceae	*Leptospermum polygalifolium*	tantoon		C		3/3
plants	higher dicots	Myrtaceae	*Eucalyptus fibrosa subsp. fibrosa*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus racemosa subsp. racemosa*	scribbly gum		C		3/1
plants	higher dicots	Myrtaceae	*Melaleuca pachyphylla*			C		2/2
plants	higher dicots	Myrtaceae	*Lophostemon confertus*	brush box		C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus resinifera*	red mahogany		C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus helidonica*			C		1/1
plants	higher dicots	Myrtaceae	*Rhodamnia rubescens*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus curtisii*	Plunkett mallee		NT		7/7
plants	higher dicots	Myrtaceae	*Corymbia intermedia*	pink bloodwood		C		2/1
plants	higher dicots	Myrtaceae	*Melaleuca salicina*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus robusta*	swamp mahogany		C		1
plants	higher dicots	Myrtaceae	*Syzygium australe*	scrub cherry		C		1
plants	higher dicots	Myrtaceae	*Sannantha collina*			C		1/1
plants	higher dicots	Myrtaceae	*Corymbia citriodora subsp. variegata*			C		1/1
plants	higher dicots	Myrtaceae	*Eucalyptus seeana*	narrow-leaved red gum		C		4/3
plants	higher dicots	Myrtaceae	*Eucalyptus carnea*			C		1/1
plants	higher dicots	Myrtaceae	*Melaleuca nodosa*			C		1/1
plants	higher dicots	Myrtaceae	*Melaleuca sieberi*			C		1/1
plants	higher dicots	Ochnaceae	*Ochna serrulata*	ochna	Y			1
plants	higher dicots	Orobanchaceae	*Striga parviflora*			C		1/1
plants	higher dicots	Oxalidaceae	*Oxalis exilis*			C		1/1
plants	higher dicots	Passifloraceae	*Passiflora suberosa subsp. litoralis*		Y			1/1
plants	higher dicots	Phyllanthaceae	*Breynia oblongifolia*			C		1
plants	higher dicots	Phyllanthaceae	*Poranthera microphylla*	small poranthera		C		1/1
plants	higher dicots	Phyllanthaceae	*Glochidion sumatranum*	umbrella cheese tree		C		1/1
plants	higher dicots	Plantaginaceae	*Scoparia dulcis*	scoparia	Y			1/1
plants	higher dicots	Polygalaceae	*Polygala paniculata*		Y			1/1
plants	higher dicots	Polygalaceae	*Comesperma hispidulum*			C		3/3
plants	higher dicots	Polygalaceae	*Comesperma sphaerocarpum*			C		1/1
plants	higher dicots	Proteaceae	*Grevillea banksii*			C		1/1
plants	higher dicots	Proteaceae	*Banksia integrifolia*			C		1
plants	higher dicots	Proteaceae	*Persoonia tenuifolia*			C		1/1
plants	higher dicots	Proteaceae	*Hakea florulenta*	three-nerved willow hakea		C		2/2

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plants	higher dicots	Proteaceae	*Banksia oblongifolia*	dwarf banksia		C		1
plants	higher dicots	Proteaceae	*Macadamia integrifolia*	macadamia nut		V	V	2/2
plants	higher dicots	Rhamnaceae	*Alphitonia excelsa*	soap tree		C		1/1
plants	higher dicots	Rosaceae	*Rubus laudatus*		Y			1/1
plants	higher dicots	Rosaceae	*Rosa laevigata*	cherokee rose	Y			2/2
plants	higher dicots	Rubiaceae	*Opercularia diphylla*			C		1/1
plants	higher dicots	Rubiaceae	*Cyclophyllum coprosmoides var. coprosmoides*			C		1/1
plants	higher dicots	Rubiaceae	*Ixora beckleri*	brown coffeewood		C		1/1
plants	higher dicots	Rubiaceae	*Pomax umbellata*			C		1/1
plants	higher dicots	Rubiaceae	*Spermacoce remota*		Y			1/1
plants	higher dicots	Rutaceae	*Pentaceras australe*	bastard crow's ash		C		1/1
plants	higher dicots	Rutaceae	*Zieria furfuracea subsp. gymnocarpa*			E		28/28
plants	higher dicots	Rutaceae	*Acronychia imperforata*	beach acronychia		C		1/1
plants	higher dicots	Rutaceae	*Boronia polygalifolia*	dwarf boronia		C		1/1
plants	higher dicots	Rutaceae	*Acronychia pauciflora*	soft acronychia		C		2/2
plants	higher dicots	Rutaceae	*Zieria smithii*			C		2/2
plants	higher dicots	Santalaceae	*Exocarpos latifolius*			C		1/1
plants	higher dicots	Sapindaceae	*Cupaniopsis shirleyana*	wedge-leaf tuckeroo		V	V	1/1
plants	higher dicots	Sapindaceae	*Mischocarpus anodontus*	veiny pearfruit		C		1/1
plants	higher dicots	Sapindaceae	*Cupaniopsis parvifolia*	small-leaved tuckeroo		C		1/1
plants	higher dicots	Sapindaceae	*Dodonaea triquetra*	large-leaved hop bush		C		2/2
plants	higher dicots	Sapotaceae	*Planchonella australis*			C		1/1
plants	higher dicots	Scrophulariaceae	*Myoporum acuminatum*	coastal boobialla		C		1/1
plants	higher dicots	Solanaceae	*Cestrum nocturnum*		Y			1/1
plants	higher dicots	Solanaceae	*Solanum nodiflorum*		Y			1/1
plants	higher dicots	Solanaceae	*Solanum stelligerum*	devil's needles		C		5/5
plants	higher dicots	Sparrmanniaceae	*Grewia latifolia*	dysentery plant		C		1/1
plants	higher dicots	Stylidiaceae	*Stylidium tenerum*			C		1/1
plants	higher dicots	Symplocaceae	*Symplocos harroldii*	hairy hazelwood		NT		1/1
plants	higher dicots	Tropaeolaceae	*Tropaeolum majus*	garden nasturtium	Y			1/1
plants	higher dicots	Verbenaceae	*Lantana camara*	lantana	Y			1
plants	higher dicots	Verbenaceae	*Phyla canescens*		Y			1/1
plants	higher dicots	Verbenaceae	*Lantana montevidensis*	creeping lantana	Y			1/1
plants	higher dicots	Violaceae	*Hybanthus monopetalus*			C		1/1
plants	higher dicots	Violaceae	*Afrohybanthus stellarioides*			C		1/1
plants	higher dicots	Vitaceae	*Cayratia clematidea*	slender grape		C		1/1
plants	liverworts	Aneuraceae	*Riccardia graeffei*			C		1/1
plants	liverworts	Lejeuneaceae	*Lejeunea*			C		1/1
plants	lower dicots	Annonaceae	*Melodorum leichhardtii*			C		1
plants	lower dicots	Lauraceae	*Cassytha filiformis*	dodder laurel		C		1/1
plants	lower dicots	Lauraceae	*Cinnamomum camphora*	camphor laurel	Y			2/1
plants	lower dicots	Lauraceae	*Cryptocarya bidwillii*	yellow laurel		C		1/1
plants	lower dicots	Lauraceae	*Cassytha glabella forma glabella*			C		1/1
plants	lower dicots	Linderniaceae	*Artanema fimbriatum*			C		2/2
plants	lower dicots	Menispermaceae	*Pleogyne australis*	wiry grape		C		1/1
plants	lower dicots	Menispermaceae	*Stephania japonica var. discolor*			C		1/1

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plants	lower dicots	Monimiaceae	*Wilkiea huegeliana*	veiny wilkiea		C		1/1
plants	lower dicots	Nymphaeaceae	*Nymphaea mexicana x N. unknown*			C		1/1
plants	lower dicots	Papaveraceae	*Fumaria officinalis subsp. officinalis*		Y			1/1
plants	lower dicots	Ranunculaceae	*Clematis glycinoides*			C		1/1
plants	lower dicots	Ranunculaceae	*Ranunculus sceleratus subsp. sceleratus*		Y			1/1
plants	monocots	Alismataceae	*Sagittaria platyphylla*	sagittaria	Y			2/2
plants	monocots	Alismataceae	*Echinodorus cordifolius*		Y			1/1
plants	monocots	Araceae	*Gymnostachys anceps*	settler's flax		C		1/1
plants	monocots	Asparagaceae	*Asparagus macowanii*		Y			1/1
plants	monocots	Colchicaceae	*Burchardia umbellata*			C		1/1
plants	monocots	Commelinaceae	*Murdannia graminea*	murdannia		C		1/1
plants	monocots	Commelinaceae	*Callisia repens*		Y			1/1
plants	monocots	Cyperaceae	*Eleocharis philippinensis*			C		1/1
plants	monocots	Cyperaceae	*Rhynchospora brownii*	beak rush		C		1/1
plants	monocots	Cyperaceae	*Schoenus apogon var. apogon*			C		1/1
plants	monocots	Cyperaceae	*Lepironia articulata*			C		2/2
plants	monocots	Cyperaceae	*Gahnia aspera*			C		1/1
plants	monocots	Cyperaceae	*Cyperus fulvus*			C		1/1
plants	monocots	Cyperaceae	*Scleria rugosa*			C		1/1
plants	monocots	Cyperaceae	*Cyperus lucidus*			C		1/1
plants	monocots	Cyperaceae	*Cyperus pilosus*			C		1/1
plants	monocots	Cyperaceae	*Fuirena ciliaris*			C		1/1
plants	monocots	Cyperaceae	*Baumea articulata*	jointed twigrush		C		1/1
plants	monocots	Cyperaceae	*Baumea rubiginosa*	soft twigrush		C		2/2
plants	monocots	Cyperaceae	*Cyperus aquatilis*			C		1/1
plants	monocots	Cyperaceae	*Isolepis inundata*	swamp club rush		C		1/1
plants	monocots	Cyperaceae	*Ptilothrix deusta*			C		1/1
plants	monocots	Cyperaceae	*Cyperus aggregatus*		Y			1/1
plants	monocots	Cyperaceae	*Rhynchospora rubra*			C		1/1
plants	monocots	Cyperaceae	*Fimbristylis velata*			C		1/1
plants	monocots	Cyperaceae	*Chorizandra cymbaria*			C		1/1
plants	monocots	Cyperaceae	*Cyperus involucratus*		Y			1/1
plants	monocots	Dracaenaceae	*Sansevieria trifasciata*	mother-in-law's tongue	Y			1/1
plants	monocots	Eriocaulaceae	*Eriocaulon scariosum*			C		1/1
plants	monocots	Hemerocallidaceae	*Dianella longifolia var. stenophylla*			C		1/1
plants	monocots	Hemerocallidaceae	*Dianella caerulea var. vannata*			C		1/1
plants	monocots	Hemerocallidaceae	*Dianella revoluta*			C		1
plants	monocots	Hemerocallidaceae	*Dianella brevipedunculata*			C		1/1
plants	monocots	Hypoxidaceae	*Molineria capitulata*			C		1
plants	monocots	Iridaceae	*Patersonia glabrata*			C		1/1
plants	monocots	Iridaceae	*Aristea ecklonii*	blue stars	Y			1/1
plants	monocots	Iridaceae	*Sisyrinchium rosulatum*		Y			1/1
plants	monocots	Iridaceae	*Patersonia sericea var. sericea*			C		1/1
plants	monocots	Johnsoniaceae	*Tricoryne elatior*	yellow autumn lily		C		2/2
plants	monocots	Juncaceae	*Juncus planifolius*			C		1/1
plants	monocots	Juncaceae	*Juncus polyanthemus*			C		1/1

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Juncaceae	*Juncus continuus*			C		1/1
plants	monocots	Juncaginaceae	*Cycnogeton microtuberosus*			C		1/1
plants	monocots	Laxmanniaceae	*Lomandra longifolia*			C		1
plants	monocots	Laxmanniaceae	*Eustrephus latifolius*	wombat berry		C		2/1
plants	monocots	Laxmanniaceae	*Lomandra filiformis*			C		1
plants	monocots	Marantaceae	*Thalia geniculata*		Y			1/1
plants	monocots	Orchidaceae	*Calochilus grandiflorus*	giant beard orchid		C		1/1
plants	monocots	Orchidaceae	*Geodorum densiflorum*	pink nodding orchid		C		1
plants	monocots	Orchidaceae	*Dendrobium speciosum*			C		1
plants	monocots	Orchidaceae	*Prasophyllum brevilabre*			C		2/2
plants	monocots	Orchidaceae	*Phaius australis*			E	E	2/1
plants	monocots	Orchidaceae	*Cymbidium suave*			C		2/1
plants	monocots	Orchidaceae	*Spiranthes australis*			C		2/2
plants	monocots	Orchidaceae	*Microtis parviflora*	slender onion orchid		C		1/1
plants	monocots	Philydraceae	*Philydrum lanuginosum*	frogsmouth		C		1/1
plants	monocots	Poaceae	*Eriochloa procera*	slender cupgrass		C		1/1
plants	monocots	Poaceae	*Eriachne glabrata*			C		2/2
plants	monocots	Poaceae	*Sorghum halepense*	Johnson grass	Y			1/1
plants	monocots	Poaceae	*Cenchrus purpureus*		Y			1/1
plants	monocots	Poaceae	*Digitaria diminuta*			C		1/1
plants	monocots	Poaceae	*Entolasia whiteana*			C		1/1
plants	monocots	Poaceae	*Sacciolepis indica*	Indian cupscale grass		C		1/1
plants	monocots	Poaceae	*Themeda triandra*	kangaroo grass		C		1/1
plants	monocots	Poaceae	*Leersia hexandra*	swamp rice grass		C		1/1
plants	monocots	Poaceae	*Panicum effusum*			C		1/1
plants	monocots	Poaceae	*Panicum simile*			C		2/2
plants	monocots	Poaceae	*Hordeum glaucum*		Y			1/1
plants	monocots	Poaceae	*Setaria parviflora*	slender pigeon grass	Y			1/1
plants	monocots	Poaceae	*Setaria sphacelata*		Y			2/2
plants	monocots	Poaceae	*Urochloa decumbens*		Y			1/1
plants	monocots	Poaceae	*Dichelachne montana*			C		3/3
plants	monocots	Poaceae	*Entolasia marginata*	bordered panic		C		3/3
plants	monocots	Poaceae	*Paspalidium distans*	shotgrass		C		2/2
plants	monocots	Poaceae	*Cymbopogon refractus*	barbed-wire grass		C		3/3
plants	monocots	Poaceae	*Digitaria longiflora*			C		1/1
plants	monocots	Poaceae	*Digitaria parviflora*			C		2/2
plants	monocots	Poaceae	*Digitaria violascens*	bastard summergrass	Y			1/1
plants	monocots	Poaceae	*Dichanthium annulatum*	sheda grass	Y			1/1
plants	monocots	Poaceae	*Aristida caput-medusae*			C		1/1
plants	monocots	Poaceae	*Paspalum scrobiculatum*	ditch millet		C		3/3
plants	monocots	Poaceae	*Eragrostis spartinoides*			C		1/1
plants	monocots	Poaceae	*Ehrharta erecta var. erecta*		Y			1/1
plants	monocots	Poaceae	*Megathyrsus maximus var. maximus*		Y			1/1
plants	monocots	Poaceae	*Aristida benthamii var. benthamii*			C		2/2
plants	monocots	Poaceae	*Calyptochloa gracillima subsp. gracillima*			C		1/1
plants	monocots	Poaceae	*Aristida queenslandica var. queenslandica*			C		2/2

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	monocots	Poaceae	*Aristida queenslandica var. dissimilis*			C		1/1
plants	monocots	Poaceae	*Hemarthria uncinata var. spathacea*			C		1/1
plants	monocots	Poaceae	*Paspalum urvillei*	vasey grass	Y			1/1
plants	monocots	Potamogetonaceae	*Potamogeton octandrus*			C		1/1
plants	monocots	Smilacaceae	*Smilax glyciphylla*	sweet sarsaparilla		C		1/1
plants	monocots	Typhaceae	*Typha domingensis*			C		1
plants	monocots	Xanthorrhoeaceae	*Xanthorrhoea macronema*			C		1/1
protists	blue-green algae	Cyanophyceae	*Phormidium submembranaceum*			C		1/1
protists	green algae	Chlorophyceae	*Cephaleuros*			C		1/1
protists	green algae	Chlorophyceae	*Caulerpa taxifolia*			C		1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

LAMBERT & REHBEIN
ENGINEERS • MANAGERS • SCIENTISTS

APPENDIX G

EPBC PROTECTED MATTERS REPORT

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

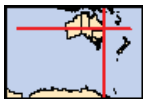
Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

Report created: 23/07/18 15:15:58

This map may contain data which are ©Commonwealth of Australia (Geoscience Australia), ©PSMA 2010

Coordinates
Buffer: 5.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	38
Listed Migratory Species:	17

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	24
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	2
Regional Forest Agreements:	None
Invasive Species:	43
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Moreton bay	Within 10km of Ramsar

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat likely to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Poephila cincta cincta Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat may occur within area
Fish		
Maccullochella peelii Murray Cod [66633]	Vulnerable	Species or species habitat may occur within area
Insects		
Argynnis hyperbius inconstans Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat may occur within area
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat may occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Xeromys myoides Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area
Plants		
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat may occur within area
Baloghia marmorata Marbled Balogia, Jointed Baloghia [8463]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Bosistoa transversa Three-leaved Bosistoa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
Corchorus cunninghamii Native Jute [14659]	Endangered	Species or species habitat likely to occur within area
Cryptocarya foetida Stinking Cryptocarya, Stinking Laurel [11976]	Vulnerable	Species or species habitat may occur within area
Cupaniopsis shirleyana Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat likely to occur within area
Endiandra floydii Floyd's Walnut [52955]	Endangered	Species or species habitat may occur within area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat known to occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area
Phaius australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat likely to occur within area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Saiphos reticulatus Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area

Name	Threatened	Type of Presence
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Cuculus saturatus Oriental Cuckoo, Himalayan Cuckoo [710]		Species or species habitat known to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur

Name	Threatened	Type of Presence within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves [Resource Information]

Name	State
Leslie Harrison Dam	QLD
Mount Petrie Road	QLD

Invasive Species [Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species habitat likely to occur within area
Annona glabra Pond Apple, Pond-apple Tree, Alligator Apple, Bullock's Heart, Cherimoya, Monkey Apple, Bobwood, Corkwood [6311]		Species or species habitat may occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus africanus Climbing Asparagus, Climbing Asparagus Fern [66907]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish		Species or species

Name	Status	Type of Presence
Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cryptostegia grandiflora Rubber Vine, Rubbervine, India Rubber Vine, India Rubbervine, Palay Rubbervine, Purple Allamanda [18913]		Species or species habitat likely to occur within area
Dolichandra unguis-cati Cat's Claw Vine, Yellow Trumpet Vine, Cat's Claw Creeper, Funnel Creeper [85119]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Hymenachne amplexicaulis Hymenachne, Olive Hymenachne, Water Stargrass, West Indian Grass, West Indian Marsh Grass [31754]		Species or species habitat likely to occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Parthenium hysterophorus Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur within area
Prosopis spp. Mesquite, Algaroba [68407]		Species or species habitat likely to occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Reptiles		
Hemidactylus frenatus Asian House Gecko [1708]		Species or species habitat likely to occur within area
Ramphotyphlops braminus Flowerpot Blind Snake, Brahminy Blind Snake, Cacing Besi [1258]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27.51229 153.14134

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

Department of the Environment
GPO Box 787
Canberra ACT 2601 Australia
+61 2 6274 1111

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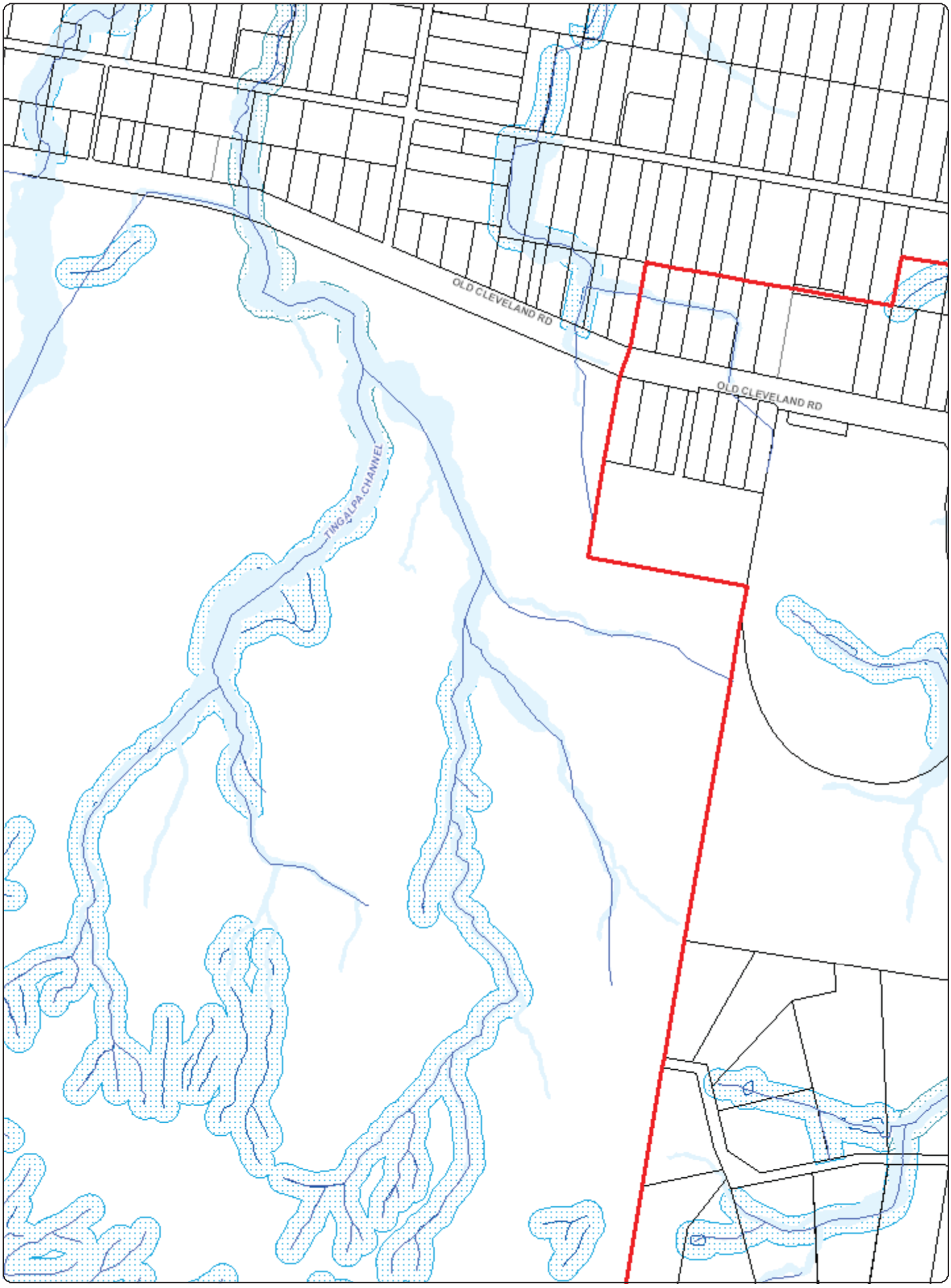
ENGINEERS • MANAGERS • SCIENTISTS

APPENDIX H

BRISBANE CITY COUNCIL WATERWAYS AND FLOW PATHS



Brisbane City Plan 2014

BRISBANE CITY
Planning Scheme

NOTES

This map is notional only and should not be used for interpreting City Plan provisions relating to specific sites. To properly interpret the maps, the planning scheme must be referred to. The Digital Cadastre Database (supplied by State of Queensland - Department of Natural Resources and Mines) will be updated from time to time.

Mapping adopted by Council, effective 18 September 2015.

Projection: Map Grid of Australia, Zone 56
Horizontal Datum: Geocentric Datum of Australia 1994

Approximate Scale @ A4 1:10,000

0 375

Metres

Date: 24/07/2018

Legend

- LGA Name
- LGA Boundary
- Labels - Major_Road - StreetPro
- Waterbody
- Waterway - Major
- Waterway
- Parcel
- Overland flow flood planning area
- Brisbane River corridor
- Citywide waterway corridor
- Local waterway corridor
- Brisbane River corridor - section boundary
- Waterway centreline
- Railway Line
- Airport Roads
- Waterbody
- Brisbane River, Creek
- Drainage Regions
- Drainage Centrelines (BCC Masked)
- Drainageline

Brisbane City Plan 2014

BRISBANE CITY Planning Scheme

NOTES

This map is notional only and should not be used for interpreting City Plan provisions relating to specific sites. To properly interpret the maps, the planning scheme must be referred to. The Digital Cadastre Database (supplied by State of Queensland - Department of Natural Resources and Mines) will be updated from time to time.

Mapping adopted by Council, effective 18 September 2015.

Projection: Map Grid of Australia, Zone 56
Horizontal Datum: Geocentric Datum of Australia 1994

Date: 24/07/2018

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APPENDIX I

RISK ASSESSMENT

Location	Activity / Work Packages	Key Environmental Value (KEV)	Environmental Factor	Unmitigated Impact Details	Likelihood	Consequence	Primary Consequence Category	Unmitigated Risk Rating	Acceptability	Management Controls	Likelihood	Consequense	Residual Risk Rating	Acceptability	GAP Analysis
Construction Activities	**Construction of the shot curtain, retaining wall and noise barrier wall**														
		Land	Soils (eg contamination)	Operation of machinery during site works for the establishment of the site has the potential to result in spills of fuels, oils, etc. It is not expected any chemicals or hazardous materials including fuels) will be stored or used during construction activities. Any of these events have the potential to result in contamination of the site soils.	3	1	Environmental Impacts	4	A = acceptable	The following controls will be in place: * Hazardous substances and dangerous goods management - No fuel and oil will be stored on site. Mobile refueling will be undertaken in designated areas with bunds, spill kits and other appropriate controls in place. - No chemical or chemical substance shall be brought to site unless a Safety Data Sheet (SDS) has been supplied. - All personnel handling chemicals or hazardous substances must be informed of the requirements for the safe transport, storage, use and emergency treatment, as detailed in the SDS. - A hazardous materials register shall be maintained in the storage area. - All hazardous substances and dangerous goods shall be stored and used as per Australian standards - A copy of the SDS is to be kept onsite for easy access by personnel; - Permission is to be sought by Contractors from the client prior to mobilising Hazardous Substances and Dangerous Goods to site; - Contractors are required to provide a full list of all hazardous subsances and dangerous goods they propose to use or bring to site prior to mobilisation to site; - A register is to be developed for all hazardous substances and dangerous goods onsite; - Hazardous substances shall be stored under cover and in a manner that will prevent deterioration of goods and to prevent environmental contamination (e.g., bunded to capture any spillage or leakage); - Corrosive materials to be stored and handled in accordance with AS3780.8:2008 (Class 8 Substances – Corrosives); - Fuel, oils and chemicals in containers to be stored in impervious bunded area with capacity of at least 130% of largest container/tankor in a self-bunded tank; - All fuel, oils and chemical containers must have their contents clearly labelled; - Spill clean-up kits including absobent materials are to be kept at each storage facility and site of use; - All site personnel will be trained in the use of spill kits; - Drip trays or alternate method will be used to collect fluids and debris during mechanical or roadside repairs; - All employees will be trained in spill response. This will be included in site inductions * Waste management - see waster management	2	1	2	A = acceptable	
		Land	Soils (physical)	Operation of construction machinery impacts soils structure.	5	3	Environmental Impacts	20	U = unacceptable	A Topsoil pile management strategy will be developed once topsoil and volumes required to be managed are understood. Depending on the outcomes the fdlowing controls will be in place for access track upgrade: - top soil will be stockpiled and used during rehabilitation post-construction; or - if it is not required for construction areas reused around the site in areas that require toosil and / a rehabilitation.	5	1	11	A = acceptable	
		Land	Flora and vegetation	Construction of infrastructure requires clearing of vegetation. Vegetation is required to be cleared for infrastructure foot print and construction space.	5	3	Environmental Impacts	20	U = unacceptable	The following will be implemented: - Clearing will be minimised through design (e.g. retainings walls instead of sloped batters) - Existing cleared areas will be utilised - All areas proposed to be cleared will be marked clearly to ensure risk of inadvertent clearing is kept to a minimum. -Inspect all vehicles entering the site for signs of weed and pests; treat appropriately if present. - Inspect all material leaving site for signs of weeds or pests; treat appropriately if present. - Undertake visual inspections monthly for weeds on site and implement appropriate actions if weeds are becoming established on site. - Mobile plant and equipment is to be restricted to designated routes. - A Topsoil pile management strategy will be developed once topsoil and volumes required to be managed are understood. Depending on the outcomes the following controls will be in place for access track upgrade: - top soil will be stockpiled and used during rehabilitation post-construction; or - if it is not required for construction areas reused around the site in areas that require topsil and / a rehabilitation. - Vehicles are to arrive clean and leave clean (develop a procedure that is appropriate for this site location to ensure any cleaning is undertaken prior to mobilising for site to minimise	2	2	5	A = acceptable	A flora survey maybe required to further reduce risks. If not undertaken for the test pit it is likely to be required for future activities that expand the operation.
		Land	Fauna	The area has fauna present. Fauna surveys have not found the presence of any conservation significnat fauna, however the vegetation is koala habitat.	5	2	Environmental Impacts	16	U = unacceptable	The following will be implemented: - Any fauna habitat specifically to be retained will be pegged and marked. - Mobile plant and equipment is to be restricted to designated routes. - All vegetation to be cleared is to be inspected for fauna at the fdlowing intervals: - 2 days before clearing - 1 day before clearing - day of clearing. - Any fauna to be found is to be moved by a suitably qualified fauna spotter catcher. - A suitably qualified fauna spotter catcher is to be present during all clearing works.. - Ensure only qualified personnel are to engage with fauna. - Personnel will be educated not to feed, handle or interact with any fauna. - All injured or sick fauna are to be reported to environmental personnel. A wildlife carer will be engaged to care for the sick or injured animal. - Vehicle speeds to be minimised to reduce the risk of animal strike. - Consultation with landholder to be undertaken to discuss the opportunity to remove cattle from access road during construction period. -Consultation with landholder to be undertaken to develop site specific gate and fence management strategy. - Inspect all material leaving site for signs of weeds or pests; treat appropriately if present - Undertake visual inspections monthly for weeds on site and implement appropriate actions if weeds are becoming established on site. - Mobile plant and equipment is to be restricted to designated routes. - Inspect any open trenches daily for trapped fauna.. - Ensure only qualified personnel are to engage with fauna. - Personnel will be educated not to feed, handle or interact with any fauna.	2	3	9	A = acceptable	A fauna survey may be required to further reduce risks. If not undertaken for the test pit it is likely to be required for future activities that expand the operation.
		Land	Weeds and Pests	Potential for construction activities to increase weeds in the vegetation and also to introduce fireants to the location.	3	3	Environmental Impacts	13	U = unacceptable	The following will be implemented: - All vehicles to be free of dirt and seeds, and be clean before arrival. - All vehicles are to come clean and leave clean. - Vehicles to carry documentation stating they have been cleaned prior to mobilising to site. - Inspect all vehicles entering the site for signs of weed and pests; treat appropriately if present. - Reject any vehicles that are dirty and can't be treated appropriately before entering the site. - Inspect all material leaving site for signs of weeds or pests; treat appropriately if present. - Vehicle cleaning station to be provided to clean vehicles prior to leaving site. - Undertake visual inspections monthly for weeds on site and implement appropriate actions if weeds are becoming established on site. - Mobile plant and equipment is to be restricted to designated routes. - Weed inspections to be undertaken prior to the commencement track upgrades, then pre and post wet season for the life of the project. - Management plan to list declared weeds known to be in area based on mapping or site specific assessment and attach specific contrds measures for each species. - Fire ant control and management to be in accordance with policy and guiddlines.	2	3	9	A = acceptable	
		Land	Flooding	Construction of infrastructure has the potential to increases localised flooding through changes to surface water management and infiltration rates.	5	3	Environmental Impacts	20	U = unacceptable	Water management will be managed through: -site design - erosion and sediment control plans will be prepared for road construction and maintenance activities - surface water monitorina proaram to be imolemented	5	1	11		
		Land	Sedimentation and Erosion	Increased sedimentation and erosion into adjacent overland flowpath.	3	3	Environmental Impacts	13	U = unacceptable	Water management will be managed through: -designed into road plans - erosion and sediment control plans will be prepared for road construction and maintenance activities - surface water monitorina proaram to be imolemented.	3	1	4	A = acceptable	
		Land	Waste Generation	Waste and litter from construction activities enters surrounding environment	3	2	Reputation or Credentials, including social	8	A = acceptable	The following will be implemented: * Waste management - Waste receptacles are to be provided by contractor. - Anyone caught littering may be ejected from site, at the discretion of the client - The Contractor is to keep the site clear of litter at all times. - Wastes requiring disposal will be transported by a licensed waste carrier to an appropriate licensed waste landfill and records kept. - Waste segregation will be undertaken, isolating general waste (packing timber, steel, wire, cables, aluminium, clay/sand/gravel, concrete, paper, cardboard, plastic, food waste) from regulated waste (waste oils, oil filters, oily rags, used absorbent, old chemical/paint/fuel/oil drums, batteries, acids, alkalis, welding rods, sewerage sludge, and used tyres) and separate recyclable material). - All waste will be collected and transported off site for disposal or recycling. - Recyclable wastes (include batteries, tyres, glass, paper, scrap metal, aluminium cans and timber) is to be transferred by a licensed waste carrier to an appropriate recycling facility where possible. - Waste must be stored neatly in appropriately labelled bins, containers or stockpiles; with hazardous wastes stored in such a manner that stormwater run-off does not come into contact with the waste. - Waste collection bins/areas will be located on site and minimise the amount of waste generated through avoidance, re-use and recycling strategies. - Records of the following will be kept: • Date of pickup of waste; • Description of waste; • Cross reference to the relevant waste transport documentation; • Quantity of waste; • Origin of waste; • Destination of waste; and • Intended fate of waste, e.g. type of waste treatment, reprocessing or disposal. Records of each waste transfer will be kept on site at all time until the completion of the Project. Monthly reports will be provided by the waste disposal contractor to the client detailing all waste transfers. - Used spill kit material will be disposed of in accordance with the requirements of the material cleaned up with the spill kit. - Temporary amenities will be implemented, including portable toilets. These amenities will be serviced by the service provider with all wastes to be removed and disposed of off-site, by a private contractor, in accordance with relevant legislation and local policies. All amenities will be isolated at the end of each shift to prevent overflow. - Portable ablutions facilities to be provided by contractor.	2	2	5	A = acceptable	
		Air	Noise	The nearest sensitive receptor is approximately 200m to the norht east. Construction activities will increase noise.	5	3	Environmental Impacts	20	U = unacceptable	The following will be implemented: *Noise management - The quietest plant and equipment that can be selected to undertake works will be used, where possible. - Where possible efficient noise suppression and muffling devices will be installed on equipment, and equipment will be maintained in good working order. - Plant, machinery and equipment maintenance records will be kept. - Noise levels from generators, compressors and other noise emitting plant and equipment shall be routinely monitored to ensure equipment is operating within realistic industry standards. - All noise complaints will be recorded and reported to the Client immediately following receipt of the complaint. - Construction ativities will be limited to 7am-5pm Monday to Friday	5	2	16	A = acceptable	

Air	Dust	The nearest sensitive receptor is approximaltey 200m to the north east. Construction activities will increase the risk of dust generation.	5	2	Environmental Impacts	16	U = unacceptable	Althought there is not likely to be any significant consequence from dust generation the following will be implemented as best practise: *Air quality and emissions management - All employees to visually monitor dust generation during construction activities. - All dust complaints will be recorded and reported to the Client. - Materials or spoil transported in open trucks or bins to or from the site will be covered if there is potential for dust to be generated. - Dust is to be controlled (where applicable) by regular of unsealed work areas and stockpiles. - Mobile plant and equipment is to be restricted to designated routes. - All air quality management controls to be developed in consultation with workplace health and safety management plan to ensure cohesion between plans.	3	2	8	A = acceptable	ALARP
Air	Emissions	Emmmissions will be generated from the operation of construction equipment and manufacture of infrastructure materials.	5	1	Environmental Impacts	11	A = acceptable	Although air quality emissions are considered acceptable, the following will be implemented as best practise: *Air quality and emissions management - All employees to visually monitor dust generation from construction works. - All dust complaints will be recorded and reported to the client. - Materials or spoil transported in open trucks or bins and from the site will be covered if there is potential for dust to be generated. - Dust is to be controlled (where applicable) by regular watering of unsealed roads, work areas and stockpiles. - Mobile plant and equipment is to be restricted to designated routes. - All equipment used on site shall have fitted standard emission control exhaust systems. - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Minimise consumption of fuel, for example, through shutting down equipment, machinery and vehicles when not in use. - Consideration will be given when purchasing goods to ensure that goods do not contain ozone depletion material. If a suitable replacement can be obtained, by reviewing cost and supply, these will be purchased in preference to ozone depleting substances. *Energy efficiency management - Educate personnel, through site induction and site wide notices, of the importance of energy efficiency. - Minimise printing. - Request minimal packaging from suppliers. - Reuse materials that may be fit for another purpose, considering other work groups. - Minimise consumption of fuel, for example, through shutting down equipment, machinery and vehicles when not in use. - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept.	5	1	11	A = acceptable	ALARP
Air	Odour	It is not expected any odour will be produced from construction activities.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP							
Air	Lighting	No light sensitive receptors have been identified. Additionally, it is not proposed to undertake nighttime activities.	1	1	Environmental Impacts	1	A = acceptable	ALARP							
Water	Surface water quality	A number of activities or associated with construction activities have the potential to affect surface water quality, these include, but are not limited to, poor stormwater management, use of chemicals and other hazardous materials (e.g. fuel in vehicles), generation of waste and spills, increased sedimentation and erosion	4	3	Environmental Impacts	17	U = unacceptable	The following will be implemented: - surface water monitoring program to be implemented *Water quality management - Spill kits will be located with plant, equipment and at hazardous material storage sites. - Chemicals, fuels and other contaminants will be stored in a bund to prevent uncontrolled spills. - All employees will be trained in spill response (in Project Specific Induction). - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Fuel tanks will be monitored regularly and maintained to prevent leakage. - Fuel tanks will have cut off valves. - Absorbents will be used to clean up spills. -Access track upgraded design to inlcude surface water management. * Hazardous substances and dangerous goods management -No fuel and oil will be stored on site. Mobile refuelling wil be undertaken in designated areas with bunds, spill kits and other appropriate controals in place. - No chemical or chemical substance shall be brought to site unless a Safety Data Sheet (SDS) has been supplied. - All personnel handling chemicals or hazardous substances must be informed of the requirements for the safe transport, storage, use and emergency treatment, as detailed in the SDS. - A hazardous materials register shall be maintained in the storage area. - All hazardous substances and dangerous goods shall be stored and used as per Australian standards - A copy of the SDS is to be kept onsite for easy access by personnel; - Permission is to be sought by Contractors from the client prior to mobilising Hazardous Substances and Dangerous Goods to site; - Contractors are required to provide a full list of all hazardous subsances and dangerous goods they propose to use or bring to site prior to mobilisation to site; - A register is to be developed for all hazardous substances and dangerous goods onsite; - Hazardous substances shall be stored under cover and in a manner that will prevent deterioration of goods and to prevent environmental contamination (e.g., bunded to capture any spillage or leakage); - Corrosive materials to be stored and handled in accordance with AS3780.8:2008 (Class 8 Substances – Corrosives); - Fuel, oils and chemicals in containers to be stored in impervious bunded area with capacity of at least 110% of largest container/tankor in a self-bunded tank.	2	2	5	A = acceptable	Results of ongoing monitoring will determine if additional management actions are required.
Water	Groundwater quality	It is not expected construction activities increase the risk of impact to groundwater. Even if there is a spill (e.g. fuel) the risk and volume is likely to small enough that the risk is considered insignificant.	1	1	Environmental Impacts	1	A = acceptable	Although groundwater is not expected to be impacted, the following management strategies will provide additional protection: - groundwater monitoring program to be implemented *Water quality management - Spill kits will be located with plant, equipment and at hazardous material storage sites. - Chemicals, fuels and other contaminants on will be stored in a bund to prevent uncontrolled spills. - All employees will be trained in spill response (in Project Specific Induction). - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Fuel tanks will be monitored regularly and maintained to prevent leakage. - Fuel tanks will have cut off valves. - Absorbents will be used to clean up spills. - Sediment and erosion control management plan will be developed for the Project. * Hazardous substances and dangerous goods management - Contractors will liaise with the client regarding a suitable site location for the placement and storage of hazardous substances. - No chemical or chemical substance shall be brought on to the Project unless a Material Safety Data Sheet (MSDS) has been supplied. - All personnel handling these chemicals or chemical substances must be informed of the requirements for the safe transport, storage, use and emergency treatment, as detailed in the MSDS. - A hazardous materials register shall be maintained in each Project area. - All hazardous substances and dangerous goods shall be stored and used as per Australian standards -Permission is to be sought prior to mobilising Hazardous Substances and Dangerous Goods to site; and - Hazardous substances shall be stored under cover and in a manner that will prevent deterioration of goods and to prevent environmental contamination (e.g., bunded to capture any spillage or leakage). - Corrosive materials to be stored and handled in accordance with AS3780.8.2008 (Class 8 Substances – Corrosives). - Fuel, oils and chemicals in containers to be stored in impervious bunded area with capacity of at least 110% of largest container/tank. - All fuel, oils and chemical containers must have their contents clearly labelled. - Spill clean-up kits including absorbent materials are to be kept at each storage facility and site of use. - Drip trays or alternate method will be used to collect fluids and debris during demolition works. - All employees will be trained in spill response. This will be included in site inductions	1	1	1	A = acceptable	Results of ongoing monitoring will determine if additional management actions are required.
Water	Aquatic ecology / wetlands	Increased sedimentation or decreases in surface water quality have the potential to impact the health of the overland flow path adjacent to the construction areas.	3	3	Environmental Impacts	13	U = unacceptable	The following will be implemented: - surface water quality controls - soil management controls - constructions activities will stay outside the overland flow path (except where design and cconstruction activities specifically require). Design will minimise the need for construction to be in overland flow areas. - implement surface and groundwater monitoring pre-construction to provide baseline, during construction and ongoing during operation of facility - surface water management plan to be implemented.	2	2	5	A = acceptable	Ongoing monitoring will monitor the effectiveness of management controls. Additional management to be developed if initial controls not effective.
Social	Tourism	Construction activities have the potential to affect use of the neighbouring facilities.	3	2	Reputation or Credentials, including social	8	A = acceptable	ALARP - this is a short term potetnial impact that is expected to be outweighed by the benefit se new facility will create.							
Social	Amenity	The site is within the Belmont Shooting Complex. Construction activities or the permanent use of the einfrastructure is not expected to imapct amenity.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP							
Social	Traffic	Construction traffic will access the site from Old Cleveland Rd. Construction activities will increase traffic to the site but it will be temporary and not expected to have a significant impact and traffic numbers (trucks, workers) will be relatively low.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP							
Social	Indigenous heritage	No heritage sites are known to exist within the construction areas. The mjority of the construction area has been previously modified.	1	2	Environmental Impacts	3	A = acceptable	ALARP - however, the following will be implemented: * Cultural Heritage Management Plan - All site personnel will be educated regarding cultural heritage should artefacts be encountered. - Should items of cultural significance be discovered, personnel will act according to the following: • Stop work in the vicinity of the item • Notify the Project Manager who shall contact the Client's Environmental Representative; • Leave items where they were found; • If items are dislodged by machinery, make a note of where they came from; and • The Project Environmental Representative shall have Cultural Heritage Consultant on call to come to site to inspect artefacts and advise on what action to take.					
Social	European heritage	No eurcpean heritage locations are recorded as occuring within the Project area.	1	1	Environmental Impacts	1	A = acceptable	ALARP - however, the following will be implemented: * Cultural Heritage Management Plan - All site personnel will be educated regarding cultural heritage should artefacts be encountered. - Should items of cultural significance be discovered, personnel will act according to the following: • Stop work in the vicinity of the item; • Notify the Project Manager who shall contact the Client's Environmental Representative; • Leave items where they were found; • If items are dislodged by machinery, make a note of where they came from; and • The Project Environmental Representative shall have Cultural Heritage Consultant on call to come to site to inspect artefacts and advise on what action to take.					

Construction and establishment of the future clubhouse.

Land	Soils (eg contamination)	Construction of the future cluibhouse is not expected to have a significant risk of impact to soils.	1	1	Environmental Impacts	1	A = acceptable	ALARP - however the following controls will be in place: * Hazardous substances and dangerous goods management - No fuel and oil will be stored on site. Mobile refueling will be undertaken in designated areas with bunds, spill kits and other appropriate controls in place. - No chemical or chemical substance shall be brought to site unless a Safety Data Sheet (SDS) has been supplied. - All personnel handling chemicals or hazardous substances must be informed of the requirements for the safe transport, storage, use and emergency treatment, as detailed in the SDS. - A hazardous materials register shall be maintained in the storage area. - All hazardous substances and dangerous goods shall be stored and used as per Australian standards - A copy of the SDS is to be kept onsite for easy access by personnel; - Permission is to be sought by Contractors from the client prior to mobilising Hazardous Substances and Dangerous Goods to site; - Contractors are required to provide a full list of all hazardous subsances and dangerous goods they propose to use or bring to site prior to mobilisation to site; - A register is to be developed for all hazardous substances and dangerous goods onsite; - Hazardous substances shall be stored under cover and in a manner that will prevent deterioration of goods and to prevent environmental contamination (e.g., bunded to capture any spillage or leakage); - Corrosive materials to be stored and handled in accordance with AS3780.8:2008 (Class 8 Substances – Corrosives); - Fuel, oils and chemicals in containers to be stored in impervious bunded area with capacity of at least 130% of largest container/tankor in a self-bunded tank; - All fuel, oils and chemical containers must have their contents clearly labelled; - Spill clean-up kits including absorbent materials are to be kept at each storage facility and site ofuse; - All site personnel will be trained in the use of spill kits; - Drip trays or alternate method will be used to collect fluids and debris during mechanical or roadside repairs; - All employees will be trained in spill response. This will be included in site inductions. * Waste management - see waster management							
Land	Soils (structure and health)	The site of the future clubhouse is currently a carpark. There is not considered a significant risk to site soils.	1	1	Environmental Impacts	1	A = acceptable	ALARP - however a Topsoil pile management strategy will be developed once topsoil and volumes required to be managed are understood. Depending on the outcomes the following controls will be in place for access track upgrade: - top soil will be stockpiled and used during rehabilitation post-construction; or - if it is not required for construction areas reused around the site in areas that require topsoil and /a rehabilitation.							
Land	Flora and vegetation	The site of the future clubhouse is currently a carpark. No further clearing of vegetation is proposed.	1	1	Environmental Impacts	1	A = acceptable	ALARP							
Land	Fauna	The site of the future clubhouse is currently a carpark. No further clearing of vegetation is proposed. It is not considered construction of the future clubhouse will have an impact of fauna.	1	1	Environmental Impacts	1	A = acceptable	ALARP							
Land	Weeds and Pests	Potential for construction activities to increase weeds in the vegetation and also to introduce fireants to the location.	3	3	Environmental Impacts	13	U = unacceptable	The following will be implemented: - All vehicles to be free of dirt and seeds, and be clean before arrival. - All vehicles are to come clean and leave clean. - Vehicles to carry documentation stating they have been cleaned prior to mobilising to site. - Inspect all vehicles entering the site for signs of weed and pests; treat appropriately if present. - Reject any vehicles that are dirty and can't be treated appropriately before entering the site. - Inspect all material leaving site for signs of weeds or pests; treat appropriately if present. - Vehicle cleaning station to be provided to clean vehicles prior to leaving site. - Undertake visual inspections monthly for weeds on site and implement appropriate actions if weeds are becoming established on site. - Mobile plant and equipment is to be restricted to designated routes. - Weed inspections to be undertaken prior to the commencement track upgrades, then pre and post wet season for the life of the project. - Management plan to list declared weeds known to be in area based on mapping or site specific assessment and attach specific controls measures for each species. - Fire ant control and management to be in accordance with policy and guidelines.	2	2	5	A = acceptable	General inspections to include for weeds. Any that are found to be present are to be controlled.
Land	Flooding	The site of the future clubhouse is currently a carpark. No further clearing of vegetation is proposed.No increased surface area that would increase flooding risk is proposed.	1	1	Environmental Impacts	1	A = acceptable	Water management will be managed through: - site design - erosion and sediment control plans will be prepared for road construction and maintenance activities - surface water monitorina proarram to be imdemented.							Results of ongoing surface water monitoring program to indicated if additional management required.
Land	Sedimentation and Erosion	Increased sedimentation and erosion into adjacent overland flowpath.	3	3	Environmental Impacts	13	U = unacceptable	Water management will be managed through: - designed into road plans - erosion and sediment control plans will be prepared for road construction and maintenance activities - surface water management plan to be implemented. - surface water monitorina proarram to be imdemented.	2	2	5	A = acceptable	Results of ongoing surface water monitoring program to indicated if additional management required.
Land	Waste Generation	Waste and litter from construction activities enters surrounding environment	3	2	Environmental Impacts	8	U = unacceptable	The following will be implemented: * Waste management - Waste receptacles are to be provided by contractor. - Anyone caught littering may be ejected from site, at the discretion of the client - The Contractor is to keep the site clear of litter at all times. - Wastes requiring disposal will be transported by a licensed waste carrier to an appropriate licensed waste landfill and records kept. - Waste segregation will be undertaken, isolating general waste (packing timber, steel, wire, cables, aluminium, clay/sand/gravel, concrete, paper, cardboard, plastic, food waste) from regulated waste (waste oils, oil filters, oily rags, used absorbent, old chemical/paint/fuel/oil drums, batteries, acids, alkalis, welding rods, sewerage sludge, and used tyres) and separate recyclable material). - All waste will be collected and transported off site for disposal or recycling. - Recyclable wastes (include batteries, tyres, glass, paper, scrap metal, aluminium cans and timber) is to be transferred by a licensed waste carrier to an appropriate recycling facility where possible. - Waste must be stored neatly in appropriately labelled bins, containers or stockpiles; with hazardous wastes stored in such a manner that stormwater run-off does not come into contact with the waste. - Waste collection bins/areas will be located on site and minimise the amount of waste generated through avoidance, re-use and recycling strategies. - Records of the following will be kept: • Date of pickup of waste; • Description of waste; • Cross reference to the relevant waste transport documentation; • Quantity of waste; • Origin of waste; • Destination of waste; and • Intended fate of waste, e.g. type of waste treatment, reprocessing or disposal. Records of each waste transfer will be kept on site at all time until the completion of the Project. Monthly reports will be provided by the waste disposal contractor to the client detailing all waste transfers. - Used spill kit material will be disposed of in accordance with the requirements of the material cleaned up with the spill kit. - Temporary amenities will be implemented, including portable toilets. These amenities will be serviced by the service provider with all wastes to be removed and disposed of off-site, by a private contractor, in accordance with relevant legislation and local policies. All amenities will be isolated at the end of each shift to prevent overflow. - Portable ablutions facilities to be provided by contractor.	2	2	5	A = acceptable	
Air	Noise	The nearest sensitive receptor is approximately 200m to the norht east. Construction activities will increase noise.	5	2	Reputation or Credentials, including social	16	A = acceptable	The following will be implemented: *Noise management - The quietest plant and equipment that can be selected to undertake works will be used, where possible. - Where possible efficient noise suppression and muffling devices will be installed on equipment, and equipment will be maintained in good working order. - Plant, machinery and equipment maintenance records will be kept. - Noise levels from generators, compressors and other noise emitting plant and equipment shall be routinely monitored to ensure equipment is operating within realistic industry standards. - All noise complaints will be recorded and reported to the Client immediately following receipt of the complaint. - Construction ativities will be limited to 7am-5pm Monday to Friday	4	1	7	A = acceptable	ALARP
Air	Dust	The nearest sensitive receptor is approximaltey 200m to the north east. Construction activities will increase the risk of dust generation. Any impact is expected to be short term in nature.	5	2	Environmental Impacts	16	U = unacceptable	Although there is not likely to be any significant consequence from dust generation the following will be implemented as best practise: *Air quality and emissions management - All employees to visually monitor dust generation during construction activities. - All dust complaints will be recorded and reported to the Client. - Materials or spoil transported in open trucks or bins to or from the site will be covered if there is potential for dust to be generated. - Dust is to be controlled (where applicable) by regular of unsealed work areas and stockpiles. - Mobile plant and equipment is to be restricted to designated routes. - All air quality managment controls to be developed in consultation with workplace health and safety management plan to ensure cohesion between plans.	4	1	7	A = acceptable	ALARP
Air	Emissions	Emmmissions (excluding dust) will be generated from the operation of construction equipment and manufacture of infrastructure materials.	5	1	Environmental Impacts	11	A = acceptable	ALARP - although air quality emissions are considered acceptable, the following will be implemented as best practise: *Air quality and emissions management - All equipment used on site shall have fitted standard emission control exhaust systems. - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Minimise consumption of fuel, for example, through shutting down equipment, machinery and vehicles when not in use. - Consideration will be given when purchasing goods to ensure that goods do not contain ozone depletion material. If a suitable replacement can be obtained, by reviewing cost and supply, these will be purchased in preference to ozone depleting substances. *Energy efficiency management - Educate personnel, through site induction and site wide notices, of the importance of energy efficiency. - Minimise printing. - Request minimal packaging from suppliers. - Reuse materials that may be fit for another purpose, considering other work groups. - Minimise consumption of fuel, for example, through shutting down equipment, machinery and vehicles when not in use. - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project.					
Air	Odour	It is not expected any odour will be produced from construction activities.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP							
Air	Lighting	No light sensitive receptors have been identified. Additionally, it is not proposed to undertake nighttime activities.	1	1	Environmental Impacts	1	A = acceptable	ALARP							

	Water	Surface water quality	A number of activities or associated with construction activities have the potential to affect surface water quality, these include, but are not limited to, poor stormwater management, use of chemicals and other hazardous materials (e.g. fuel in vehicles), generation of waste and spills, increased sedimentation and erosion	4	3	Environmental Impacts	17	U = unacceptable	The following will be implemented: - Surface water monitoring program to be implemented *Water quality management - Spill kits will be located with plant, equipment and at hazardous material storage sites. - Chemicals, fuels and other contaminants will be stored in a bund to prevent uncontrolled spills. - All employees will be trained in spill response (in Project Specific Induction). - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Fuel tanks will be monitored regularly and maintained to prevent leakage. - Fuel tanks will have cut off valves. - Absorbents will be used to clean up spills. -Access track upgraded design to inlcude surface water management. * Hazardous substances and dangerous goods management -No fuel and oil will be stored on site. Mobile refueling will be undertaken in designated areas with bunds, spill kits and other appropriate contrads in place. - No chemical or chemical substance shall be brought to site unless a Safety Data Sheet (SDS) has been supplied. - All personnel handling chemicals or hazardous substances must be informed of the requirements for the safe transport, storage, use and emergency treatment, as detailed in the SDS. - A hazardous materials register shall be maintained in the storage area. - All hazardous substances and dangerous goods shall be stored and used as per Australian standards - A copy of the SDS is to be kept onsite for easy access by personnel; - Permission is to be sought by Contractors from the client prior to mobilising Hazardous Substances and Dangerous Goods to site; - Contractors are required to provide a full list of all hazardous subsances and dangerous goods they propose to use or bring to site prior to mobilisation to site; - A register is to be developed for all hazardous substances and dangerous goods onsite; - Hazardous substances shall be stored under cover and in a manner that will prevent deterioration of goods and to prevent environmental contamination (e.g., bunded to capture any spillage or leakage); - Corrosive materials to be stored and handled in accordance with AS3780.8:2008 (Class 8 Substances – Corrosives); - Fuel, oils and chemicals in containers to be stored in impervious bunded area with capacity of at least 110% of largest container/tankor in a self-bunded tank.	2	2	5	A = acceptable	Results of ongoing surface water monitoring will determine if additional management actions required.
	Water	Groundwater quality	It is not expected construction activities increase the risk of impact to groundwater. Even if there is a spill (e.g. fuel) the risk and volume is likely to small enough that the risk is considered insignificant.	1	1	Environmental Impacts	1	A = acceptable	Although groundwater is not expected to be impacted, the following management strategies will provide additional protection: - groundwater monitoring program to be implemented *Water quality management - Spill kits will be located with plant, equipment and at hazardous material storage sites. - Chemicals, fuels and other contaminants on will be stored in a bund to prevent uncontrolled spills. - All employees will be trained in spill response (in Project Specific Induction). - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Fuel tanks will be monitored regularly and maintained to prevent leakage. - Fuel tanks will have cut off valves. - Absorbents will be used to clean up spills. - Sediment and erosion control management plan will be developed for the Project. * Hazardous substances and dangerous goods management - Contractors will liaise with the client regarding a suitable site location for the placement and storage of hazardous substances. - No chemical or chemical substance shall be brought on to the Project unless a Material Safety Data Sheet (MSDS) has been supplied. - All personnel handling these chemicals or chemical substances must be informed of the requirements for the safe transport, storage, use and emergency treatment, as detailed in the MSDS. - A hazardous materials register shall be maintained in each Project area. - All hazardous substances and dangerous goods shall be stored and used as per Australian standards -Permission is to be sought prior to mobilising Hazardous Substances and Dangerous Goods to site; and -Hazardous substances shall be stored under cover and in a manner that will prevent deterioration of goods and to prevent environmental contamination (e.g., bunded to capture any spillage or leakage). -Corrosive materials to be stored and handled in accordance with AS3780.8:2008 (Class 8 Substances – Corrosives). - Fuel, oils and chemicals in containers to be stored in impervious bunded area with capacity of at least 110% of largest container/tank. - All fuel, oils and chemical containers must have their contents clearly labelled. - Spill clean-up kits including absorbent materials are to be kept at each storage facility and site of use. - Drip trays or alternate method will be used to collect fluids and debris during demolition works. - All employees will be trained in spill response. This will be included in site inductions.					Ongoing groundwater monitoring program will determine if there is an impact to groundwater (Note: construtiomn activities are expected to be too short term to notice an impact on groundwater).
	Water	Aquatic ecology / wetlands	Increased sedimentation and decreases in surface water quality have the potential to impact the health of the overland flow path adjacent to the construction areas.	3	3	Environmental Impacts	13	U = unacceptable	The following will be implemented: - surface water management plan to be implemented. - surface water quality controls - soil management controls - constructions activities will stay outside the overland flow path (except where design and ccontruction activities specifically require). Design will minimise the need for construction to be in overland flow areas. - implement surface and groundwater monitoring pre-construction to provide baseline, during construction and ongoing during operation of facility	3	1	4	A = acceptable	An assessment of the waterways associated with the site may be required.
	Social	Tourism	Construction of the future clubhouse is not expected to impact tourism or use of neighbouring facilities.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP - this is a short term potetnial impact that is expected to be outweighed by the benefitst he new facitily will create.							
	Social	Amenity	The site is within the Belmont Shooting Complex. Construction activities or the permanent use of the einfrastructre is not expected to impact amenity.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP							
	Social	Traffic	Construction traffic will access the site from Old Cleveland Rd. Construction activities will increase traffic to the site but it will be temporary and not expected to have a significant impact and traffic numbers (trucks, workers) will be relatively low.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP							
	Social	Indigenous heritage	No heritage sites are known to exist within the future clubhouse area. The site of the future clubhouse is currently a carpark.	1	2	Environmental Impacts	3	A = acceptable	ALARP - however, the following will be implemented: * Cultural Heritage Management Plan - All site personnel will be educated regarding cultural heritage should artefacts be encountered. - Should items of cultural significance be discovered, personnel will act according to the following: • Stop work in the vicinity of the item; • Notify the Project Manager who shall contact the Client's Environmental Representative; • Leave items where they were found; • If items are dislodged by machinery, make a note of where they came from; and • The Project Environmental Representative shall have Cultural Heritage Consultant on call to come to site to inspect artefacts and advise on what action to take.					
	Social	European heritage	No eurcpean heritage locations are recorded as occuring within the Project area. The site of the future clubhouse is currently a carpark.	1	1	Environmental Impacts	1	A = acceptable	ALARP - however, the following will be implemented: * Cultural Heritage Management Plan - All site personnel will be educated regarding cultural heritage should artefacts be encountered. - Should items of cultural significance be discovered, personnel will act according to the following: • Stop work in the vicinity of the item; • Notify the Project Manager who shall contact the Client's Environmental Representative; • Leave items where they were found; • If items are dislodged by machinery, make a note of where they came from; and • The Project Environmental Representative shall have Cultural Heritage Consultant on call to come to site to inspect artefacts and advise on what action to take.					
Operational Activities	**Shooting**															
	Land	Soils (eg contamination)	Shooting lead shot is likely to result on contamination of soils.	5	3	Environmental Impacts	20	U = unacceptable	The following controls will be in place: - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area - ongoing surface and groundwater quality monitoring programs to monitoring the impact of lead on the receiving environment - Develop a rehabilitation strategy for end of life remediation	5	2	16	U = unacceptable	The outcomes of the ongoing monitoring programs will be monitoring for actual impact of lead on the receiving environment. Exceedences of site / activity specific trigger values will guide addional management strategies. Future technologies will be investigated to minimise the invasive remediation techniques currently available.
	Land	Soils (structure and health)	Shooting lead shot is likely to result on contamination of soils.	5	3	Environmental Impacts	20	A = acceptable	The following controls will be in place: - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area - ongoing surface and groundwater quality monitoring programs to monitoring the impact of lead on the receiving environment - Develop a rehabilitation strategy for end of life remediation	5	2	16	U = unacceptable	The outcomes of the ongoing monitoring programs will be monitoring for actual impact of lead on the receiving environment. Exceedences of site / activity specific trigger values will guide addional management strategies. Future technologies will be investigated to minimise the invasive remediation techniques currently available.
	Land	Flora and vegetation	Flora and vegetation is not expected to be adversely affected by lead shot.	1	2	Environmental Impacts	3	A = acceptable	ALARP - although ALARP, the following controls will be in place: - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area - ongoing surface and groundwater quality monitoring programs to monitoring the impact of lead on the receiving environment - Develop a rehabilitation strategy for end of life remediation to ltt minimize the direct impact of flora and vegetation	1	2	3	A = acceptable	Rehabilitation activities are currently expected to require removal of vegetation to remediate soils in the overshoot area. As it is currently expected this is unavoidable offsets may be considered appropriate. To mitigate the future impacts these can be commenced now so that when remediation is required vegetation will have reached a mature stage providing an immediate (and prior) offset value.
	Land	Fauna	Birds and some other fauna will potentially ingest the lead shot. Indirectly soil contamination has the potential to decrease surface water quality that has the potential to enter the overland flow area and adversely affect fauna in that environment. If the contamination became severe enough it has the potential to affect offsite fauna due to migration of contaminated water offsite.	3	3	Environmental Impacts	13	U = unacceptable	The following will be implemented: - Surface and groundwater monitoring - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area	3	2	8	A = acceptable	The outcomes of the ongoing monitoring programs will be monitoring for actual impact of lead on the receiving environment. Exceedences of site / activity specific trigger values will guide addional management strategies. Future technologies will be investigated to minimise the invasive remediation techniques currently available.
	Land	Weeds and Pests	Shooting is unlikely to change the risk of weeds and pests.	1	1	Environmental Impacts	1	A = acceptable								
	Land	Flooding	Shooting is ulikely to increase the risk or impacts of flooding.	1	1	Environmental Impacts	1	A = acceptable								
	Land	Sedimentation and Erosion	Shooting is not likely to increase the risk or impacts of sedimentation and erosion.	1	1	Environmental Impacts	1	A = acceptable								

	Land	Waste Generation	Waste from shooting (e.g. used cartridges) have the potential to increase litter in the area.	4	2	Environmental Impacts	12	U = unacceptable	The following will be implemented: * Waste management - Waste receptacles are to be provided by contractor. - Anyone caught littering may be ejected from site, at the discretion of site operators - All waste will be collected and transported off site for disposal or recycling. - Waste must be stored neatly in appropriately labelled bins, containers or stockpiles; with hazardous wastes stored in such a manner that stormwater run-off does not come into contact with the waste. - Waste collection bins/areas will be located on site and minimise the amount of waste generated through avoidance, re-use and recycling strategies. - Records of the following will be kept: • Date of pickup of waste; • Description of waste; • Cross reference to the relevant waste transport documentation; • Quantity of waste; • Origin of waste; • Destination of waste; and • Intended fate of waste, e.g. type of waste treatment, reprocessing or disposal.	3	1	4	A = acceptable	ALARP
	Air	Noise	The nearest sensitive receptor (residential) is approximately 200m to the north east. Shooting will increase ndise.	5	2	Reputation or Credentials, including social	16	A = acceptable	The following will be implemented: *Noise management - The quietest plant and equipment that can be selected to undertake works will be used, where possible. - Where possible efficient noise suppression and muffling devices will be installed on equipment, and equipment will be maintained in good working order. - Plant, machinery and equipment maintenance records will be kept. - Noise levels from generators, compressors and other noise emitting plant and equipment shall be routinely monitored to ensure equipment is operating within realistic industry standards. - All noise complaints will be recorded and reported to the Client immediately following receipt of the complaint. - Consrtuction ativities will be limited to 7am-5pm Monday to Friday	4	2	12	A = acceptable	ALARP
	Air	Dust	The nearest sensitive receptor is approximaltey 200m to the north east. Shooting is not excpected to increase dust.	1	1	Environmental Impacts	1	A = acceptable	ALARP						
	Air	Emissions	Shooting does not generate significant emmisions.	1	1	Environmental Impacts	1	A = acceptable	ALARP						
	Air	Odour	It is not expected any odour will be produced from odour.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP						
	Air	Lighting	Shooting is not proposed for night time.	1	1	Environmental Impacts	1	A = acceptable	ALARP						
	Water	Surface water quality	Lead shot has the potential to decrease surface water quality. As it breaks down a portion goes into solution and carried in surface water flows.	5	3	Environmental Impacts	20	U = unacceptable	The following will be implemented: - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area - ongoing surface and groundwater quality monitoring programs to monitoring the impact of lead on the receiving environment - Develop a rehabilitation strategy for end of life remediation	5	2	16	A = acceptable	The outcomes of the ongoing monitoring programs will be monitoring for actual impact of lead on the receiving environment. Exceedences of site / activity specific trigger values will guide addional management strategies. Future technologies will be investigated to minimise the invasive remediation techniques currently available.
	Water	Groundwater quality	Lead shot has the potential to decrease groundwater quality. As it breaks down a portion goes into solution and can be carried into the groundwater.	3	3	Environmental Impacts	13	U = unacceptable	The following will be implemented: - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area - ongoing surface and groundwater quality monitoring programs to monitoring the impact of lead on the receiving environment - Develop a rehabilitation strategy for end of life remediation	2	2	5	A = acceptable	The outcomes of the ongoing monitoring programs will be monitoring for actual impact of lead on the receiving environment. Exceedences of site / activity specific trigger values will guide addional management strategies. Future technologies will be investigated to minimise the invasive remediation techniques currently available.
	Water	Aquatic ecology / wetlands	Lead shot has the potential to decrease surface water quality. As it breaks down a portion goes into solution and carried in surface water flows. This has the potetnial to enter the overland flow area and imapct the ecology of this aquatic area.	3	3	Environmental Impacts	13	U = unacceptable	The following will be implemented: - surface water quality controls - constructions activities will stay outiside the overland flow path (except where design and countruction activities specifically require). Design will minimise the need for construction to be in overland flow areas. - implement surface and groundwater monitoring pre-construction to provide baseline, during construction and ongoing during operation of facility - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area - ongoing surface and groundwater quality monitoring programs to monitoring the impact of lead on the receiving environment - Develop a rehabilitation strategy for end of life remediation	3	2	8	A = acceptable	The outcomes of the ongoing monitoring programs will be monitoring for actual impact of lead on the receiving environment. Exceedences of site / activity specific trigger values will guide addional management strategies. Future technologies will be investigated to minimise the invasive remediation techniques currently available.
	Social	Tourism	Shooting activities (operation of the facility) has the potential to increase tourism. The is unlikely to be a negative impact.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP - potential increase in tourism						
	Social	Amenity	Althoug hthe site is within the Belmont Shooting Complex. Shooting activities have the potential to affect the amenity of nearby sensitive receptors.	4	2	Reputation or Credentials, including social	12	U = unacceptable	Implement controls for the impacts that have the potential to impact nearby sensitive receptors (e.g. noise - sound barrier wall, scheduling of events).	3	2	8	A = acceptable	
	Social	Traffic	Increased traffic associated with shooting is not likely to have a significant impact on traffic, except for major events.	1	2	Reputation or Credentials, including social	3	A = acceptable	ALARP						
	Social	Indigenous heritage	No heritage sites are known to exist within the shooting area. The main shooting area is developed. Much of the overshoot area is heavily disturbed. Some of the area is less well known however given the past use of the site it is not expected a significant risk exists.	1	2	Environmental Impacts	3	U = unacceptable	ALARP - however, the following will be implemented: * Cultural Heritage Management Plan - All site personnel will be educated regarding cultural heritage should artefacts be encountered. - Should items of cultural significance be discovered, personnel will act according to the following: • Stop work in the vicinity of the item; • Notify the Project Manager who shall contact the Client's Environmental Representative; • Leave items where they were found; • If items are dislodged by machinery, make a note of where they came from; and • The Project Environmental Representative shall have Cultural Heritage Consultant on call to come to site to inspect artefacts and advise on what action to take.					
	Social	European heritage	No heritage sites are known to exist within the shooting area. The main shooting area is developed. Much of the overshoot area is heavily disturbed. Some of the area is less developed however given the past use of the site it is not expected a significant risk exists.	1	1	Environmental Impacts	1	A = acceptable	ALARP - however, the following will be implemented: * Cultural Heritage Management Plan - All site personnel will be educated regarding cultural heritage should artefacts be encountered. - Should items of cultural significance be discovered, personnel will act according to the following: • Stop work in the vicinity of the item; • Notify the Project Manager who shall contact the Client's Environmental Representative; • Leave items where they were found; • If items are dislodged by machinery, make a note of where they came from; and • The Project Environmental Representative shall have Cultural Heritage Consultant on call to come to site to inspect artefacts and advise on what action to take.					
Decomissioning Activities	**Site rehabilitation**														
	Land	Soils (eg contamination)	Rehabilitation activites may require removal of contaminated soils up to approximately 500mm below the surface in the area where most shot is likley to fall decreasing to the extremities of the overshoot area where there is likley to be less impact from lead. Topsoil will be impacted (removed) or the structure of the soil damaged from rehabilitation activities. These activites are unlikley to contaminated the soil further.	1	1	Environmental Impacts	1	A = acceptable	Although ALARP, these activities will conform to the hazardous substances and dangerous goods management requirements and waste management plan.						
	Land	Soils (structure and health)	Currently rehabilitation technologies will require the destruction (by removal) of the topsoil). This will be required to remediate the overshoot area (as well as the shot gun range area)	5	3	Environmental Impacts	20	A = acceptable	Although ALARP a rehabilitation management plan will be prepared that will include a section for topsopil replacement / soil health and structure.						
	Land	Flora and vegetation	Vegetation may require complete removal to allow soil removal or other remediation strategies to be undertaken.	5	3	Environmental Impacts	20	A = acceptable	ALARP - although ALARP, the following controls will be in place to minimise the area requiring rehabilitation: - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area - ongoing surface and groundwater quality monitoring programs to monitoring the impact of lead on the receiving environment - Develop a rehabilitation strategy for end of life remediation prior to commencement of the site becoming permanent infrastructure to to minimise the area likely to require remediation at end of life	5	2	16	A = acceptable	Rehabilitation activities are currently expected to require removal of vegetation to remediate soils in the overshoot area. As it is currently expected this is unavoidable offsets may be considered appropriate. To mitigate the future impacts these can be commenced now so that when remediation is required vegetation will have reached a mature stage providing an immediate (and prior) offset value.
	Land	Fauna	If vegetation is removed as part of rehabilitation activities all fauna habitat within the remediation area will be lost.	5	4	Environmental Impacts	23	A = acceptable	ALARP - although ALARP, the following controls will be in place to minimise the area requiring rehabilitation: - lead capture (shot curtain, sediment basin design) and collection strategies implemented and reduction in use of lead / increase in steel shot to reduce the amount of lead in the shotgun range and overshoot area - ongoing surface and groundwater quality monitoring programs to monitoring the impact of lead on the receiving environment - Develop a rehabilitation strategy for end of life remediation prior to commencement of the site becoming permanent infrastructure to to minimise the area likely to require remediation at end of life	5	2	16	A = acceptable	Rehabilitation activities are currently expected to require removal of vegetation to remediate soils in the overshoot area. As it is currently expected this is unavoidable offsets may be considered appropriate. To mitigate the future impacts these can be commenced now so that when remediation is required vegetation will have reached a mature stage providing an immediate (and prior) offset value.
	Land	Weeds and Pests	Potential for machinery and equipment used to bring weeds to site, including increasing the risk of fire ants.	4	3	Environmental Impacts	17	U = unacceptable	The following will be implemented: - All vehicles to be free of dirt and seeds, and be clean before arrival. - All vehicles are to come clean and leave clean. -Vehicles to carry documentation stating they have been cleaned prior to mobilising to site. - Inspect all vehicles entering the site for signs of weed and pests; treat appropriately if present. - Reject any vehicles that are dirty and can't be treated appropriately before entering the site. - Inspect all material leaving site for signs of weeds or pests; treat appropriately if present. - Vehicle cleaning station to be provided to clean vehicles prior to leaving site. - Undertake visual inspections monthly for weeds on site and implement appropriate actions if weeds are becoming established on site. - Mobile plant and equipment is to be restricted to designated routes. - Weed inspections to be undertaken prior to the commencement track upgrades, then pre and post wet season for the life of the project. - Management plan to list declared weeds known to be in area based on mapping or site specific assessment and attach specific controls measures for each species. - Fire ant control and management to be in accordance with policy and guidelines.	2	2	5	A = acceptable	General inspections to include for weeds. Any that are found to be present are to be controlled.
	Land	Flooding	Rehabilitation activites have the potential to increase localised flooding due to vegetation removal reducing infiltration and water holding capacity.	5	3	Environmental Impacts	20	A = acceptable	Water management will be managed through: - site design - erosion and sediment control plans will be prepared for road construction and maintenance activities - rehabilitation monitoring (including for e.g. surface water, erosion, sediment basin etc) to be implemented.	4	2	12	A = acceptable	Results of rehabilitation monitoring to determine if additional management actions required.
	Land	Sedimentation and Erosion	Rehabilitation activites have the potential to increase localised sedimentation and erosion due to vegetation removal and any earthworks activities creating bare soil that will be easily transported during rain events.	5	3	Environmental Impacts	20	U = unacceptable	Water management will be managed through: - site design - erosion and sediment control plans will be prepared for road construction and maintenance activities - rehabilitation monitoring (including for e.g. surface water, erosion, sediment basin etc) to be implemented.	4	2	12	A = acceptable	Results of rehabilitation monitoring to determine if additional management actions required.
	Land	Waste Generation	It is not expected any significant waste (excluding workers general waste) will be generated during rehabilitation activities.	1	1	Environmental Impacts	1	A = acceptable	Although ALARP - if contaminated soil requires disposal offsite this will be undertaken and managed through a remediation management plan. Contaminated soil disposed of offsite (i.e. to a landfill) currently requires tracking and records kept of disposal.						

Air	Noise	The nearest sensitive receptor is approximately 200m to the north east. Rehabilitation activities are likely to increase noise however it is likely to be relatively short term.	5	2	Reputation or Credentials, including social	16	A = acceptable	The following will be implemented: *Noise management - The quietest plant and equipment that can be selected to undertake works will be used, where possible. - Where possible efficient noise suppression and muffling devices will be installed on equipment, and equipment will be maintained in good working order. - Plant, machinery and equipment maintenance records will be kept. - Noise levels from generators, compressors and other noise emitting plant and equipment shall be routinely monitored to ensure equipment is operating within realistic industry standards. - All noise complaints will be recorded and reported to the Client immediately following receipt of the complaint. - Rehabilitation ativities will be limited to socially acceptable times	5	1	11	A = acceptable	ALARP
Air	Dust	The nearest sensitive receptor is approximately 200m to the north east. Rehabilitation activities are likely to create dust.	5	2	Environmental Impacts	16	U = unacceptable	Althought there is not likely to be any significant consequence from dust generation the following will be implemented as best practise: *Air quality and emissions management - All employees to visually monitor dust generation during construction activities. - All dust complaints will be recorded and reported to the Client. - Materials or spoil transported in open trucks or bins to or from the site will be covered if there is potential for dust to be generated. - Dust is to be controlled (where applicable) by regular of unsealed work areas and stockpiles. - Mobile plant and equipment is to be restricted to designated routes. - All air quality managment controls to be developed in consultation with workplace health and safety management plan to ensure cohesion between plans.	4	1	7	A = acceptable	ALARP
Air	Emissions	Emissions (excluding dust) associated machinery and equipment used for reahabilitation activities are not likely to be considered significant.	5	1	Environmental Impacts	11	A = acceptable	Although air quality emissions are considered acceptable, the following will be implemented as best practise: *Air quality and emissions management - All equipment used on site shall have fitted standard emission control exhaust systems. - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Minimise consumption of fuel, for example, through shutting down equipment, machinery and vehicles when not in use. - Consideration will be given when purchasing goods to ensure that goods do not contain ozone depletion material. If a suitable replacement can be obtained, by reviewing cost and supply, these will be purchased in preference to ozone depleting substances. *Energy efficiency management - Educate personnel, through site induction and site wide notices, of the importance of energy efficiency. - Minimise printing. - Request minimal packaging from suppliers. - Reuse materials that may be fit for another purpose, considering other work groups. - Minimise consumption of fuel, for example, through shutting down equipment, machinery and vehicles when not in use. - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project.					
Air	Odour	The nearest sensitive receptor is 200m to the north east. Rehabilitation activities are not expected to generate odour.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP						
Air	Lighting	Rehabilitation activities are not expected to be undertaken at night time.	1	1	Environmental Impacts	1	A = acceptable	ALARP						
Water	Surface water quality	Rehabilitation activities have the potential to impact surface water quity through the potential increased levels of sediment during rain events.	5	3	Environmental Impacts	20	U = unacceptable	The following will be implemented: - surface water monitoring program to be implemented *Water quality management - Spill kits will be located with plant, equipment and at hazardous material storage sites. - Chemicals, fuels and other contaminants will be stored in a bund to prevent uncontrolled spills. - All employees will be trained in spill response (in Project Specific Induction). - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Fuel tanks will be monitored regularly and maintained to prevent leakage. - Fuel tanks will have cut off valves. - Absorbents will be used to clean up spills. -Access track upgraded design to inlcude surface water management. * Hazardous substances and dangerous goods management -No fuel and oil will be stored on site. Mobile refuelling will be undertaken in designated areas with bunds, spill kits and other appropriate contrads in place. - No chemical or chemical substance shall be brought to site unless a Safety Data Sheet (SDS) has been supplied. - All personnel handling chemicals or hazardous substances must be informed of the requirements for the safe transport, storage, use and emergency treatment, as detailed in the SDS. - A hazardous materials register shall be maintained in the storage area. - All hazardous substances and dangerous goods shall be stored and used as per Australian standards - A copy of the SDS is to be kept onsite for easy access by personnel; - Permission is to be sought by Contractors from the client prior to mobilising Hazardous Substances and Dangerous Goods to site; - Contractors are required to provide a full list of all hazardous subsances and dangerous goods they propose to use or bring to site prior to mobilisation to site; - A register is to be developed for all hazardous substances and dangerous goods onsite; - Hazardous substances shall be stored under cover and in a manner that will prevent deterioration of goods and to prevent environmental contamination (e.g., bunded to capture any spillage or leakage); - Corrosive materials to be stored and handled in accordance with AS3780.8:2008 (Class 8 Substances – Corrosives); - Fuel, oils and chemicals in containers to be stored in impervious bunded area with capacity of at least 110% of largest container/tankor in a self-bunded tank.	4	2	12	A = acceptable	Results of ongoing monitoring will determine if additional management actions are required.
Water	Groundwater quality	Rehabilitation activities are not expected to impact groundwater.	1	1	Environmental Impacts	1	A = acceptable	Although groundwater is not expected to be impacted, the following management strategies will provide additional protection: - groundwater monitoring program to be implemented *Water quality management - Spill kits will be located with plant, equipment and at hazardous material storage sites. - Chemicals, fuels and other contaminants on will be stored in a bund to prevent uncontrolled spills. - All employees will be trained in spill response (in Project Specific Induction). - All plant and machinery to be inspected and repaired as necessary prior to operation to identify any operational faults or leaks. - All plant and machinery to be inspected (daily), maintained and repaired as necessary throughout the project. - Plant, machinery and equipment maintenance records will be kept. - Fuel tanks will be monitored regularly and maintained to prevent leakage. - Fuel tanks will have cut off valves. - Absorbents will be used to clean up spills. - Sediment and erosion control management plan will be developed for the Project. * Hazardous substances and dangerous goods management - Contractors will liaise with the client regarding a suitable site location for the placement and storage of hazardous substances. - No chemical or chemical substance shall be brought on to the Project unless a Material Safety Data Sheet (MSDS) has been supplied. - All personnel handling these chemicals or chemical substances must be informed of the requirements for the safe transport, storage, use and emergency treatment, as detailed in the MSDS. - A hazardous materials register shall be maintained in each Project area. - All hazardous substances and dangerous goods shall be stored and used as per Australian standards -Permission is to be sought prior to mobilising Hazardous Substances and Dangerous Goods to site; and -Hazardous substances shall be stored under cover and in a manner that will prevent deterioration of goods and to prevent environmental contamination (e.g., bunded to capture any spillage or leakage). - Corrosive materials to be stored and handled in accordance with AS3780.8:2008 (Class 8 Substances – Corrosives). - Fuel, oils and chemicals in containers to be stored in impervious bunded area with capacity of at least 110% of largest container/tank. - All fuel, oils and chemical containers must have their contents clearly labelled. - Spill clean-up kits including absorbent materials are to be kept at each storage facility and site of use. - Drip trays or alternate method will be used to collect fluids and debris during demolition works. - All employees will be trained in spill response. This will be included in site inductions.	1	1	1	A = acceptable	Results of ongoing monitoring will determine if additional management actions are required.
Water	Aquatic ecology / wetlands	Rehabilitation activities have the potential to impact aquatic ecology in the overland flow path through the risk of increased sedimentation and decreased water quality.	5	3	Environmental Impacts	20	U = unacceptable	The following will be implemented: - surface water quality controls - soil management controls - constructions activities will stay outiside the overland flow path (except where design and ccontruction activities specifically require). Design will minimise the need for construction to be in overland flow areas. - implement surface and groundwater monitoring pre-construction to provide baseline, during construction and ongoing during operation of facility - surface water management plan to be implemented.	4	2	12	A = acceptable	Ongoing monitoring will monitor the effectiveness of management controls. Additional management to be developed if initial controls not effective.
Social	Tourism	Rehabilitation activities are not likely to imapct tourism. If the site is being rehabilitated is liekly because it is being decommisioned (no longer being used for shooting activities) or for contamination management during use (to enable shooting activties to continue for longer).	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP						
Social	Amenity	The facility is not visible to the public - amenity os not expected to be impacted.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP						
Social	Traffic	Rehabilitation activities are not expected to have an impact on traffic.	1	1	Reputation or Credentials, including social	1	A = acceptable	ALARP						
Social	Indigenous heritage	Rehabilitation activities are not expected to have an impact on indigenous heritage.	1	1	Environmental Impacts	1	A = acceptable	ALARP - however, the following will be implemented: * Cultural Heritage Management Plan - All site personnel will be educated regarding cultural heritage should artefacts be encountered. - Should items of cultural significance be discovered, personnel will act according to the following: • Stop work in the vicinity of the item; • Notify the Project Manager who shall contact the Client's Environmental Representative; • Leave items where they were found; • If items are dislodged by machinery, make a note of where they came from; and • The Project Environmental Representative shall have Cultural Heritage Consultant on call to come to site to inspect artefacts and advise on what action to take.					
Social	European heritage	No impacts to European heritage are expected.	1	1	Environmental Impacts	1	A = acceptable	ALARP - however, the following will be implemented: * Cultural Heritage Management Plan - All site personnel will be educated regarding cultural heritage should artefacts be encountered. - Should items of cultural significance be discovered, personnel will act according to the following: • Stop work in the vicinity of the item; • Notify the Project Manager who shall contact the Client's Environmental Representative; • Leave items where they were found; • If items are dislodged by machinery, make a note of where they came from; and • The Project Environmental Representative shall have Cultural Heritage Consultant on call to come to site to inspect artefacts and advise on what action to take.					

Appendix F

Site Based STromwater Management Plan

Department of Housing and Public Works

Queensland Government

STORMWATER MANAGEMENT PLAN

WOOD & GRIEVE ENGINEERS

MINISTERIAL INFRASTRUCTURE DESIGNATION CLAY TARGET RANGE BELMONT SHOOTING CENTRE

VITAL EXPERIENCE IN
acoustics / civil / electrical / ESD / fire / hydraulic / lifts / mechanical / property asset management / structural / underground power

MODE DESIGN

11 July 2018

Revision B

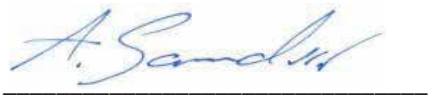
Prepared by Wood & Grieve Engineers Project Number: 27400-BRI-C
Level 2, 232 St Pauls Terrace, Fortitude Valley, QLD, 4000
Phone +61 7 3811 4500 Fax +61 7 3811 4600 Email brisbane@wge.com.au Web www.wge.com.au

DOCUMENT CONTROL

REVISION	DATE	COMMENT	CHECKED	APPROVED BY
P1	19/01/2018	Draft Issue	KF	AKS
P2	25/06/2018	Revised Draft Issue		AKS
A	26/06/2018	Revision A	AKS	AKS
B	11/07/2018	Issued for Infrastructure Designation Approval	AKS	AKS

Stormwater Management Plan

Site Address:	1485 Old Cleveland Road, Belmont Q 4153
Real Property Description:	Lot 1 on RP 169229
Proposed Development:	Ministerial Infrastructure Designation Clay Target Range
Client:	Mode Design
Authority	Department of State Development Manufacturing Infrastructure and Planning
Authority Reference #:	N/A
Wood & Grieve Reference:	27400-BRI-C



Alex Saunders RPEQ 13360
For and on behalf of
Wood & Grieve Engineers

CONTENTS PAGE

1 Introduction

Wood & Grieve Engineers have been commissioned by Mode Design, on behalf of State of Queensland acting through the Major Projects Office (MPO) Department of State Development, Manufacturing, Infrastructure and Planning (DSDMIP), to prepare this Site Based Stormwater Management Plan (SBSMP) for the proposed development at 1485 Old Cleveland Road, Belmont. The site's real property description is Lot 1 on RP 169229. This SBSMP has been prepared to accompany a Ministerial Infrastructure Designation (MIP) submission for a designated site within the Belmont Shooting Centre (BSC) to be lodged with the DSDMIP.

The principles of Water Sensitive Urban Design (WSUD) and Total Water Cycle Management (TWCM) have been applied to protect environmental values and achieve required Standards.

The WSUD principles determined to be of higher importance, in the context of the development's purpose, and applied in this SBSMP were:

- protecting existing natural features of the natural drainage system including overland flow paths, waterways and water bodies and ecological processes where mapped;
- maintaining natural hydrologic behaviour of catchments and preserving the natural water cycle via minimising changes to the natural frequency, duration, volume and peak discharge of urban stormwater;
- management of contaminants generated through the operation of the facility through specialist advice;
- Protecting water quality environmental values of surface and ground waters.

2 Purpose & Constraints

2.1 Purpose

The purpose of this SBSMP is to evaluate the potential impacts on the quantity and quality of stormwater associated with the permanent use of the Clay Target Range Legacy facility; and demonstrate to the State that an appropriate stormwater management strategy can been adopted.

The SBSMP specifically addresses the following items for the Ministerial Infrastructure Designation, incorporating both the existing and proposed development:

- Stormwater quantity (changes in runoff characteristics);
- Stormwater quality (treatment measures); and
- Maintenance of water quality treatment devices.

Correct application of this document will achieve the following:

- Applicable stormwater standards will be met and maintained within the site,
- Pollution control will be achieved and maintained in accordance with specialist advice,
- Neighbouring properties will not be adversely affected, nor unduly disrupted by stormwater,
- The incorporation of controls and remediation for potential water contaminants, and
- Implementation of an appropriate stormwater management strategy.

2.2 Constraints

Key statutory requirements for the management of stormwater include the following:

- A duty of care is owed to property owners who receive stormwater flows, which may be altered by the development, to ensure that such properties are not adversely affected by hydraulic or water quality impacts during the construction, maintenance and operational phase of the development,
- Stormwater discharged from the site is to be of an acceptable water quality standard,
- Reasonable and practical measures must be taken to avoid misuse of any floodway or waterway,
- All reasonable and practical measures must be taken to minimise or prevent environmental harm,
- All proposed stormwater infrastructure design must have due regard for public safety.

2.3 Exclusions

This report does not model or quantitatively address pollutants generated as a result of shooting activities on the proposed clay target range or from adjoining ranges controlled by the Queensland Rifle Association. DSDMIP have separately commissioned Groundcorp Pty Ltd. as a specialist environmental consultant in this regard for contamination advice. Water quality treatment measures put forward within this report reflect the advice provided by Groundcorp Pty ltd as recommended stormwater treatment measures.

3 Existing Site Characteristics

3.1 Property Detail

Address:	1485 Old Cleveland Road, Belmont
Real Property Description:	Lot 1 on RP 169229
Total Property Area:	5,020,019 m2 (502 Ha)

The Ministerial Infrastructure Designation application covers only the area of the recently constructed Commonwealth Games Clay Target range facility, consisting of three trap and skeet housing structures, hardstand and the associated drainage and clay target curtain, and the proposed addition of a fourth skeet and trap housing structure and four additional adjoining 'down the line' ranges, additional pollutant control measures, earthworks and shot curtain modifications.

For the purpose of this report, the term 'Site' will refer to the designation area within Figure 2.

The greater Belmont Shooting Complex site is heavily vegetated with most shooting range development and facilities located in the north end of the site. The area of the works is shown in Figure 2 and is bounded by large lot residential uses toward the north-east, vegetated area and the Sleeman Sports Complex to the east, and the densely vegetated area and large lot residential to the south and South East. **Figure 1** and **Figure 2** show the development site and the existing temporary use clay target range development area respectively. Further, C01 in Appendix 1 shows the site plan.

Figure 1: Site Location Plan (Source: Near Map Australia, 2017)

Figure 2 Temporary Clay Target Range Area to be refurbished for permanent use (Source: Near Map Australia, 2017)

3.2 Commonwealth Games Temporary Works

The Temporary Clay Target Facility shown in Figure 2 was constructed for the 2018 Commonwealth Games (and test event) to comply with ISSF requirements. The site consists of a newly constructed Clay Target Range Facility including gravel carpark, range including three trap and skeet house structures, and a field of play, which has an 18m high shot curtain to the perimeter. The site has been treated with hydro-mulch and turf, which has been established for approximately 6 months at time of writing this report. As part of the temporary works a 100 year ARI stormwater diversion channel was constructed along the eastern and southern perimeter of the facility to divert upstream 'clean' natural runoff around the field of play containment area. There are also diversion drains, surfed swales and a sediment basin within the field of play containment area. The newly constructed temporary clay target range Facility was for the 2018 Commonwealth Games' Skeet, Trap and Double Trap shooting events.

3.3 Existing Site Conditions & Improvements

The property is subject to Brisbane Council's overlay mapping. The site contains overlays with respect to stormwater management which are:

- Flood (Overland flow planning area),
- Biodiversity (High ecological significance).

Other overlays apply to the larger Belmont Shooting Complex, however, are outside of the subject site area for this application and therefore have not been considered relevant except where the features adjoin the designation site require comment.

The Clay Target Range site also falls within Council's Conservation zone and is subject to the conservation zone code. The stormwater management strategy adopted by this SBSMP promotes conservation values consistent with the code. This includes the application of WSUD and TWCM principles through the adoption of Stormwater Quality Improvement Devices (SQIDS) that also assist in the removal of non-standard contaminants consequential to the purpose of the development.

3.4 Topography, Catchments and Site Drainage

3.4.1 Topography

The Belmont Shooting Centre allotment is 502 ha and densely vegetated. Mount Petrie is located in the centre of the site, dividing it into two large catchments. The BSC site itself is located in the northern catchment. It is high in the north, east and south, and generally falls to the valley in the west at an approximate grade of 3.8%.

3.4.2 Stormwater Catchments

Mount Petrie, located centrally within the site's allotment, divides the allotment into two large catchments, the Bulimba Creek Catchment in the north – flowing to the Brisbane River, and the Tingalpa Creek Catchment southeast – flowing to the Tingalpa Reservoir. The site, belonging to the greater northern catchment, divides into seven sub-catchments for the purpose of this report which includes the facility and direct upstream catchments. These total 14.1303 hectares:

- C1A – 0.4540 ha
- C1B - 0.6031 ha
- C2 – 2.0876 ha
- C3 – 7.6867 ha
- C4 – 0.7717 ha
- C5 – 2.0208 ha
- C6 – 0.5064 ha

The catchment plan CW07-A is provided in Appendix 1.

3.4.3 Existing Stormwater Discharge within the site

The recently constructed drainage works consists of a combination of swales, sub-soil drains, field inlets and pipes. Flows from the North, East, and South surrounding the clay target site fall toward the field of play and then flow westward. There are diversion drains - bunds and swale combinations that divert runoff from external catchments around the Clay Target range and its field of play containment area. There is rock scour protection in the South-West corner and to the West of the site beyond the contained area.

Further, there are varying depths of crushed concrete under some swales and the centre drainage area to provide pH management to assist in the minimisation of lead contaminants, as recommended by GroundCorp Pty Ltd.

There is a temporary wet sediment basin at the Western edge of the field of play to allow for the settlement and capture of pellet and coarse sediment. Overflow from this basin then flows North into the mapped overland flow path through the Belmont Shooting Complex towards Old Cleveland Road.

3.5 Soils & Erosion

3.5.1 Erosion and Sediment

WGE completed an erosion hazard assessment for the Clay Target Range site on 11 May 2016. The assessment identified the development of the site as high risk. This was primarily due to some slopes being greater than 15% and longer than

3m. Further, the development of the site would have also been considered high risk if the external catchment water was not diverted around the range.

WGE created a conceptual Erosion and Sediment Control (ESC) plan to manage the erosion risks associated with the construction works undertaken to date. The plan was prepared with reference to the International Erosion Control Association (IECA) Best Practice Erosion and Sediment Control.

The Contractor implemented their own construction management plan incorporating the erosion and sediment control measures set out in the ESC. Swale diversion drains divert external catchment flows from the north and east around the site. The Contractor installed and stabilised them with turf prior to other works in the area. Additional to the general construction phase ESC measures the Contractor installed a temporary sediment basin and treated exposed areas with hydro-mulch and turf.

3.5.2 Acid Sulphate Soils

Holocene sediments and depths below RL 5.0m AHD can contain Acid Sulphate Soils. The greater property is subject to Council's Potential and Actual Acid Sulphate Soils overlay mapping. However, the mapping indicates that the area of potential concern is North of and not near the disturbed area of the site. Further, the lowest portion of the site's disturbed area is at an approximate RL 25 m. Soil Surveys completed a geotechnical investigation and produced a report, dated April 2016. The report did not state potential or actual acid sulphate soils to be a concern.

4 Stormwater Quantity

4.1 Standards and Guidelines

This stormwater management strategy is governed by Council's Brisbane City Plan (2014), Council's Planning Scheme Policy 6, State Planning Policy, *Planning Act 2016*, Minister's Guidelines and Rules Under the *Planning Act 2016* (July 2017), and Queensland Urban Drainage Manual (2017) (QUDM).

4.1.1 Level of Serviceability

The following levels of serviceability are proposed to be provided within the stormwater drainage system.

Table 1: Stormwater Drainage Serviceability

Category	Design parameter	Design standard
Open Space and Sporting Facilities	Minor drainage system	Minimum 39% AEP (2 Yr ARI)
	Major drainage system	Minimum 1% AEP (100 Yr ARI)

4.2 Lawful Point of Discharge

It is a requirement that every development must have a lawful point of stormwater discharge. The overland flow path joins the local waterway corridor downstream within the Belmont Complex before leaving the property boundary at the existing point of discharge in the North. The existing clay target range facility and the proposed extension does not, and will not, affect the flow characteristics as it discharges from the site. Nor does it, or will it cause an actionable nuisance. It is considered that maintaining discharge to the mapped overland flow path thin the property ensures that there is no change to the lawful point of discharge from the current Belmont Shooting Centre site.

4.3 Pre Development Stormwater Condition

Prior to the construction of the temporary clay target facility, an existing south facing 300M overlapped the location of the new range. This range consisted of a shed, canopy structure. Significant clearing and earthworks had been undertaken for this range. The site could be classified as generally pervious (grassed)

The catchments to the East of this range were piped under the previous 300M range, approximately in the middle of the new field of play for the clay target range.

4.4 Post Development Stormwater Condition

The construction of the new temporary clay target range has seen the pipe removed and external catchments to the East managed via an overland diversion channel. Additional clearing has been undertaken. Surfaces are largely pervious (grassed). The small impervious surfaces such as trap houses and pathways all drain directly onto pervious surfaces.

The site changes are not significant from a stormwater volume perspective and will not substantially impact any of the following:

- Catchment hydrology: runoff volumes and peak flows, time of concentration and base flows within watercourses,
- The general form and alignment of the overland flow path and waterway corridors downstream of the facility,

As such, from a stormwater quantity perspective, we do not believe the proposed facility constitutes any material change. Further, the basins outlined within Section 5 as stormwater quality measures will further assist in mitigating runoff volumes from the site.

5 Stormwater Quality

5.1 Stormwater Management Strategy

The Queensland State Planning Policy 2017 identifies Water Quality as a State interest. Which, according to the *Planning Act 2016* (Qld), means that water quality is an interest that the Planning Minister considers:

- Affects an economic or environmental interest of the State or a part of the State
- Affects the interest of ensuring that the purpose of the Act is achieved.

The SPP State interest statement for water quality is:

- The environmental values and quality of Queensland waters are protected and enhanced.

The Ministerial Infrastructure Designation application involves disturbing a land area 2500m2 or greater in size when the works completed to date are included. In accordance with the SPP, this triggers the requirement to achieve the SPP assessment benchmarks – water quality for receiving waters as stated in the SPP.

The relevant SPP assessment benchmarks – water quality are:

- Development is located, designed, constructed and operated to avoid or minimise adverse impacts on environmental values arising from:
    - altered stormwater quality and hydrology
    - the release and mobilisation of nutrients and sediments.
- Development achieves the applicable stormwater management design objectives outlined in tables A and B (appendix 2)

This Ministerial Infrastructure Designation application aims to protect the environmental and water quality values through the adoption of locally appropriate and specialist advised solutions to avoid or minimise the impacts of stormwater discharge to receiving waters. This SBSMP demonstrates that the treatment process achieves the WQOs for the site, and is in accordance with the SPP.

It was not considered applicable or best practice to adopt standard Water Quality Objectives and treatment measures typically incorporated within the SPP and reference guidelines as these are targeted at urban development. Due to the specialist nature of the facility and potential contaminants, specialist advice from Groundcorp Pty Ltd has been used to set the proposed stormwater treatment train for the proposed permanent use Clay Target Range facility.

5.2 Integrated Contamination Management Strategy

Groundcorp Pty Ltd completed an environmental assessment and produced a report titled Contamination Report dated June 2018. The report's objective was to identify and assess the potential impacts of contamination for the Clay Target Range facility. The report identified the main sources of contamination as clay target pellets, gunshot residue, and pitch based clay targets; with lead being the contaminant of greatest concern.

The Groundcorp Pty Ltd report highlighted that lead can bind to clays in soil, impressing the importance of good vegetation cover and root systems to prevent erosion and the need to provide pH control of the soil to bind and stabilise lead. The report made the following recommendations relevant to surface stormwater management:

"Due to the nature of distribution of contaminants on a clay target range, it is unfeasible to structurally isolate sources of contamination from rainfall and stormwater runoff. It is however feasible to redirect, or substantially redirect external stormwater runoff around the source of potential contamination, it is feasible to reduce the generation of mobile contaminants, and it is feasible to incorporate measures to reduce the migration of contaminants in stormwater.

The following principles are adopted for the surface water quality management of the facility:

A. *Isolate potential sources of contamination from stormwater catchments;*
B. *Reduce stormwater migration of contaminants, including reducing corrosion and reducing the generation of more mobile forms of contamination;*
C. *Maintain low water levels in surface water basins, capturing, recycling and reusing captured site stormwater runoff onsite*
D. *Treat potentially impacted stormwater runoff prior to discharge from the Operational Area;*
E. *Monitor and manage the facility to achieve the WQOs*

In conjunction with regular monitoring and review, generally the following measures are considered necessary to protect surface water quality:

1. *Divert external catchments away from the Operational Area, and particularly away from the Cleared Operational Area;*
2. *Incorporate measures in the drainage paths and catchment to reduce corrosion, reduce runoff, reduce sediment migration, reduce pellet migration and reduce dissolved phase lead. It is anticipated that this would include measures such as geochemically engineered surface soils in the Operational Areas, recycled concrete in drainage paths, swales with geochemically engineered profiles and geochemically engineered contour banks;*
3. *Reduce erosion and sediment migration by establishing and maintaining vegetative ground cover in the Cleared Operational Area;*
4. *Establish and maintain a treatment / monitoring basin prior to surface water discharge from the Cleared Operational Area. It is anticipated that this would be designed to capture sediment and include measures such as geochemically engineered filter media and geochemically favourable construction materials. Subject to the catchment topography it may be practical to incorporate more than one basin;*
5. *Incorporate a sediment forebay prior to the treatment / monitoring basin(s) to capture migrating lead pellets;*
6. *Establish and maintain a dam that captures drainage from the Operational Area for the primary purpose of monitoring and water recycling, and the secondary purpose of surface water quality treatment;*
7. *Maintain low water levels in the treatment / monitoring basin(s) by means such as using the water in the Operational Area for irrigation;*
8. *Develop and implement procedures to manage risks that arise for regular maintenance requirements for the facility, which are anticipated to include appropriate monitoring, controls and protection for maintenance activities such as maintaining the treatment / monitoring basin(s) and forebays*
9. *Develop and implement procedures to manage risks that arise for irregular maintenance requirements for the facility, which are anticipated to include appropriate monitoring, controls and protection for irregular maintenance activities such as lead reclamation, and ensuring that lead reclamation activities are only implemented if it can be demonstrated that potential risks to the environment and human health are managed during lead reclamation, and fine fractions of contaminants are not mobilised"*

This SBSMP integrates these recommendations and other recommendations such as placing a layer of crushed concrete underneath swales, as appropriate. However, environmental advice, assessments and management plans are outside the scope of this SBSMP. Surface water, ground water, and soil monitoring programs should be undertaken in accordance with GroundCorp or other approved specialist contamination consultant recommendations.

5.3 Water Quality Treatment Train – Operational Phase

This SBSMP has adopted a stormwater management strategy, which takes account of safety, maintenance and visual amenity considerations, as well as the application of WSUD and TWCM principles. The proposed treatment train consists of diversion drains to divert flow from external catchments, recycled concrete trenches to help stabilise the lead particles through pH management, a concrete lined sediment forebay to screen coarse sediment and regulate flows, a gross pollutant trap to screen larger pollutant items, and an over overflow basin to further regulate flows. Some areas have rock scour protection.

Figure 3 shows the ultimate proposed treatment train. Some of these measures are now existing as a result of the Commonwealth Games and others are required legacy items to allow for the permanent use of the facility. Existing and proposed measures are identified as such.

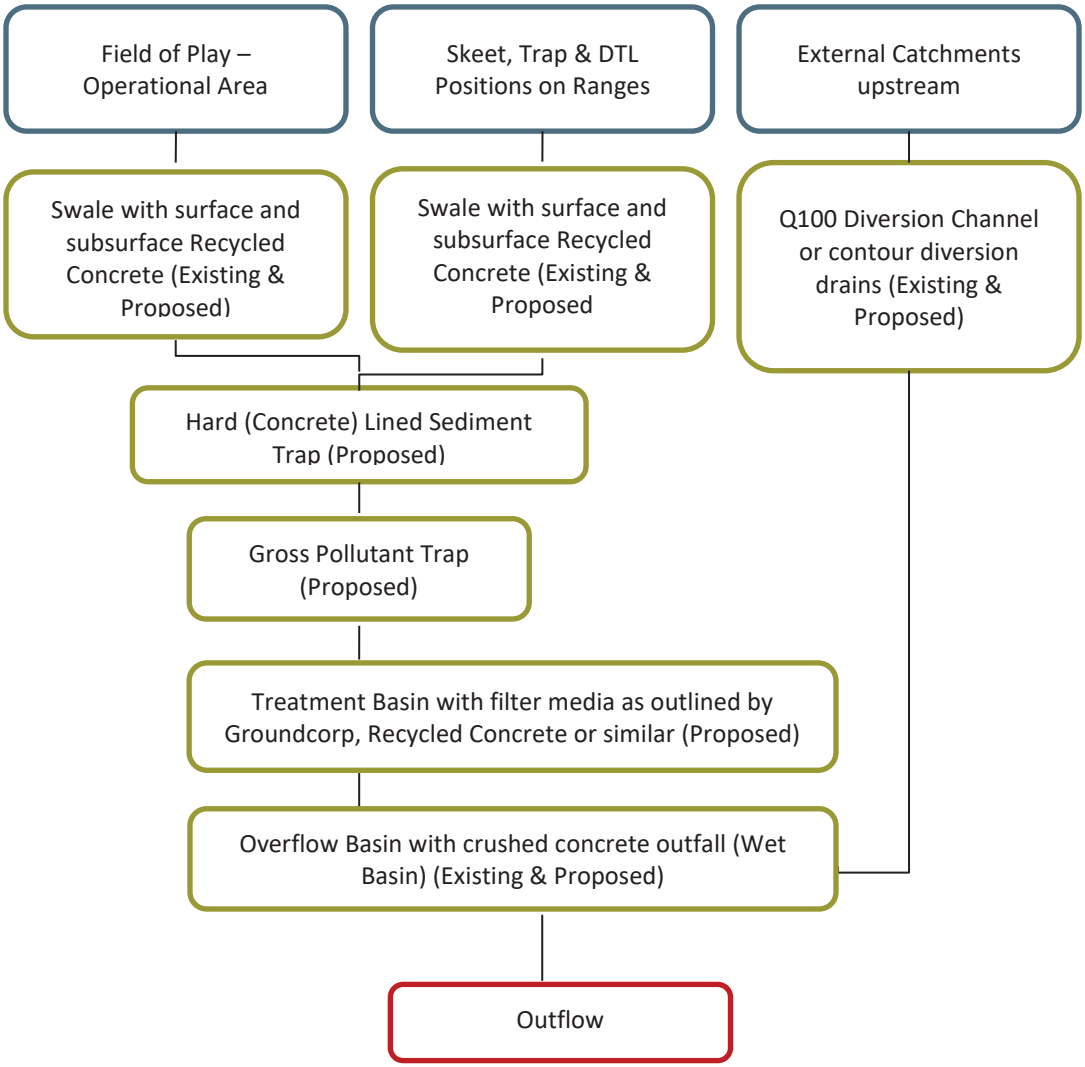


Figure 3: Proposed Treatment Train

5.4 Stormwater Quality Improvement Devices

5.4.1 Swales with Surface and Sub-surface Recycled Concrete

Swales are vegetated areas (of turf) that convey stormwater flow in lieu of conventional pipe drainage systems. They can have various sub-surface drainage profiles and assist in the removal of sediment and nutrients. The stormwater dissipates over the grass, seeping into the ground and infiltrating as base flow or discharges into the next element in the treatment train.

5.4.2 Hard (Concrete) Lined Sediment Trap

The concrete lined type 2 sediment trap is included for two functions: the removal of coarse sediment and the easy maintenance of washed pellet particles which were not captured by the swales.

5.4.1 Gross Pollutant Trap

A gross pollutant trap (GPT) is proposed to be included in the treatment train after the sediment trap. GPT's are classed as a primary water treatment device. It is typically a permanent underground structure and used filter and remove solid pollutants present in stormwater flows. The unit separates and retains gross pollutants by way of a trash rack and can be easily maintained.

The primary purpose of the GPT is to capture non-environmental plastic casing components if used which will float within the two previous devices as well as an additional lead and sediment capture device.

An example of a separator type GTP is the HumeCeptor system, which can also remove total suspended solids and hydrocarbons. Figure 4 shows an example of a HumeCeptor system.

Figure 4 HumeCeptor System (sourced HumeCeptor System Technical Manual Issue 5 2017)

5.4.1 Treatment Basin with filter media as outlined by Groundcorp, Recycled Concrete or similar (Proposed)

A treatment basin is proposed at the lower end of the field of play to treat with a filter media expected to comprise of recycled concrete or shells etc. Such a basin will operate in a similar way to a sand filter with the added intent of pH treatment. These types of filters operate in a similar manner to bioretention systems, with the exception that stormwater passes through a filter media that has no vegetation growing on the surface. Filters do not incorporate vegetation because the filter media does not retain sufficient moisture to support plant growth.

The size of the filter required will be determined during detailed design.

5.4.2 Diversion Drain with Surface Recycled Concrete Lining

The perimeter diversion drain which diverts external catchment flows around the field of play is proposed to have a 100mm min thick recycled concrete lining. This will assist in capturing any limited migrating lead pellet and managing pH associated with this overshot.

5.5 Water Quality Strategy - Construction Phase

5.5.1 Construction Associated with Permanent Use Works

The temporary works construction phase is complete, however, additional works are required for permanent use and these are yet to be undertaken and are expected to comprise:

- Remediation of the site post the 2018 Commonwealth Games
- Clearing to the north, south, east and west of the temporary works.
- Filling and Bulk Earthworks
- Site Drainage & treatment train implementation
- Landscaping and associated stabilisation
- Adjustments to the existing shot curtain.

Stormwater runoff that traverses exposed earthworks surfaces, during this new construction phase, will be managed though contamination diversion and retention mechanisms. Control mechanisms to be used include:

- Erosion controls such as sediment fences surrounding stripped earth,
- Sediment fences surrounding stockpiles of soil and debris,
- Construction of perimeter bunding at toe and/or top of earthworks batters,
- Catch drains, including check dams, though the site to catch direct runoff,
- The containment of site runoff in a temporary sediment basin during construction works,
- Diversion drains to re-direct clean water around the site.

5.5.2 Construction Phase Strategy

A detailed Erosion and Sediment Control (ESC) plan is to be prepared for the remaining construction works associated with permanent use. The ESC plan will be implemented during the construction phase. These should be prepared in accordance with the latest International Erosion Control Association (IECA) standards and applicable Council standards. A suitably qualified person will inspect construction works to ensure compliance.

Table 2: Summary of Design objectives for Construction Phase of the permanent use Development in Queensland

CONSTRUCTION PHASE STORMWATER DESIGN OBJECTIVES	DEVELOPMENT TYPE Large and medium scale construction sites Defined as disturbance area greater than 1 ha (large) or 2500m2 (medium density)
INTENT	To protect water EVs by minimising hydrologic disturbance and the loads of contaminants in runoff.
POLLUTANT/ISSUE	STORMWATER DESIGN OBJECTIVES
Coarse sediment	Retain coarse sediment on clay target range site.
Fine sediment	Take all reasonable and practicable measures to collect all runoff from disturbed areas and drain to a sediment basin—up to the design storm event. Site discharge

(Total suspended solids—TSS)	during sediment basin dewatering complies with a TSS concentration less than 50 mg/L up to the design event—flocculation as required. In storms greater than the design event take all other reasonable and practicable measures to minimize erosion and sediment export.
Turbidity	Released waters from the approved discharge point(s) have turbidity (NTU) less than 10% above receiving waters turbidity—measured immediately upstream of the site.
Nutrients (N and P)	Manage through sediment control.
pH	Acceptable site discharge pH range 6.5 to 8.5
Litter or other waste	Prevent litter/waste entering the site or the stormwater system or internal watercourses that discharge from the site—minimise on-site production, contain onsite and regularly clear bins.
Hydrocarbons and other contaminants	Prevent from entering the stormwater system or internal watercourses that discharge from the site—control storage, limit application and contain contaminants at source. Waste containing contaminants must be disposed of at authorized facilities. Store oil and fuel in accordance with Australian Standard AS1940—no visible oil or grease sheen on released waters.
Wash down water	Prevent from entering the stormwater system or internal watercourses that discharge from the site.
Cations and anions	As required under an approved Acid Sulfate Soil Management Plan, including aluminium, iron and sulfate
Stormwater drainage/flow management	Take all reasonable and practicable measures to minimize changes to the natural waterway hydraulics and hydrology from: peak flow for the 63% and 1% AEP events (respectively for aquatic habitat and flood protection) runoff frequency and volumes entering receiving waters uncontrolled release of contaminated stormwater.

5.5.3 Construction Phase for permanent use works Monitoring

During the construction phase associated with permanent uses and completion of the proposed clay target range, the maintenance and monitoring of erosion and sediment control measures remains the responsibility of the Contractor. If during the construction phase it is deemed required, monitoring can also be undertaken by qualified consultants to determine the impact of activities on the subject site only.

6 Maintenance of Treatment Devices

6.1 Maintenance Tasks & Responsibilities

The following maintenance schedules are proposed for the various Stormwater Quality Improvement Devices to ensure they continue to operate as planned.

Table 3: Summary of SQID Maintenance Responsibility

Stormwater Quality Improvement Devices	Maintenance Responsibility
Field of Play and Swales	Site Leaseholder
Concrete lined sediment trap	Site Leaseholder
Gross Pollutant Trap	Site Leaseholder
Sediment Basin (Wet Basin)	Site Leaseholder

6.2 Sediment Basins

The following long term maintenance plan is taken from the Healthy Waterways Technical Design Guide for Sediment Basins.

Sediment basins treat runoff by slowing flow velocities and promoting settlement of coarse to medium sized sediments. Maintenance focuses on ensuring inlet erosion protection is operating as designed, monitoring sediment accumulation and ensuring that the outlet is not blocked with debris. The outlets from sedimentation basins are to be designed such that access to the outlet does not require a water vessel. Maintenance of the vegetation including watering and weeding is also required, particularly during the plant establishment period (first two years).

Inspections of the inlet configuration following storm events should be made soon after construction to check for erosion. In addition, regular checks of sediment build up will be required as sediment loads from developing catchments vary significantly. The basins must be cleaned out if they are more than half full of accumulated sediment.

Similar to other types of WSUD elements, debris removal is an ongoing maintenance requirement. Debris, if not removed, can block inlets or outlets, and can be unsightly if deposited in a visible location. Inspection and removal of debris should be done regularly and debris removed whenever it is observed on the site.

Typical maintenance of sedimentation basins will involve:

- Routine inspection of the sedimentation basin to identify depth of sediment accumulation, litter and debris build up (after first 3 significant storm events and then at least every 3 months).
- Routine inspection of inlet and outlet points to identify any areas of scour, litter build up and blockages particularly after significant rain events.
- Removal of litter and debris. Removal and management of invasive weeds (both terrestrial and aquatic).
- Periodic (usually every 5 years or as determined by use) draining and desilting, which will require excavation and dewatering of removed sediment (and disposal to an approved location) and removal of lead.
- Regular watering of vegetation during plant establishment.

- Replacement of plants that have died (from any cause) with plants of equivalent size and species as detailed in the planting schedule.

All waste removed must be checked for contamination and disposed of in an appropriate manner. Works to remove sediment or waste containing lead must be strictly undertaken under controls provided by a specialist contamination consultant to prevent the risk of disturbance and contamination by lead within the sediment / waste.

In conjunction with any final design, a maintenance plan should be prepared. This is to assist the Contractor and the site's lessee to understand their obligations and responsibilities in regards to both the Construction and Operational Phases of the device.

6.3 Swales

The following long term maintenance plan is taken from the Healthy Waterways Technical Design Guide for Swales.

Stormwater treatment within swales relies upon good vegetation establishment and therefore it is important to ensure adequate vegetation growth is maintained. Swales have a stormwater conveyance role and as such, it is important that the right type and density of plant is selected to minimise complete clogging of stormwater flows.

The most intensive period of maintenance is during the plant establishment period (first two years) when weed removal and replanting may be required. It is also the time when large loads of sediments may impact on plant growth, particularly in developing catchments with an inadequate level of erosion and sediment control.

The potential for rilling and erosion along a swale needs to be carefully monitored, particularly during establishment phases of the system. Other components of the system that will require careful consideration are the inlet points (if the system does not have distributed inflows) and surcharge pits. The inlets can be prone to scour and build up of litter and occasional litter removal and potential replanting may be required.

Typical maintenance of swale elements will involve:

- Routine inspection of the swale profile to identify any areas of obvious increased sediment deposition, scouring of the swale invert from storm flows, rill erosion of the swale batters from lateral inflows or damage to the swale profile from vehicles.
- Periodic testing for and Removal of sediment and pellet particulate.
- Reprofiling of the swale and revegetating to original design specification.
- Repairing damage to the swale profile resulting from scour, rill erosion or vehicle damage.
- Regular watering/ irrigation of vegetation until plants are established and actively growing.
- Mowing of turf or slashing of vegetation (if required) to preserve the optimal design height and density of the vegetation.
- Removal and management of invasive weeds.
- Removal of plants that have died (from any cause) and replacement with plants of equivalent size and species as detailed in the plant schedule.
- Pruning to remove dead or diseased vegetation material and to stimulate new growth.
- Litter and debris removal.
- Vegetation pest monitoring and control.

Included in Appendix 4 are the Healthy Waterways Infiltration Measure Design, Construction and Maintenance Guidelines and Sign-Off Forms. These are included to assist the Contractor and the Site's Lessee to understand their obligations and responsibilities in regards to both the Construction and Operational Phases of the device.

6.4 Gross Pollutant Trap (GPT)

GPT's should be maintained in accordance with the manufacturers' specifications, but in general will include 3 to 6 monthly inspections with annual maintenance for full cleaning recommended. GPT's are generally (depending on model) cleaned as outlined below:

- Have a contamination consultant advise and confirm the GPT cleaning process.
- A vacuum truck lowers its suction hose to the surface of the water in the holding chamber and skims across the surface to capture the floating litter.
- Once this has been achieved then the hose should be lowered to the bottom of the holding chamber to remove sediments, organic matter and litter, which have sunk.
- It is sometimes appropriate to de-water the system before attempting to suck the pollutants out of the holding chamber. if required this must be done in a manner appropriate for the potential contaminants within the GPT.

All waste removed must be checked for contamination and disposed of in an appropriate manner so as to not inadvertently disturb lead that may be present within the trap.

Generally the need for maintenance can be determined easily by opening the unit from the surface and inspecting it. A dip stick to determine how much sediment and gross pollutants have been caught in the holding chamber.

7 Conclusion

This Stormwater Management Plan has been prepared for the proposed Ministerial Infrastructure Designation Application for the permanent use of the existing temporary Clay Target Range Facility within the Belmont Shooting Centre. The proposed development comprises the permanent use approval of works already constructed as well as additional construction of some additional elements. If unmitigated, the proposed development would have a detrimental impact on runoff water quality from the site if used as a permanent facility.

Stormwater management measures and treatment devices have been proposed in this report to minimise the impact the permanent use has on the external environment with specialist advice in relation to the management of contamination provided by Groundcorp Pty Ltd.

This report has demonstrated that the recommended measures can be incorporated into the design for the facility. As such we recommend that from a stormwater management perspective the application be supported.

8 Reference

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Queensland Government Environmental Protection Agency, 2006. Queensland Water Quality Guidelines 2006. Environmental Protection Agency, Brisbane

Appendix 1 – Plan Set

27400-BRI-C-ID-C01
27400-BRI-C-ID-CW01
27400-BRI-C-ID-CW02
27400-BRI-C-ID-CW03
27400-BRI-C-ID-CW04
27400-BRI-C-ID-CW05
27400-BRI-C-ID-CW06
27400-BRI-C-ID-CW07
27400-BRI-C-ID-CW08
27400-BRI-C-ID-CW09

CLAY TARGET - INFRASTRUCTURE DESIGNATION

DRAWING INDEX - INFRASTRUCTURE DESIGNATION

DWG No.	REV	DESCRIPTION
27400-BRI-C-ID-C01	C	COVER SHEET
27400-BRI-C-ID-CW01	C	CLAY TARGET EARTHWORKS LAYOUT
27400-BRI-C-ID-CW03	C	CLAY TARGET EARTHWORKS DETAILS (1 OF 3)
27400-BRI-C-ID-CW04	C	CLAY TARGET EARTHWORKS DETAILS (2 OF 3)
27400-BRI-C-ID-CW05	B	TYPICAL RANGE DETAIL PLAN
27400-BRI-C-ID-CW06	C	OVERALL SITE SURFACES PLAN
27400-BRI-C-ID-CW07	C	CLAY TARGET STORMWATER LAYOUT
27400-BRI-C-ID-CW08	C	CLAY TARGET STORMWATER LAYOUT
27400-BRI-C-ID-CW09	B	CLAY TARGET STORMWATER DETAILS

GENERAL NOTES

1. DRAWINGS ARE CONCEPTUAL ONLY AND HAVE BEEN PREPARED AS AN ILLUSTRATION OF THE CONCEPTS DISCUSSED WITHIN THIS REPORT AND ARE INTENDED FOR DEVELOPMENT APPROVAL PURPOSES ONLY.
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MODE

27400-BRI-C-ID-C01-C

WOOD & GRIEVE ENGINEERS

Wood & Grieve Ltd
A.B.N. 97 137 999 609
Level 2, 232-236 St Pauls Tce
Fortitude Valley
Queensland Australia 4000
Phone 07 3811 4500
Fax 07 3811 4600
Email wge@wge.com.au
Web www.wge.com.au

PERTH
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SYDNEY
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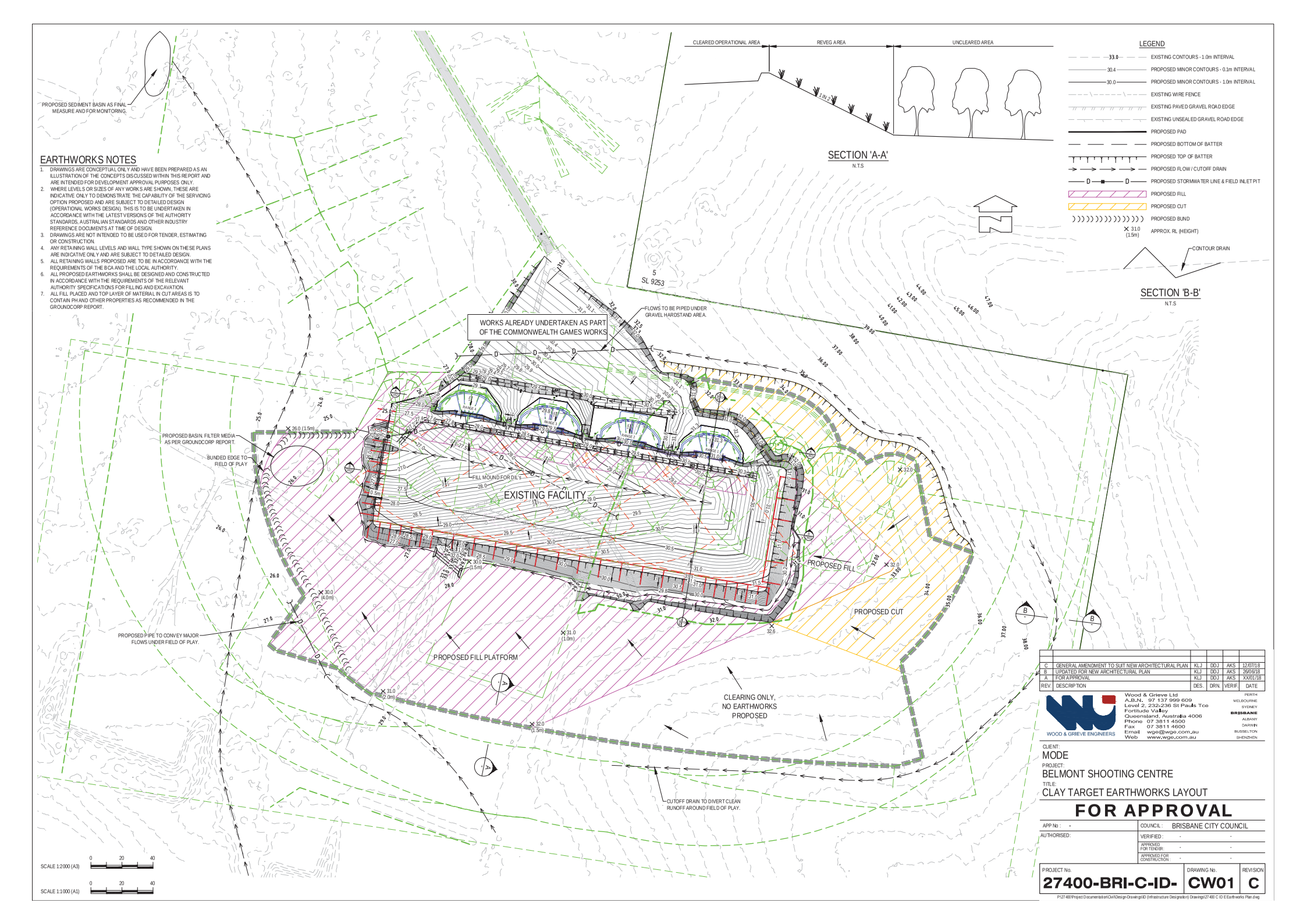
APP No : -	COUNCIL :	BRISBANE CITY COUNCIL	
AUTHORISED:	VERIFIED :	AKS	12/07/18
	APPROVED FOR TENDER:	-	-
	APPROVED FOR CONSTRUCTION :	-	-



REV.	DESCRIPTION	DES.	DRN.	VERIF.	DATE
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B	UPDATED FOR NEW ARCHITECTURAL PLAN	KLJ	DDJ	AKS	26/06/18
A	FOR APPROVAL	KLJ	DDJ	AKS	XX/01/18

WOOD & GRIEVE ENGINEERS
Wood & Grieve Ltd
A.B.N. 97 137 999 609
Level 2, 232-236 St Pauls Tce
Fortitude Valley
Queensland, Australia 4006
Phone 07 3811 4500
Fax 07 3811 4600
Email wge@wge.com.au
Web www.wge.com.au
PERTH MELBOURNE SYDNEY BRISBANE ALBANY DARWIN BUSSELTON SHENZHEN

CLIENT: MODE

PROJECT: BELMONT SHOOTING CENTRE

TITLE: CLAY TARGET EARTHWORKS LAYOUT

FOR APPROVAL

APP No : -	COUNCIL : BRISBANE CITY COUNCIL
AUTHORISED :	VERIFIED : - -
	APPROVED FOR TENDER : - -
	APPROVED FOR CONSTRUCTION : - -

PROJECT No.	DRAWING No.	REVISION
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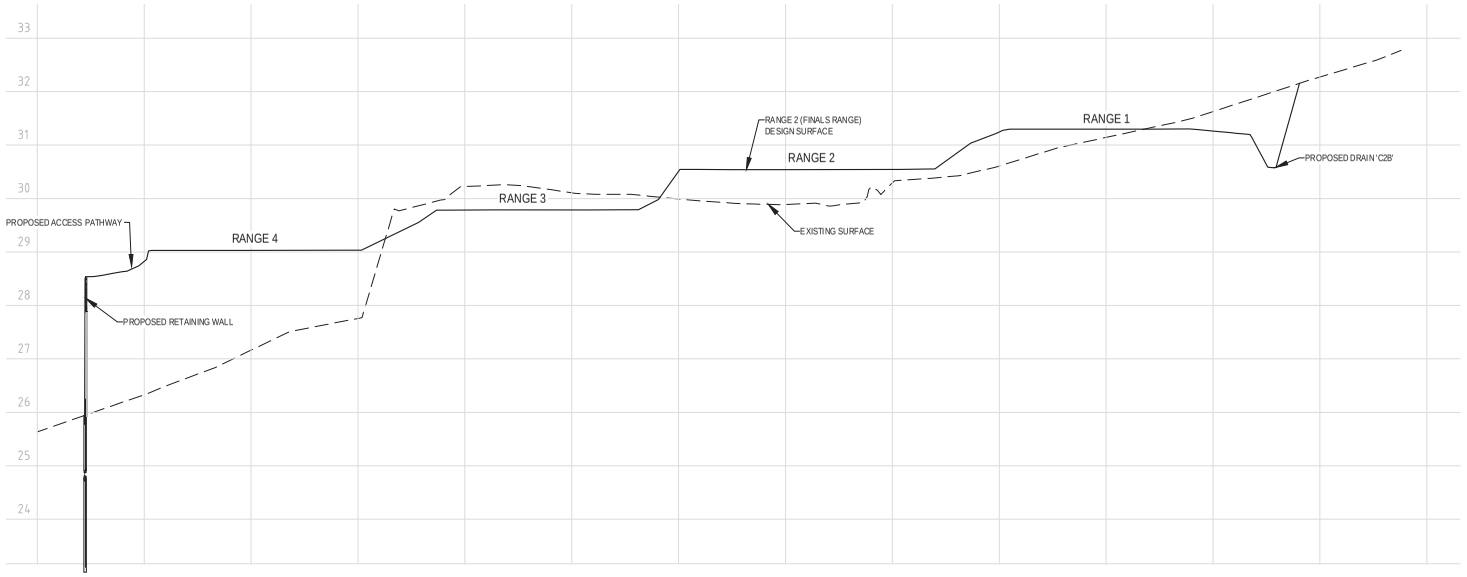

SECTION A-A CW01

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WORKS ALREADY UNDERTAKEN AS PART OF THE COMMONWEALTH GAMES WORKS

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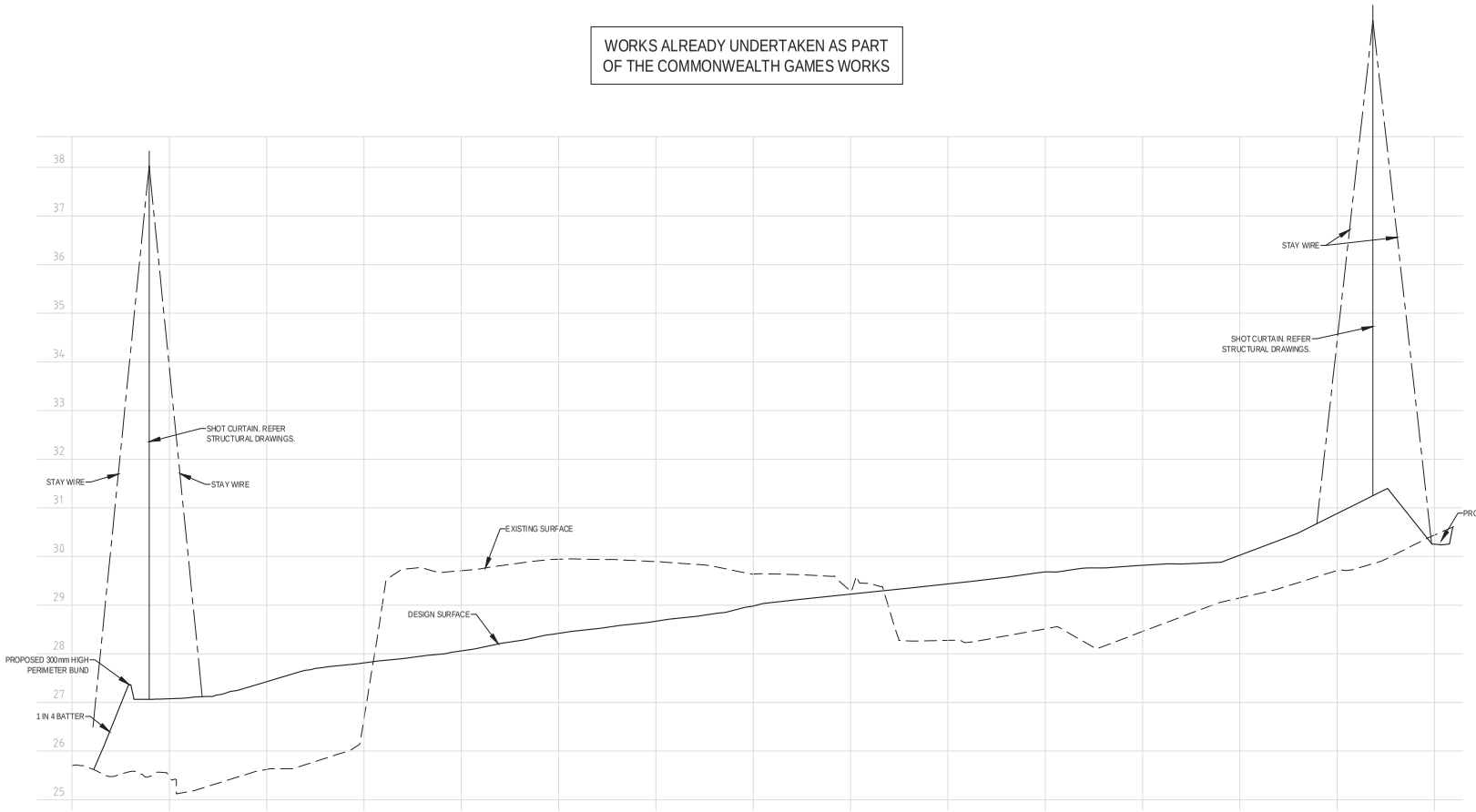
3. DRAWINGS ARE NOT INTENDED TO BE USED FOR TENDER, ESTIMATING OR CONSTRUCTION.
4. ANY RETAINING WALL LEVELS AND WALL TYPE SHOWN ON THESE PLANS ARE INDICATIVE ONLY AND ARE SUBJECT TO DETAILED DESIGN.
5. ALL RETAINING WALLS PROPOSED ARE TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE BCA AND THE LOCAL AUTHORITY.
6. ALL PROPOSED EARTHWORKS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE RELEVANT AUTHORITY SPECIFICATIONS FOR FILLING AND EXCAVATION.
7. ALL FILL PLACED AND TOP LAYER OF MATERIAL IN CUT AREAS IS TO CONTAIN PH AND OTHER PROPERTIES AS RECOMMENDED IN THE GROUNDCORP REPORT.



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REV.	DESCRIPTION	DES.	DRN.	VERIF.	DATE
C	NOTES ADDED	KLJ	DDJ	AKS	12/07/18
B	UPDATED FOR NEW ARCHITECTURAL PLAN	KLJ	DDJ	AKS	26/06/18
A	FOR APPROVAL	KLJ	DDJ	AKS	XX/01/18

WOOD & GRIEVE ENGINEERS
Wood & Grieve Ltd
A.B.N. 97 137 999 609
Level 2, 232-236 St Pauls Tce
Fortitude Valley
Queensland, Australia 4006
Phone 07 3811 4500
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CLIENT: MODE

PROJECT: BELMONT SHOOTING CENTRE

TITLE: CLAY TARGET EARTHWORKS DETAILS (1 OF 3)

FOR APPROVAL

APP No : -	COUNCIL :	BRISBANE CITY COUNCIL
AUTHORISED :	VERIFIED :	- -
	APPROVED FOR TENDER :	- -
	APPROVED FOR CONSTRUCTION :	- -

PROJECT No.	DRAWING No.	REVISION
27400-BRI-C-ID-	**CW03**	**C**

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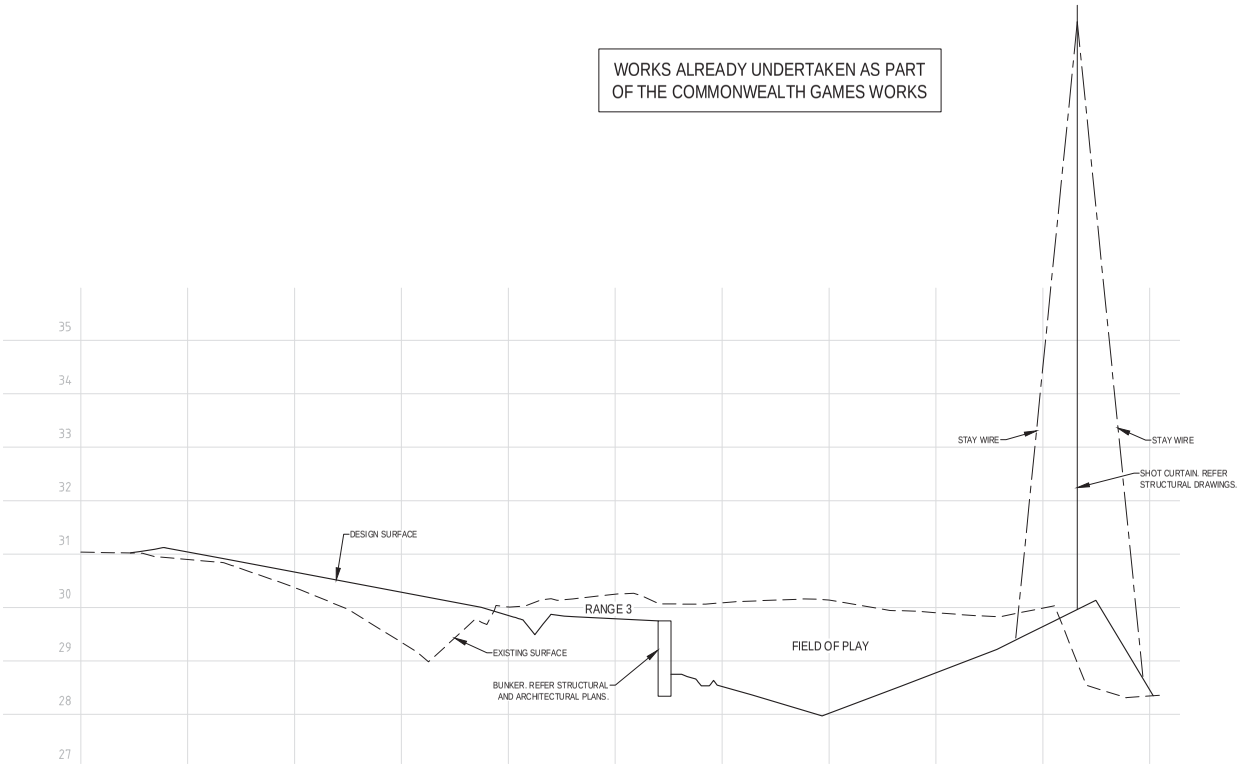
WORKS ALREADY UNDERTAKEN AS PART OF THE COMMONWEALTH GAMES WORKS



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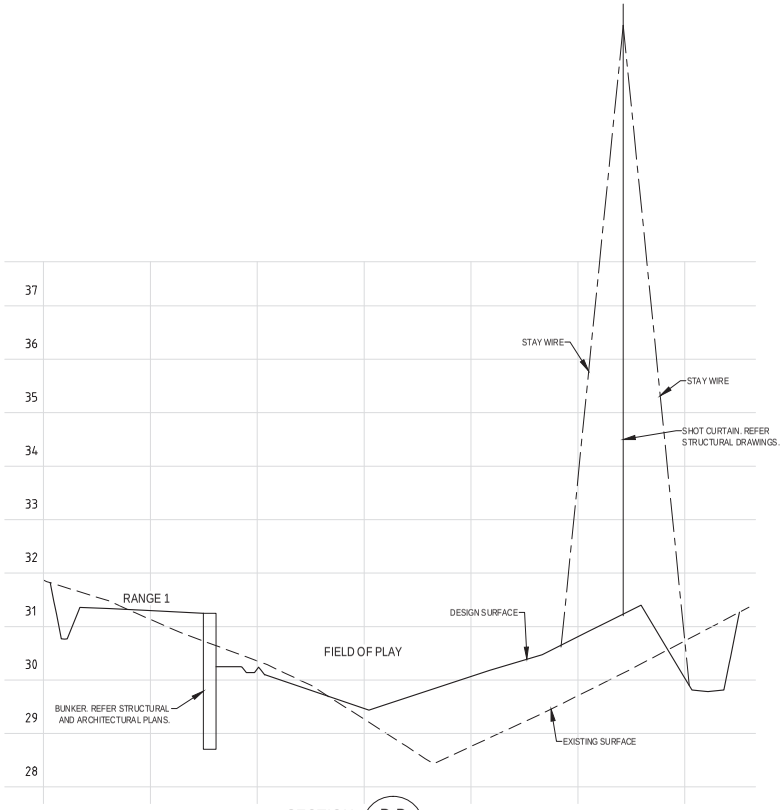

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7. ALL FILL PLACED AND TOP LAYER OF MATERIAL IN CUT AREAS IS TO CONTAIN PH AND OTHER PROPERTIES AS RECOMMENDED IN THE GROUNDCORP REPORT.

REV.	DESCRIPTION	DES.	DRN.	VERIF.	DATE
C	NOTES ADDED	KLJ	DDJ	AKS	12/07/18
B	UPDATED FOR NEW ARCHITECTURAL PLAN	KLJ	DDJ	AKS	26/06/18
A	FOR APPROVAL	KLJ	DDJ	AKS	XX/01/18

WOOD & GRIEVE ENGINEERS
Wood & Grieve Ltd
A.B.N. 97 137 999 609
Level 2, 232-236 St Pauls Tce
Fortitude Valley
Queensland, Australia 4006
Phone 07 3811 4500
Fax 07 3811 4600
Email wge@wge.com.au
Web www.wge.com.au
PERTH MELBOURNE SYDNEY **BRISBANE** ALBANY DARWIN BUSSELTON SHENZHEN

CLIENT: MODE

PROJECT: BELMONT SHOOTING CENTRE

TITLE: CLAY TARGET EARTHWORKS DETAILS (2 OF 3)

FOR APPROVAL

APP No : -	COUNCIL : BRISBANE CITY COUNCIL
AUTHORISED :	VERIFIED : - -
	APPROVED FOR TENDER : - -
	APPROVED FOR CONSTRUCTION : - -

PROJECT No.	DRAWING No.	REVISION
27400-BRI-C-ID-	CW04	C

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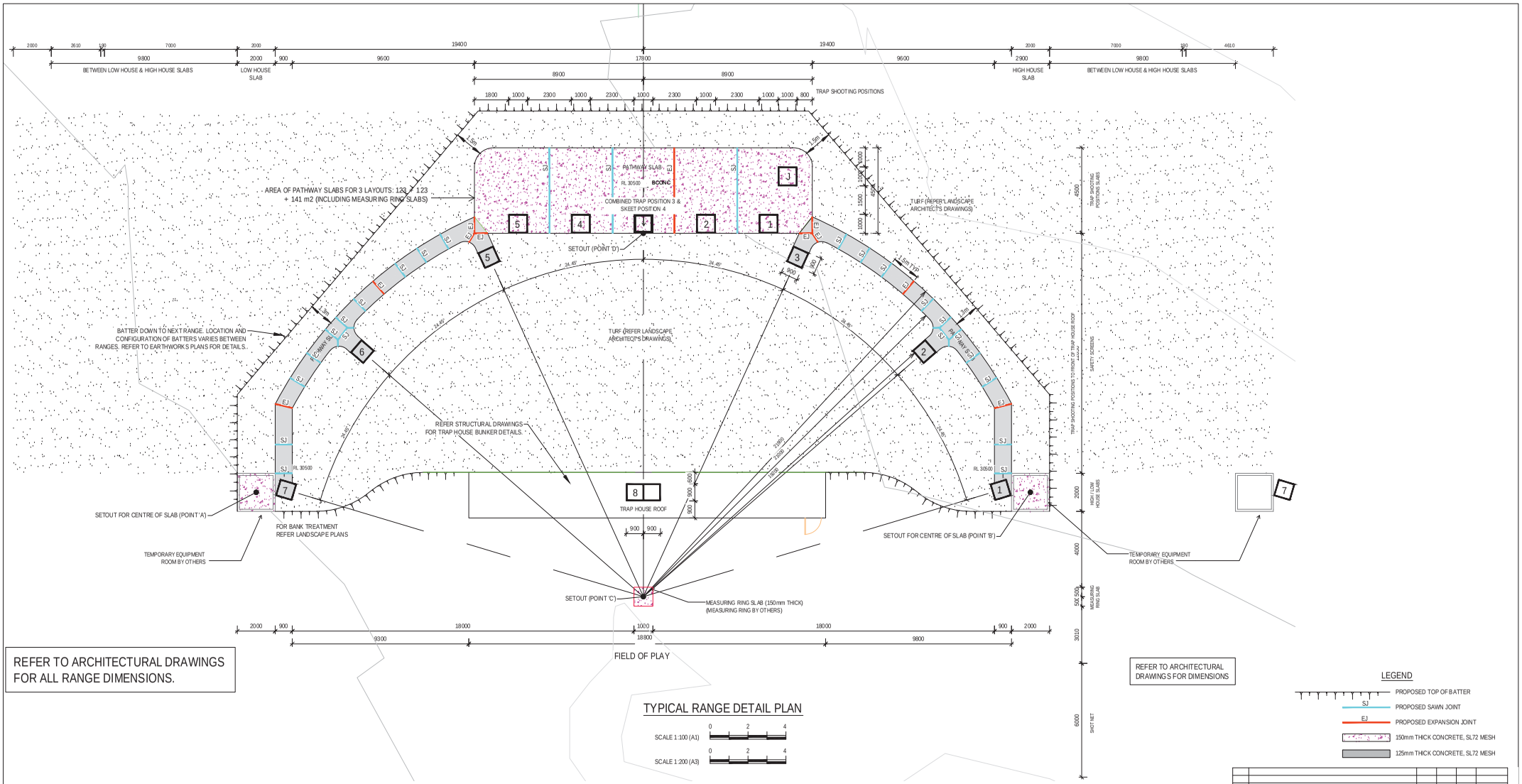

REFER TO ARCHITECTURAL DRAWINGS FOR ALL RANGE DIMENSIONS.

REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS

TYPICAL RANGE DETAIL PLAN

SCALE 1:100 (A1) 0 2 4

SCALE 1:200 (A3) 0 2 4

LEGEND

- PROPOSED TOP OF BATTER
- SJ PROPOSED SAWN JOINT
- EJ PROPOSED EXPANSION JOINT
- 150mm THICK CONCRETE, SL72 MESH
- 125mm THICK CONCRETE, SL72 MESH

WORKS ALREADY UNDERTAKEN AS PART OF THE COMMONWEALTH GAMES WORKS

REV.	DESCRIPTION	DES.	DRN.	VERIF.	DATE
B	UPDATED FOR NEW ARCHITECTURAL PLAN	KLJ	DDJ	AKS	26/06/18
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WOOD & GRIEVE ENGINEERS
Wood & Grieve Ltd
A.B.N. 97 137 999 609
Level 2, 232-236 St Pauls Tce
Fortitude Valley
Queensland, Australia 4006
Phone 07 3811 4500
Fax 07 3811 4600
Email wge@wge.com.au
Web www.wge.com.au
PERTH MELBOURNE SYDNEY BRISBANE ALBANY DARWIN BUSSELTON SHENZHEN

CLIENT: MODE

PROJECT: BELMONT SHOOTING CENTRE

TITLE: TYPICAL RANGE DETAIL PLAN

FOR APPROVAL

APP No : -	COUNCIL : BRISBANE CITY COUNCIL
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	APPROVED FOR TENDER: - -
	APPROVED FOR CONSTRUCTION : - -

PROJECT No.	DRAWING No.	REVISION
27400-BRI-C-ID-	CW05	B

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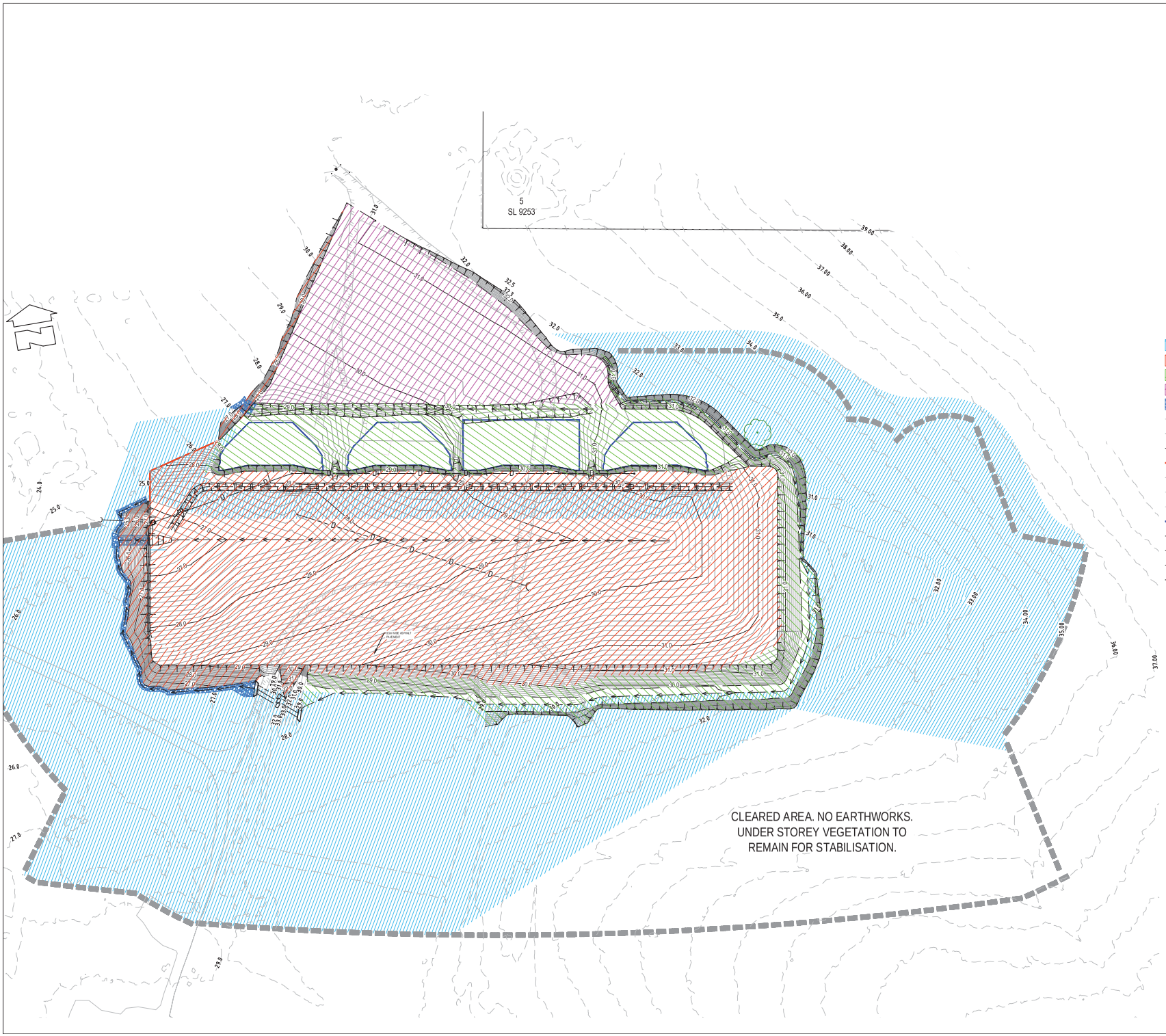

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LEGEND

- PROPOSED HYDROMULCH AREA - (EARTHWORKS COMPACTED TO 98% STD FOR FULL DEPTH) - REFER LANDSCAPING PLANS
- EXISTING HYDROMULCH AREA - (BCC MIX) - REFER LANDSCAPING PLANS
- EXISTING TURF AREA - REFER LANDSCAPING PLANS
- EXISTING UNSEALED GRAVEL PAVEMENT - REFER LANDSCAPING PLANS
- ROCK SCOUR PROTECTION - REFER LANDSCAPING PLANS
- 33.0 EXISTING CONTOURS - 0.1m INTERVAL
- 30.4 PROPOSED MINOR CONTOURS - 0.1m INTERVAL
- 30.0 PROPOSED MINOR CONTOURS - 1.0m INTERVAL
- PROPOSED RETAINING WALL
- EXISTING WIRE FENCE
- EXISTING PAVED GRAVEL ROAD EDGE
- EXISTING UNSEALED GRAVEL ROAD EDGE
- PROPOSED PAD
- PROPOSED BOTTOM OF BATTER
- PROPOSED TOP OF BATTER
- PROPOSED FLOW CHANNEL
- D D PROPOSED STORMWATER LINE & FIELD INLET PIT
- D D FUTURE STORMWATER LINE & FIELD INLET PIT
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED

SCALE 1:750 (A1) 0 15 30

SCALE 1:1500 (A3) 0 15 30

REV.	DESCRIPTION	DES.	DRN.	VERIF.	DATE
C	HYDROMULCH AREA AMENDED	KLJ	DDJ	AKS	12/07/18
B	UPDATED FOR NEW ARCHITECTURAL PLAN	KLJ	DDJ	AKS	26/06/18
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WOOD & GRIEVE ENGINEERS
Wood & Grieve Ltd
A.B.N. 97 137 999 609
Level 2, 232-236 St Pauls Tce
Fortitude Valley
Queensland, Australia 4006
Phone 07 3811 4500
Fax 07 3811 4600
Email wge@wge.com.au
Web www.wge.com.au
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CLIENT:
MODE

PROJECT:
BELMONT SHOOTING CENTRE

TITLE:
OVERALL SITE SURFACES PLAN

FOR APPROVAL

APP No : -	COUNCIL : BRISBANE CITY COUNCIL
AUTHORISED:	VERIFIED : - -
	APPROVED FOR TENDER: - -
	APPROVED FOR CONSTRUCTION : - -

PROJECT No.	DRAWING No.	REVISION
27400-BRI-C-ID-	CW06	C

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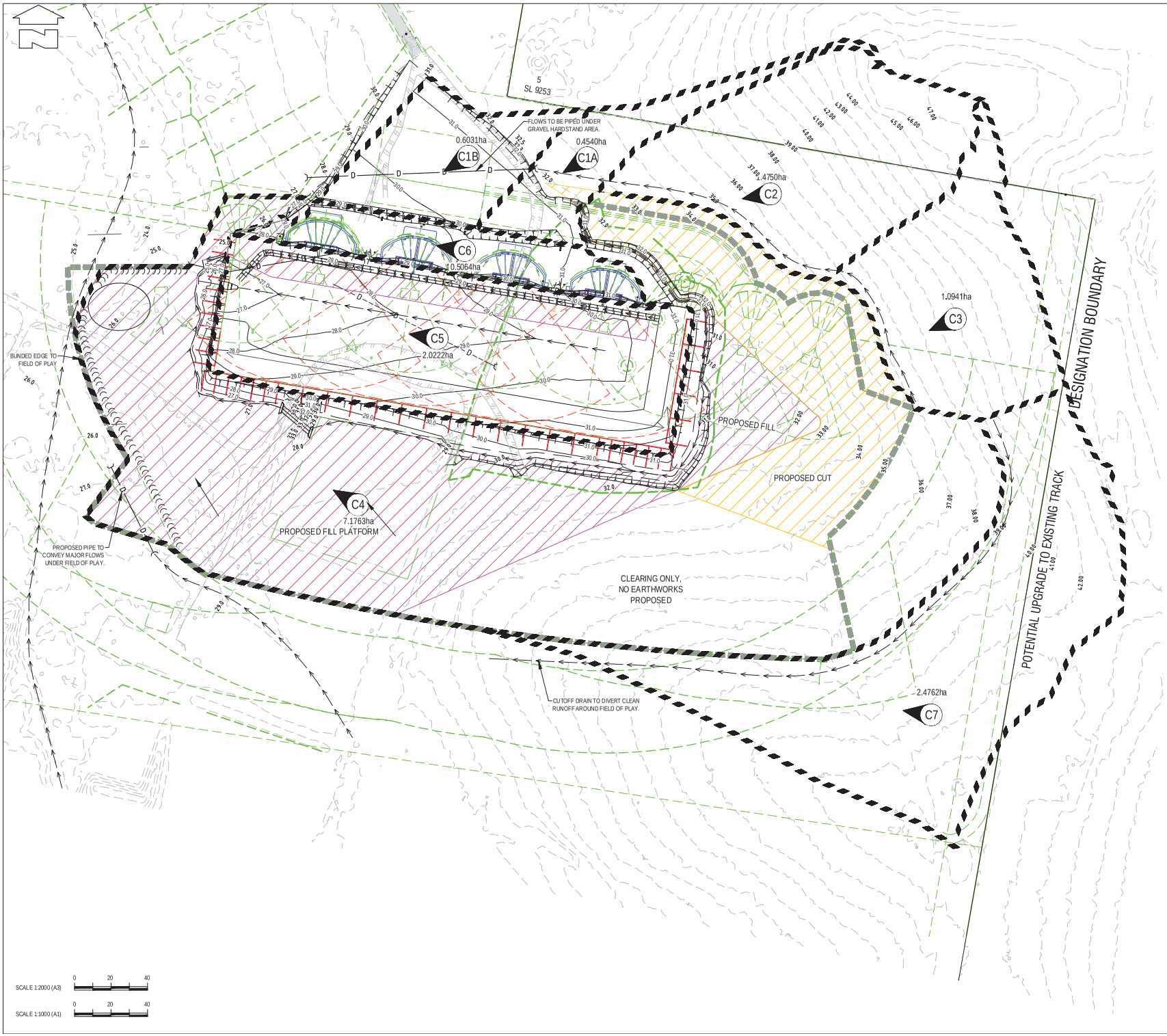

REV.	DESCRIPTION	DES.	DRN.	VERIF.	DATE
C	CATCHMENT BOUNDARY & AREA AMENDED	KLJ	DDJ	AKS	12/07/18
B	UPDATED FOR NEW ARCHITECTURAL PLAN	KLJ	DDJ	AKS	26/06/18
A	FOR APPROVAL	KLJ	DDJ	AKS	XX/01/18

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CLIENT:
MODE

PROJECT:
BELMONT SHOOTING CENTRE

TITLE:
CLAY TARGET CATCHMENT PLAN

FOR APPROVAL

APP No : -	COUNCIL : BRISBANE CITY COUNCIL
AUTHORISED :	VERIFIED : - -
	APPROVED FOR TENDER : - -
	APPROVED FOR CONSTRUCTION : - -

PROJECT No.	DRAWING No.	REVISION
27400-BRI-C-ID-	CW07	C

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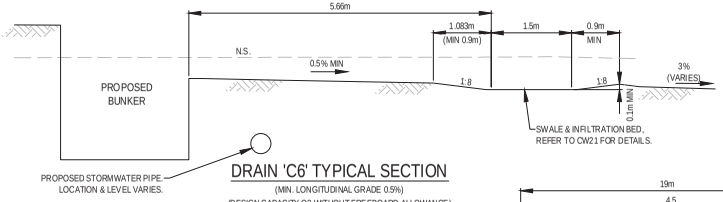
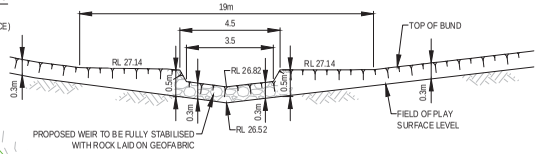


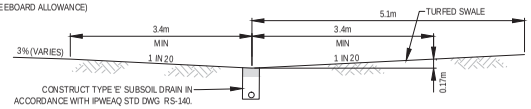
DRAIN 'C6' TYPICAL SECTION

(MIN. LONGITUDINAL GRADE 0.5%)
(DESIGN CAPACITY Q2 WITHOUT FREEBOARD ALLOWANCE)
N.T.S



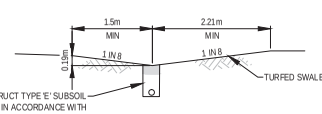
WEIR SECTION 'A-A'

(MIN. LONGITUDINAL GRADE 0.5%)
(DESIGN CAPACITY Q2 WITHOUT FREEBOARD ALLOWANCE)
N.T.S



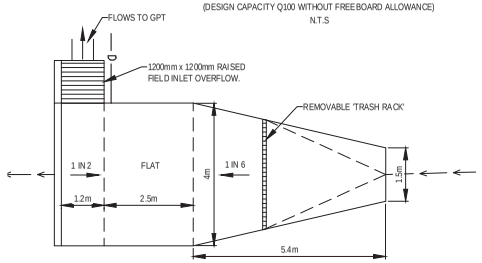
DRAIN 'C1A' TYPICAL SECTION

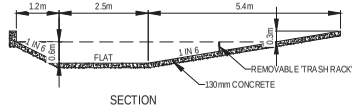
(MIN. LONGITUDINAL GRADE 0.5%)
(DESIGN CAPACITY Q100 WITHOUT FREEBOARD ALLOWANCE)
N.T.S



DRAIN 'C1' TYPICAL SECTION

(MIN. LONGITUDINAL GRADE 1.15%)
(DESIGN CAPACITY Q100 WITHOUT FREEBOARD ALLOWANCE)
N.T.S





SEDIMENT FOREBAY DETAIL

SCALE 1:75 (A1) 0 1.5 3
SCALE 1:150 (A3) 0 1.5 3

LEGEND

ROCK SCOUR PROTECTION
EXISTING SPECIFIC TREES TO BE RETAINED
EXISTING SPECIFIC TREES TO BE REMOVED

LEGEND

33.0 EXISTING CONTOURS - 0.1m INTERVAL
30.4 PROPOSED MINOR CONTOURS - 0.1m INTERVAL
30.0 PROPOSED MINOR CONTOURS - 1.0m INTERVAL
PROPOSED RETAINING WALL
EXISTING WIRE FENCE
EXISTING PAVED GRAVEL ROAD EDGE
EXISTING UNSEALED GRAVEL ROAD EDGE
PROPOSED PAD
PROPOSED BOTTOM OF BATTER
PROPOSED TOP OF BATTER
PROPOSED FLOW CHANNEL
D D PROPOSED STORMWATER LINE & FIELD INLET PIT
PROPOSED MITRE DRAIN
D FUTURE STORMWATER LINE & FIELD INLET PIT
PROPOSED FILL
PROPOSED CUT

ROCK SCOUR PROTECTION TO FLOW PATH BATTER AS SHOWN. EXTEND ROCK FOR 2m PAST BOTTOM OF BATTER AND 1m PAST TOP OF BATTER. MORTARED ROCK PITCHING IN ACCORDANCE WITH DETAIL ON CW09.

TYPE 'E' MITRE DRAINS IN ACCORDANCE WITH IPWEAQ STD DWG RS-140. DRAINS TO DISCHARGE TO DAYLIGHT AT MINIMUM 0.5%.

DRAIN 'C1'
DRAIN 'C1A'
DRAIN 'C2A'
DRAIN 'C2B'
DRAIN 'C3'
DRAIN 'C6'

STORMWATER STUB FOR FUTURE CONNECTION

PRECAST HEADWALL IL 24.82

PROPOSED GPT

PROPOSED SEDIMENT FOREBAY REFER ABOVE RIGHT FOR DETAILS.

CONSTRUCT DUMPED ROCK SCOUR PROTECTION ON WEIR & FLOW PATH BATTER AS SHOWN. EXTEND ROCK FOR 4m PAST BOTTOM OF BATTER. ROCK ON GEOFABRIC IN ACCORDANCE WITH DETAIL ON CW19.

PROPOSED BASIN WITH FILTER MEDIA AS PER GROUNDCORP REPORT.

EXISTING STORMWATER PIPE AND HEADWALL TO BE REMOVED

SCALE 1:500 (A1) 0 10 20
SCALE 1:1000 (A3) 0 10 20

REV.	DESCRIPTION	DES.	DRN.	VERIF.	DATE
C	NOTE & BASIN ADDED AS PER GROUNDCORP REPORT	KLJ	DDJ	AKS	12/07/18
B	UPDATED FOR NEW ARCHITECTURAL PLAN	KLJ	DDJ	AKS	26/06/18
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CLIENT:
MODE

PROJECT:
BELMONT SHOOTING CENTRE

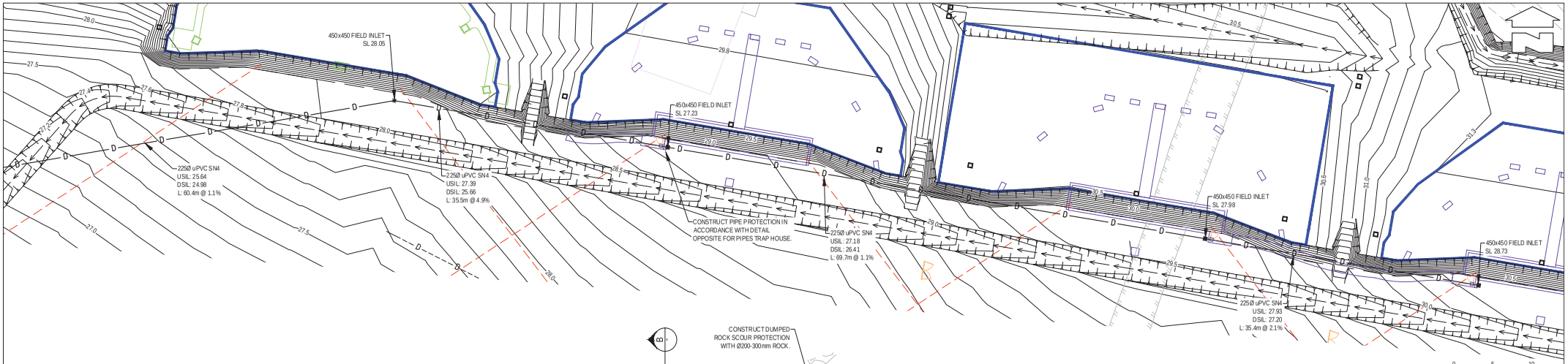
TITLE:
CLAY TARGET STORMWATER LAYOUT

FOR APPROVAL

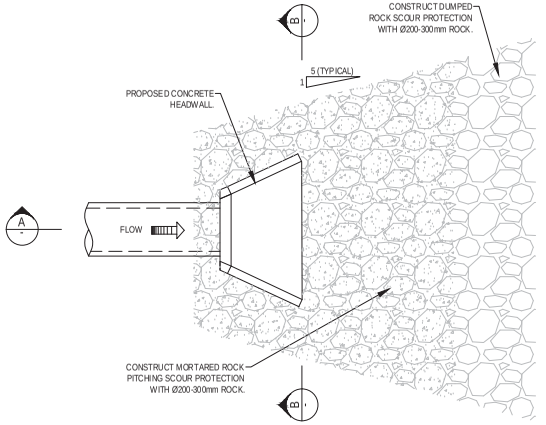
APP No : -
AUTHORISED :
COUNCIL : BRISBANE CITY COUNCIL
VERIFIED : - -
APPROVED FOR TENDER : - -
APPROVED FOR CONSTRUCTION : - -

PROJECT No.	DRAWING No.	REVISION
27400-BRI-C-ID-	CW08	C

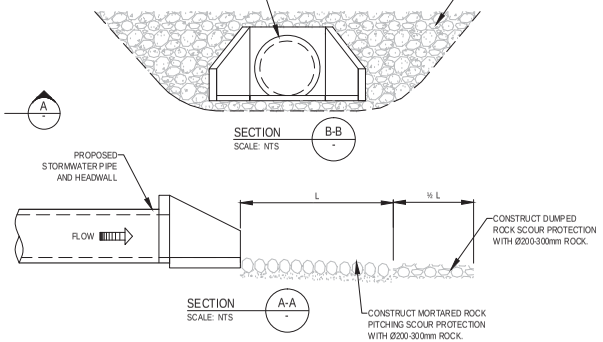
P:\27400\Project Documentation\CW\Design Drawings\D (Infrastructure Designation)\ Drawings\27400 C ID D Stormwater Plan.dwg



WORKS ALREADY UNDERTAKEN AS PART OF THE COMMONWEALTH GAMES WORKS



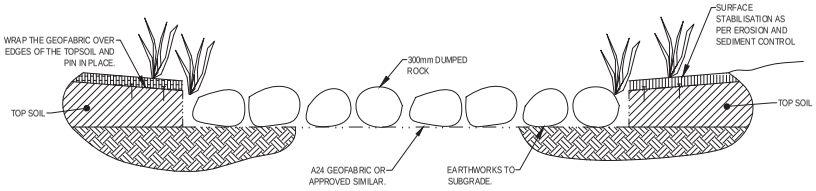
PLAN VIEW
NTS



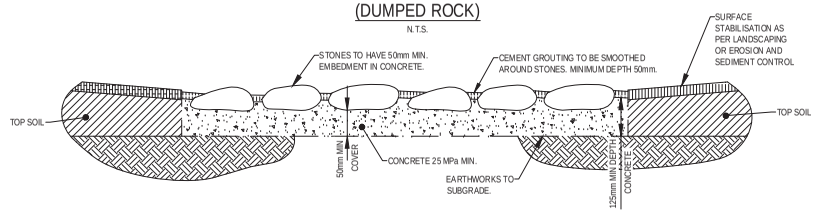
HEADWALL DETAIL WITH STONE PITCHING
N.T.S

LEGEND

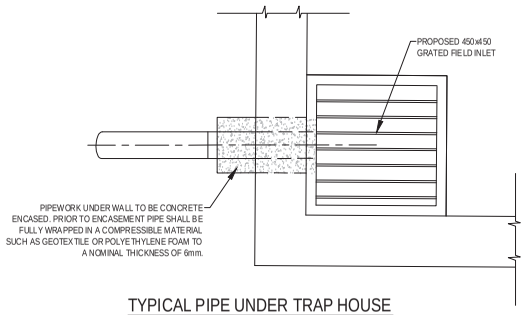
- EXISTING CONTOURS - 0.1m INTERVAL
- PROPOSED MINOR CONTOURS - 0.1m INTERVAL
- PROPOSED MINOR CONTOURS - 1.0m INTERVAL
- EXISTING WIRE FENCE
- EXISTING PAVED GRAVEL ROAD EDGE
- EXISTING UNSEALED GRAVEL ROAD EDGE
- PROPOSED PAD
- PROPOSED BOTTOM OF BATTER
- PROPOSED TOP OF BATTER
- PROPOSED FLOW CHANNEL
- PROPOSED STORMWATER LINE & FIELD INLET PIT
- FUTURE STORMWATER LINE & FIELD INLET PIT
- ROCK SCOUR PROTECTION



TYPICAL ROCK NATURAL TREATMENT DETAILS
(DUMPED ROCK)
N.T.S.



TYPICAL MORTARED ROCK PITCHING DETAILS
N.T.S.



TYPICAL PIPE UNDER TRAP HOUSE
N.T.S

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Level 2, 232-236 St Pauls Tce
Fortitude Valley
Queensland, Australia 4006
Phone 07 3811 4500
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PERTH MELBOURNE SYDNEY **BRISBANE** ALBANY DARWIN BUSSELTON SHENZHEN

CLIENT:
MODE

PROJECT:
BELMONT SHOOTING CENTRE

TITLE:
CLAY TARGET STORMWATER DETAILS

FOR APPROVAL

APP No : -	COUNCIL : BRISBANE CITY COUNCIL
AUTHORISED :	VERIFIED : - -
	APPROVED FOR TENDER : - -
	APPROVED FOR CONSTRUCTION : - -

PROJECT No.	DRAWING No.	REVISION
27400-BRI-C-ID-	**CW09**	**B**

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Appendix 2 – Treatment Recommendations

Appendix 3 – Product Information

GPT Product and Supplier

Secondary treatment

HumeCeptor® hydrodynamic separator

The HumeCeptor® system is a patented hydrodynamic separator, specifically designed to remove hydrocarbons and suspended solids from stormwater runoff, preventing spills and minimising non-point source pollution entering downstream waterways.

Right:
HumeCeptor®
system

The HumeCeptor® system is an underground, precast concrete stormwater treatment solution that utilises hydrodynamic and gravitational separation to efficiently remove Total Suspended Solids (TSS) and entrained hydrocarbons from runoff. First designed as an 'at source' solution for constrained, commercial and industrial sites it has been improved and expanded to service large catchments, mine and quarry sites, inundated drainage systems, and capture large volume emergency spill events. The system is ideal for hardstands/wash bays, car parks, shopping centres, industrial/commercial warehouses, petrol stations, airports, major road infrastructure applications, quarries, mine sites and production facilities.

Independently tested, and installed in over 30,000 projects worldwide, the HumeCeptor® system provides effective, and reliable secondary treatment of stormwater for constrained sites.

- **The system reliably removes a high level of TSS and hydrocarbons**
  The HumeCeptor® system was developed specifically to remove fine suspended solids and hydrocarbons from stormwater, and has been certified to achieve high pollutant removal efficiencies for TSS (>80%) and Total Nutrients (TN) (>30%) on an annual basis.
- **It captures and retains hydrocarbons and TSS down to 10 microns**
  Each system is specifically designed to maintain low treatment chamber velocities to capture and retain TSS down to 10 microns. It also removes up to 98% of free oils from stormwater.
- **Each device is sized to achieve the necessary Water Quality Objectives (WQO) on an annual basis**
  Utilising the latest build-up and wash-off algorithms, PCSWMM software for the HumeCeptor® system ensures that the device chosen achieves the desired WQO (e.g. 80% TSS removal) on an annual basis.
- **Its performance has been independently verified**
  The HumeCeptor® system's technology has been assessed by independent verification authorities including the New Jersey Department of Environmental Protection (NJDEP), The Washington Department of Environment (USA), and by the Canadian Environmental Technology Verification program (ETV).

- **The system is proven**
  The HumeCeptor® system was one of the first stormwater treatment devices introduced to Australia, and now after 30,000 installations worldwide, its popularity is testament to its performance, quality and value for money.
- **High flows won't scour captured sediment**
  The unique design of the HumeCeptor® unit ensures that as flows increase and exceed the treatment flow, the velocity in the storage chamber decreases.
- **Nutrients are captured along with the sediment**
  The effective capture of TSS results in the capture of particulate nutrients shown to be >30% of TN and Total Phosphorous (TP).
- **Designs allow for emergency spill storage, directional change, multiple pipes and tidal inundation**
  A new range of HumeCeptor® systems are now available, built specifically to manage emergency spills (50,000 L storage), change of pipe directions, the joining of multiple pipes, or to manage high tail water levels as a result of tides or downstream water bodies.
- **Fully trafficable to suit land use up to Class G**
  The HumeCeptor® system is a fully trafficable solution, it can be installed under pavements and hardstands to maximise above ground land use.

System operation

The HumeCeptor® system slows incoming stormwater to create a non-turbulent treatment environment (refer to Figure 3 below), allowing free oils and debris to rise and sediment to settle. Each HumeCeptor® system maintains continuous positive treatment of TSS, regardless of flow rate, treating a wide range of particle sizes, as well as free oils, heavy metals and nutrients that attach to fine sediment.

The HumeCeptor® system's patented scour prevention technology then ensures pollutants are captured and contained during all rainfall events. For more detail on the operation of the HumeCeptor® system refer to the technical manual.

Figure 3 – HumeCeptor® system operation during design flow condition

Independent verification testing

The HumeCeptor® system has been extensively researched by more than 15 independent authorities to validate its performance; it has now gained Environmental Technology Verification (ETV) certificates from ETV Canada, New Jersey Department of Environment Protection (NJDEP) and Washington Department of Environment (WDOE).

A number of agencies have conducted independent studies; their results from these studies (over 100 test events) have been summarised in Table 4.

Table 4 – HumeCeptor® systems performance summary

Pollutant	Average removal efficiency	Details
TSS	80%	Laboratory and field results, stable, hardstand, roads, commercial and industrial sites
TN	53%	Field results
TP	37%	Field results
Chromium	44%	Field results
Copper	29%	Field results
TPH	65%	<10 ppm inflow concentration
	95%	10 ppm - 50 ppm inflow concentration (typical stormwater)
	99%	>500 ppm inflow concentration (emergency spills)

Note: Detailed reports are presented in the HumeCeptor® system technical manual.

Options

There are a number of HumeCeptor® systems available to meet the requirements of various WQO maintaining catchments and local hydrology. The standard range is detailed in Table 5 below.

Table 5 – HumeCeptor® model range and details

HumeCeptor® model	Pipe diameter (mm)	Device diameter (mm)	Depth from pipe invert* (m)	Sediment capacity (m^3)	Oil capacity (l)	Total storage capacity (l)
STC 2 (inlet)	100 - 600	1,200	1.70	1	350	1,740
STC 3	100 - 1,350	1,800	1.68	2	1,020	3,410
STC 5			2.13	3		4,550
STC 7			3.03	5		6,820
STC 9		2,440	2.69	6	1,900	9,090
STC 14			3.69	10	2,980	13,640
STC 18		3,060	3.44	14		18,180
STC 23			4.04	18		22,730
STC 27		3,600	3.84	20	4,290	27,270

Note: *Depths are approximate.

Variants

Continual improvement over the last 14 years of HumeCeptor® systems installation has provided a number of enhancements to address specific treatment and design requirements.

- **HumeCeptor® STC 2 (inlet) model**
  This model features a grated inlet to directly capture runoff from hardstand areas, replacing the need for a stormwater pit (refer to Figure 4).
- **AquaCeptor™ model**
  This model has been designed with a weir extension and high level secondary inlet to increase the level at which flows bypass the treatment chamber, and accommodate downstream tail water levels or periodic inundation (e.g. tidal situations). Figure 5 displays the AquaCeptor™ model - these are available in the same sizes as the standard HumeCeptor® units (refer to Table 5 on page 10).
- **MultiCeptor™ model**
  The MultiCeptor™ model was developed to facilitate the replacement of junction pits while still providing the treatment abilities of the original HumeCeptor® system and reducing time and costs during installation. The MultiCeptor™ model is available in the same sizes as the standard HumeCeptor® units (refer Table 6 below) and a 2,400 mm diameter MultiCeptor™ unit is also available to accommodate drainage networks up to 1,800 mm diameter.

Figure 4 – HumeCeptor® STC 2 (inlet) model

Figure 5 – AquaCeptor™ model

Table 6 – MultiCeptor™ model range and details

HumeCeptor® model	Pipe diameter (mm)	Device diameter (mm)	Depth from pipe invert (m)	Sediment capacity (m^3)	Oil capacity (l)	Total storage capacity (l)
MI3	100 - 1,350	1,800	1.68	2	1,020	3,410
MI5			2.13	3		4,550
MI7			3.03	5		6,820
MI9		2,440	2.69	6	1,900	9,090
MI14			3.69	10	2,980	13,640
MI18		3,060	3.44	14		18,180
MI23			4.04	18		22,730
MI27		3,600	3.84	20	4,290	27,270
MI9 - MI27 (2,400)	100 - 1,800	2,400	2.69 - 3.84	6 - 20	1,900 - 4,290	9,090 - 27,270

- **DuoCeptor™ model**
  The DuoCeptor™ model has been developed to treat larger catchments (2 Ha – 6 Ha) as some constrained developments can only accommodate a single, large device instead of several smaller devices. Figure 6 displays the DuoCeptor™ model and Table 7 details the range of capacities available.
- **HumeCeptor EOS™ model**
  The HumeCeptor EOS™ (Emergency Oil Spill) system provides you with the maximum protection against hydrocarbon spills at petrol stations, highway interchanges and intersections. It combines the passive, always-operating functions of the HumeCeptor® system, with additional emergency storage to capture the volume of spill required by your road authority.
- **HumeCeptor MAX™ model**
  The HumeCeptor MAX™ model was developed to meet the market need for a single, large, end-of-pipe solution for TSS removal. Utilising the HumeCeptor® system's proven capture and scour prevention technology, it is ideal for very large commercial and industrial sites (>6 Ha) that need to achieve at least 50% TSS removal and hydrocarbon capture. The HumeCeptor MAX™ model can be expanded to almost any capacity required.

For more details on the variants and their application refer to the HumeCeptor® system technical manual.

Figure 6 – DuoCeptor™ model

Table 7 – DuoCeptor™ model range and details

DuoCeptor™ model	Pipe diameter (mm)	Device footprint (L x W)	Depth from pipe invert (m)	Sediment capacity (m^3)	Oil capacity (l)	Total storage capacity (l)
STC 40	600 - 1,350	7,750 x 3,500	3.41	27	10,585	42,370
STC 50			4.01	35	10,585	50,525
STC 60		9,150 x 4,200	3.89	42	11,560	60,255