

KUR-World

Biosecurity

Chapter 16.0

Environmental Impact Statement



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16.0 BIOSECURITY

The purpose of this Chapter is to:

- Describe the existing State and Commonwealth regulatory frameworks regarding the eradication and management of fauna and flora pests
- Provide the findings of the survey work undertaken on the site
- Identify the impacts of the project on pests
- Identify current regulatory management tools
- Provide mitigation and management measures to support those regulatory tools which will be applicable throughout the life of the project.

A more detailed evaluation of the impact of the project, including pest animals and weeds on native fauna and flora, is reported in Chapter 8 (Flora and Fauna).

16.1 Executive Summary

Field and desk-based assessments were undertaken by NRA Environmental Consultants (NRA) to ascertain the potential and actual biosecurity matters relevant to the KUR-World project area. The results of these assessments by NRA inform this chapter of the EIS and the NRA report (NRA 2017c) is included in Appendix 5 of the EIS.

Forty-three (43) non-native flora species were identified during field surveys conducted by NRA, each posing varying levels of threat in terms of their invasiveness, potential for spread and their potential to cause environmental, social and economic impacts. The dominant non-native flora species in the project area were Lantana (*Lantana camara*), Giant Bramble (*Rubus alceifolius*) and Sky Flower (*Duranta erecta*), and while these occurrences detract from habitat integrity, their presence is likely to benefit, or have a net-neutral effect on, some fauna species. Most other occurrences of non-native flora species pose a minor threat to the project area, with the exception of Cat's Claw Creeper (*Dolichandra unguis-cati*). A single infestation of Cat's Claw Creeper was found on the project area and, if left uncontrolled, it has the potential to spread and dominate the forest areas.

The non-native fauna species recorded on the project area were Feral Pigs (*Sus scrofa*), Cane Toads (*Rhinella marina*) and Dogs (*Canis sp.*) (NRA 2017c). Three non-native fish species were recorded on the project area (NRA 2017a). Other biosecurity risks are present in the region, including Yellow Crazy Ants (*Anoplolepis gracilipes*) and Electric Ants (*Wasmannia auropunctata*). Feral Pigs, Cane Toads and Dogs are not noticeably abundant in the project area. The impacts of these species vary but are currently small-scale due to their low abundance. The non-native fish species present in the project area and the other biosecurity risks present in the region (e.g. Tramp Ants) have the potential to impact the project area.

Mitigation and management measures relevant to minimising the spread of non-native flora and fauna species, and controlling existing non-native flora and fauna species, have been identified herein.

16.2 Statutory framework

16.2.1 Queensland

The *Biosecurity Act 2014* commenced on 1 July 2016. The Biosecurity Act replaced the *Queensland Land Protection (Pest and Stock Route Management) Act 2002* (LP Act), and ensures a consistent, modern, risk-based and less prescriptive approach to biosecurity in Queensland. The Biosecurity Act provides



comprehensive biosecurity measures against non-native flora and fauna species, diseases and contaminants. The Queensland Biosecurity Regulation 2016 sets out how the Act is implemented and applied. The Department of Agriculture and Fisheries, Biosecurity Queensland website provides information on the pest distribution maps, biosecurity zones (for example fire ants), pest animals (including yellow crazy ants and electric ants), declared pest animals and plants and diseases, and notification and management measures. The Mareeba Shire Council regulates pest animals, plants and diseases through its Pest Management Plan 2015-2020.

Under the Biosecurity Act, the Declared Pest Classes in the LP Act have been replaced by Prohibited Matters and Restricted Matters. Prohibited Matters are diseases and non-native flora and fauna species that are not found in Queensland, though if it were to enter, would seriously impact society, including the economy and the environment. No Prohibited Matters were found in the project area during the field assessments (NRA 2017c). Restricted Matters are diseases or non-native flora and fauna species already found in Queensland that may result in adverse effects on a biosecurity consideration if conditions or restrictions under the Act were not imposed. There are seven categories of Restricted Matter and a species may fall under more than one category (NRA 2017c). The Restricted Matter Biosecurity Act categories are defined as follows:

- Category 1 & 2 – A person must report Category 1 Restricted Matter to an inspector or authorised person within 24 hours of becoming aware of its presence and must not take any action likely to exacerbate the biosecurity risk.
- Category 3 – A person who has Category 3 Restricted Matter in the person's possession or under the person's control must not distribute or dispose of the Restricted Matter unless the distribution or disposal meets the requirements of the Act.
- Category 4 – A person must not move, or cause or allow to be moved, Category 4 Restricted Matter, unless the moving is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.
- Category 5 – A person must not keep in the person's possession or under the person's control Category 5 Restricted Matter, unless the keeping is for the purposes of its identification by, or at the request of, a relevant entity as defined by the Act.
- Category 6 – A person must not give food to a Category 6 Restricted Matter unless the feeding is carried out in preparation for, or in the course of, lawfully baiting, trapping or shooting the Category 6 Restricted Matter.
- Category 7 – A person must kill Category 7 Restricted Matter in their possession and dispose of the carcass through appropriate methods.

Under the Biosecurity Act, landholders are required to comply with the general biosecurity obligation (GBO), which is defined as follows:

- Take all reasonable and practical steps to prevent or minimise each biosecurity risk.
- Minimise the likelihood of the risk causing a biosecurity event and limit the consequences of such an event.
- Prevent or minimise the adverse effects the risk could have and refrain from doing anything that might exacerbate the adverse effects.

The *Queensland Public Health Act 2005* aims to protect and promote the health of the Queensland public. Through cooperation between the State government, local governments, health care providers and the community, the Public Health Act provides the basic safeguards necessary to protect public health. The



Queensland Public Health Regulation 2005 supports the Public Health Act and includes specific measures for the control of designated pests, including mosquitoes, rats and mice.

This regulatory framework has been considered as part of the environmental impact assessment process.

16.2.2 Commonwealth

The *Environment Protection and Biodiversity Conservation Act 1999* regulates pest animals and plants and diseases. Threat abatement plans to manage pest animals such as feral cats, pigs, rabbits, cane toads, and the identification of weeds of national significance have been approved pursuant to the EPBC Act.

Shared responsibility between the States and the Commonwealth for biosecurity is outlined in the agreements and guidelines made under the Intergovernmental Agreement on Biosecurity 2012. Biosecurity includes pests and diseases which impact upon, for example, native flora and fauna and public health.

The Commonwealth Government's Australian Pest Animal Strategy 2017-2027 outlines the management and prevention tools to minimise the impacts of pests and diseases on the environment. The Strategy also outlines the responsibilities for landholders, the Commonwealth, State and Local governments.

The Wet Tropics Conservation Strategy (WTMA 2004) for the Wet Tropics World Heritage Area which adjoins the project site includes pest identification and management strategies. The strategy also addresses the importance of freehold and leasehold lands outside the Wet Tropics World Heritage Area to conservation of the Area.

This regulatory framework has been considered as part of the environmental impact assessment process.

The Department of Environment and Energy advised the Coordinator-General on 20 July 2016 that the project will be assessed by state assessment under a bilateral agreement between the Commonwealth and the State of Queensland. This Chapter will provide information to enable the assessment of the project in accordance with the requirements of the bilateral agreement.

16.3 Surveys

Field and desk-based assessments were undertaken to ascertain the potential and actual biosecurity matters relevant to the KUR-World project area. The results of the desk-based review informed the design of the field surveys and predictions regarding the presence or potential presence of flora and fauna values, inherent in which is the consideration and subsequent assessment of fauna and flora pests. The following are the primary information sources that were consulted.

For flora:

- Results from searches of the following databases:
 - EPBC Act Protected Matters Search Tool (DoEE 2017a). An EPBC Act Protected Matters Report was generated for the area within a 10 km radius of point -16.8306, 145.6032.
 - EHP Wildlife Online database (EHP 2017a). Report was generated for the area within a 10 km radius of point -16.8306, 145.6032.
 - Atlas of Living Australia search (ALA 2017). Review of specific species records and a database search within a 5 km radius of point -16.8306, 145.6032.
- Regional Ecosystem (RE) mapping (Version 8.0) (DNRM 2017a; Figure 5) and VM Act Regulated Vegetation mapping (DNRM 2017b).



- NC Act Protected Plants Flora Survey Trigger Maps (EHP 2016b).
- Detailed surface geology - Queensland (DNRM 2011).
- Matters of State Environmental Significance Environmental Report (EHP 2017b) for a 2 km search area radius around point -16.8306, 145.6032.
- Reports relevant to flora values of the project area: Astrebla (2015a-b); Hoskin (2016, 2017).
- Aerial imagery available via Google Earth and Queensland Globe, and QImagery.

The desk-based review identified a variety of vegetation communities across the project area. RE mapping (DNRM 2017a, Version 8.0), in conjunction with aerial imagery, was used to plan the field surveys. The intention was to visit all identifiable vegetation types within the study area. The field survey was conducted over multiple mobilisations. The initial survey was conducted between 18 and 22 January 2017 (early wet season). Following the surveys, the preliminary results were reviewed to identify data deficiencies. Follow up surveys occurred between May and September 2017 (early dry season). An inventory of plant species encountered during the course of field surveys was maintained. Full details of the field surveys and sources of reviewed data are provided in NRA (2017c: refer to Section 3.2).

For fauna:

- Results from searches of the following databases:
 - EPBC Act Protected Matters Search Tool (DoEE 2017a). An EPBC Act Protected Matters Report was generated for the area within a 10 km radius of point -16.8306, 145.6032.
 - EHP Wildlife Online database (EHP 2017a). Report was generated for the area within a 10 km radius of point -16.8306, 145.6032.
 - Atlas of Living Australia search (ALA 2017). Review of specific species records and a database search within a 5 km radius of point -16.8306, 145.6032.
- Regional Ecosystem (RE) mapping (Version 8.0) (DNRM 2017a) and Broad Vegetation Groups (BVG) mapping (Version 3) (DSITI 2016).
- Hoskin's (2016, 2017) reports on the presence of threatened frogs in the study area.
- Aerial imagery available via Google Earth and Queensland Globe, and QImagery.

Cognisant of the existing information reviewed, baseline fauna surveys were conducted in the early wet season and early dry season. The field fauna survey program involved two independent studies, as follows.

1. A baseline terrestrial vertebrate fauna survey (hereafter, 'baseline fauna survey') conducted in general accordance with the approach described in Eyre et al. (2014). The survey included targeted sampling for T/NT&M fauna species, with the exception of threatened frogs.
2. A specialised survey for threatened stream-dwelling frogs. Surveys for threatened frogs occurred over eight days in January 2016 (reported in Hoskin 2016) and over nine days between February and March 2017 (reported in Hoskin 2017).

The baseline fauna survey involved systematic sampling at formal survey sites, targeted sampling (using a subset of techniques) for specific species and/or at specific areas of interest, and continuous observation. As per advice contained in Eyre et al. (2014), surveys were timed to occur in the early wet and early dry seasons. The survey schedule is summarised below.

- Early wet season (EWS). The EWS survey occurred over five days in January 2017. A three-person team of ecologists was devoted to the task.



- Early dry season (EDS). The majority of the EDS survey work occurred over six days in May 2017. The survey team comprised four ecologists during the first and final day of the survey, and two ecologists for the remainder of the time. Additional acoustic bat detection/recording occurred in June 2017.

Full details of the field surveys for terrestrial fauna and sources of reviewed information are provided in NRA (2017c: refer to Section 3.3). Surveys for aquatic species were made (NRA 2017a).

16.4 Findings

16.4.1 Flora

16.4.1.1 Non-Native Flora Species (Weeds)

The weed species found within the project site are listed in Table 16-1. Forty-three (43) weed species were identified during field surveys conducted by NRA (2017c) (Table 16-1). This represents approximately 11% of all flora species recorded across the project area. This proportion of weeds is less than that documented for the Macalister Biogeographic Subregion (the subregion where the KUR-World project area is located) (of the plant species documented for the subregion, approximately 13% are weeds (EHP 2017)). The weeds recorded in the project area pose varying levels of threat in terms of their invasiveness, potential for spread and their potential to cause environmental, social and economic impacts. The status and relative threat posed by each species was assessed with reference to the below documents and the results are presented in Table 16-1.

- Weeds of National Significance (WoNS)
- *Queensland Biosecurity Act 2014*
- The Wet Tropics Management Plan 1998
- Mareeba Shire Council Local Area Pest Management Plan 2015 to 2020.

16.4.1.2 Weeds of National Significance

The Commonwealth Government maintains a list of 32 Weeds of National Significance (WoNS) (DoEE 2017c). An intergovernmental agreement between the Commonwealth government and the State and Territory governments has been established to manage WoNS through species-specific strategic plans. A National Management Group/Steering Committee oversees the implementation of the goals and actions of the WoNS strategic plans. State and Territory governments are responsible for implementing the plans and reporting progress to the Steering Committee.

Two WoNS were recorded during the field survey (Table 16-1); Cat's Claw Creeper and Lantana.

16.4.1.3 State Significant weeds under the biosecurity act 2004

In the project area, four Restricted Matter species were observed during the field survey (Table 16-1), all of which are Category 3 species: Cat's Claw Creeper, Lantana, African Tulip (*Spathodea campanulate*) and Singapore Daisy (*Sphagneticola trilobata*).

16.4.1.4 Locally and Regionally significant weeds

Local and regional pest management documents provide a resource for determining the significance of weed species at local scales. Relevant to the project area are the Mareeba Shire Council Pest Management Plan (2015-2020) (hereafter MSC PMP) (MSC undated) and the Queensland Wet Tropics Management Plan 1998 (hereafter WTMP). The MSC PMP is applicable to the Mareeba Shire Council Local Government Area and lists weeds that are notifiable if found, that are under active surveillance and control, and that are environmental weeds. The WTMP is applicable to the Wet Tropics World Heritage Area though is relevant to the entire Wet Tropics Bioregion. Schedule 2 of the WTMP lists 'undesirable plants'.



For the project area, the following weed species recorded during the field survey are locally and regionally significant.

- MSC PMP. Lantana is listed as a 'Priority Plant for Impact Reduction' (Table 16-1).
- WTMP. Twelve (12) weed species found in the project area during the field survey are listed as 'Undesirable Plants' under Schedule 2 of the WTMP (Table 16-1). These are: African Tulip, Common Bamboo (*Bambusa vulgaris*), Common Centro (*Centrosema mole*), Arabica Coffee (*Coffea Arabica*), Sky Flower, Lantana, Guinea Grass (*Megathyrsus maximus*), Molasses Grass (*Melinis minutiflora*), Stinking Passionflower (*Passiflora foetida*), Caribbean Pine (*Pinus caribaea*), Guava (*Psidium guajava*) and Singapore Daisy.



Table 16-1: Weed species recorded on the KUR-World project area

Scientific Name	Common name	Status ^A			Occurrence		Comments
		Biosecurity Act 2014	WoNS	WTMP Undesirable Plant	Localised or Widespread	Abundant or Sparse	
<i>Ageratum conyzoides</i>	Billygoat Weed	-	-	-	Widespread	Abundant	Mostly observed in pasture areas and forest fringes.
<i>Ageratum houstonianum</i>	Blue Billygoat Weed	-	-	-	Widespread	Abundant	Mostly observed in pasture areas and forest fringes.
<i>Ardisia crenata</i> ^B	Coral Berry	-	-	-	Localised	Sparse	
<i>Bambusa vulgaris</i>	Common Bamboo	-	-	Yes	Localised	Sparse	Observed at the edge of riparian forest adjacent to produce gardens.
<i>Bidens Pilosa</i>	Cobbler's Pegs	-	-	-	Localised	Sparse	Mostly observed in pasture areas and forest fringes.
<i>Brachiaria decumbens</i>	Signal Grass	-	-	-	Widespread	Abundant	Mostly observed in pasture areas.
<i>Centrosema mole</i>	Common Centro	-	-	Yes	Localised	Sparse	Forest edges and some pasture areas.
<i>Citrus x jambhiri</i>	Lemon	-	-	-	Localised	Sparse	
<i>Coffea arabica</i>	Arabica Coffee	-	-	Yes	Localised	Sparse	Mostly observed in forested areas.
<i>Crassocephalum crepidioides</i>	Redflower Ragleaf	-	-	-	Widespread	Sparse	
<i>Crotalaria pallida</i>	Rattlepod	-	-	-	Localised	Sparse	
<i>Delonix regia</i>	Poinciana	-	-	-	Localised	Sparse	Near the homestead.
<i>Desmodium tortuosum</i>	Beggarweed	-	-	-	Localised	Sparse	
<i>Dolichandra unguis-cati</i> ^B	Cat's Claw Creeper	Category 3	Yes	-	Localised	Abundant	Single large infestation found on outer edge of riparian area south-west of the homestead.
<i>Duranta erecta</i>	Sky Flower	-	-	Yes	Widespread	Abundant	Mostly observed in regrowth forest. Has formed large thickets within regrowth vegetation

Scientific Name	Common name	Status ^A			Occurrence		Comments
		Biosecurity Act 2014	WoNS	WTMP Undesirable Plant	Localised or Widespread	Abundant or Sparse	
							adjacent to creeks and gullies in the northern portion of the site.
<i>Hyptis capitata</i> ^B	Buttonweed	-	-	-	Widespread	Abundant	
<i>Lantana camara</i>	Lantana	Category 3	Yes	Yes	Widespread	Abundant	Mostly observed in forested areas. Found within woodlands in the southern portion of the site and in disturbed areas within vine forest regrowth. Listed in MSC PMP as a 'Priority Plant for Impact Reduction'.
<i>Macroptilium atropurpureum</i>	Siratro	-	-	-	Widespread	Sparse	
<i>Mangifera indica</i>	Mango	-	-	-	Widespread	Sparse	
<i>Megathyrsus maximus</i> ^B	Guinea Grass	-	-	Yes	Widespread	Abundant	Mostly near streams and gullies where there has been previous disturbance.
<i>Melinis minutiflora</i>	Molassus grass	-	-	Yes	Widespread	Sparse	
<i>Melinis repens</i>		-	-	-	Widespread	Sparse	
<i>Mimosa pudica</i>	Sensitive Weed	-	-	-	Widespread	Abundant	Mostly observed in pasture areas.
<i>Passiflora foetida</i>	Stinking Passionflower	-	-	Yes	Widespread	Sparse	
<i>Pinus caribaea</i>	Caribbean Pine	-	-	Yes	Localised	Abundant	Patches occur in the southern portion of the project area.
<i>Polygala paniculate</i>	Island Snake-root	-	-	-	Widespread	Abundant	Mostly observed in pasture areas and present in forested areas.
<i>Psidium cattleianum</i>	Cherry Guava	-	-	-	Widespread	Sparse	
<i>Psidium guajava</i>	Guava	-	-	Yes	Widespread	Sparse	

Scientific Name	Common name	Status ^A			Occurrence		Comments
		Biosecurity Act 2014	WoNS	WTMP Undesirable Plant	Localised or Widespread	Abundant or Sparse	
<i>Rubus alceifolius</i> ^B	Giant Bramble	-	-	-	Widespread	Abundant	Mostly observed in pasture areas and present in forested areas. Has formed dense thickets within regrowth vegetation adjacent to creeks and gullies in the northern portion of the site.
<i>Selaginella kraussiana</i>	African Clubmoss	-	-	-	Localised	Sparse	
<i>Senna septemtrionalis</i>	Smooth Senna	-	-	-	Localised	Sparse	
<i>Sida rhombifolia</i>	Common Sida	-	-	-	Widespread	Sparse	
<i>Solanum mauritianum</i> ^B	Wild tobacco	-	-	-	Widespread	Sparse	Mostly observed in pasture areas but also present in forest.
<i>Solanum torvum</i>	Devil's Fig	-	-	-	Widespread	Abundant	Present along forest edges and in pasture areas.
<i>Spathodea campanulate</i>	African Tulip	Category 3		Yes	Localised	Sparse	Two trees observed in pasture areas.
<i>Spermacoce alata</i>	Borreria	-	-	-	Widespread	Sparse	
<i>Spermacoce remota</i>	Woodland False Buttonweed	-	-	-	Widespread	Sparse	
<i>Sphagneticola trilobata</i>	Singapore Daisy	Category 3		Yes	Localised	Abundant	An area of Singapore Daisy was detected within a clearing adjacent to the southern boundary of the project area.
<i>Stachytarpheta jamaicensis</i> ^B	Snakeweed	-	-	-	Widespread	Abundant	Mostly observed in pasture areas and forest fringes.
<i>Stylosanthes scabra</i>	Shrubby Stylo	-	-	-	Widespread	Abundant	Mostly observed in pasture areas
<i>Syagrus romanzoffiana</i>	Queen Palm	-	-	-	Localised	Sparse	
<i>Triumfetta rhomboidea</i>	Chinese Burr	-	-	-	Widespread	Sparse	Mostly observed in pasture areas.

Scientific Name	Common name	Status ^A			Occurrence		Comments
		Biosecurity Act 2014	WoNS	WTMP Undesirable Plant	Localised or Widespread	Abundant or Sparse	
<i>Urena lobate</i>	Pink Burr	-	-	-	Widespread	Sparse	Mostly observed in pasture areas.

A: Status according to the Queensland *Biosecurity Act* 2014, and species listed under the schedules for Weeds of National Significance (WoNS) and *Wet Tropics Management Plan 1998* (WTMP).

B: Undesirable Plant in the Proposed Amendment to Schedule 2 of the WTMP.

Note: Table 16-1 sourced from NRA 2017c .

16.4.2 Non-native fauna species (pests)

Feral Pig and Cane Toad were the only non-native fauna species recorded during the field assessments (NRA 2017c). Neither species was noticeably abundant. Feral Pigs are listed as Categories 3, 4 and 6 *Restricted Matter* under the Biosecurity Act. Cane Toads are recognised as ‘invasive biosecurity matter’ though are not listed as *Restricted Matter*.

Dogs were recorded on the project area; however, it was not possible to confirm if they were wild Domestic Dogs (*Canis lupus familiaris*), Dingo (*Canis lupus dingo*) and/or hybrids. A pack of approximately six wild dogs (resembling dingoes in appearance) was recorded during the 2017 field survey (NRA 2017c). One dog had a collar, which suggests it is/was domesticated. All dogs were tan coloured, except for one brindled dog, and superficially resembled Dingoes (NRA 2017c). Dingoes are regarded as native fauna species under the Queensland *Nature Conservation Act 1992*. Wild Domestic Dogs are listed in Categories 3, 4 and 6 *Restricted Matter* under the Biosecurity Act, and Dingoes are listed in Categories 3, 4, 5 and 6 *Restricted Matter*.

16.4.3 Aquatic fauna species

Three non-native fish species were identified during the field assessments - Guppies (*Poecilia reticulata*), Platys (*Xiphophorus maculatus*) and Swordtails (*Xiphophorus hellerii*) (refer to Appendix F in NRA 2017a). Guppies were the only abundant and widespread non-native fish, with only one (1) Platy and two (2) Swordtails collected (refer to Appendix F in NRA 2017a). These small-bodied fishes have likely been introduced to the project area (and the wider Barron River Catchment) from a combination of discards from private aquariums and deliberate stockings into farm dams and ornamental ponds (refer to Appendix F in NRA 2017a).

16.4.4 Other biosecurity risks

During the field assessments, no other biosecurity issues were identified at the project site. The other biosecurity issues identified for the local area are listed below.

16.4.4.1 Tramp Ants

Two species of “Tramp Ants”¹, Yellow Crazy Ants and Electric Ants, are of particular concern due to their current and former presence in the Kuranda area and the threat they pose to the human population and natural environment (NRA 2017c).

The Yellow Crazy Ant is listed as Category 3 *Restricted Matter* under the Biosecurity Act. In 2013, a Yellow Crazy Ant infestation was found in the Russett Park area near Myola and is now established over approximately 27 hectares (WTMA 2017a). Russett Park is approximately 1.5 kilometres north of the project area on the northern side of the Barron River. The Yellow Crazy Ant Eradication Programme is currently in its 2nd year of implementation (NRA 2017c).

Electric Ants are listed in Category 1 *Restricted Matter* under the Biosecurity Act. An Electric Ant infestation was found in Kuranda in 2011. The Queensland Department of Agriculture and Fisheries has implemented a treatment programme. Kuranda continues to be a high risk area, with plant swapping thought to be a major cause of the spread of the species (DAF 2014). Electric Ant Biosecurity zones have been declared by the Queensland Government to restrict the movement of materials that could carry electric ants. Biosecurity Zone Kuranda 1, which includes properties on Barnwell Road, Monaro Close and High Chaparral Road plus

¹ A group of invasive ant species with dispersal methods linked to human movement and transport pathways (common names of significant tramp ant species in Australia are Red imported fire ant, Yellow crazy ant, African big-headed ant or coastal brown ant, Argentine ant, Electric ant or little fire ant, Tropical fire ant (DAWR 2017)).



areas along the southern banks of the Barron River, is within 300 metres of the project area boundary (NRA 2017c).

16.4.4.2 Domestic cats & dogs

Domestic Cats (*Felis catus*) and Dogs are present in the areas surrounding the KUR-World development, and could potentially occur on the project area. These Domestic Cats and Dogs have the potential to become feral, free-ranging or wild. Feral Cats are present in the Kuranda region (DNPRSR 2013) and free-ranging or wild Domestic Dogs were recorded in the project area (Section 16.4).

16.4.4.3 Asian Honey Bee

Asian Honey Bees (*Apis cerana*) were first detected in 2007 in Cairns and are now found from Cairns northern beaches, south to Innisfail and on the Atherton Tablelands. The KUR-World project area is within the Asian Honey Bee known infestation area (DAF 2016d).

16.4.4.4 Phytophthora

Phytophthora are soil-borne plant pathogens known to occur across extensive areas of rainforest in northern Queensland, including sites at Kuranda where *Phytophthora cinnamomi* was detected in soil (NRA 2017c). It is therefore likely to be present in the project area.

Dieback potentially attributable to Phytophthora was not observed within the KUR-World project area (NRA 2017c).

16.4.4.5 Myrtle Rust

Myrtle Rust (*Puccinia psidii*) is a disease caused by the non-native fungus *Puccinia psidii*. Myrtle Rust threatens trees and shrubs in the Myrtaceae family of plants, which includes Australian natives such as *Melaleuca* spp., *Eucalyptus* spp., *Angophora* spp. and *Corymbia* spp. It is established along the east coast of Australia from southern New South Wales to far north Queensland with impacts recorded across a range of ecosystems (DoEE 2017b). It was detected in Cairns in 2011, and is likely to be present in the Kuranda region and on the project area.

Dieback potentially attributable to Myrtle Rust was not observed within the KUR-World project area (NRA 2017c).

16.4.4.6 Chytrid Fungus

Eight species of Wet Tropics stream-dwelling frogs have experienced population declines, some associated with an infectious disease of amphibians (*chytridiomycosis*) caused by the fungus *Batrachochytrium dendrobatidis* (Chytrid Fungus) (Woodhams & Alford 2005). All declines have occurred at sites above 400 metres elevation, but the Chytrid Fungus has never been shown to cause population declines at sites below 400 metres (Alford 2010) (that is the streams in the KUR-World project area). Chytrid Fungus is present across the entire Wet Tropics region (Alford 2010), and therefore is likely to be present in the Kuranda region and on the project area. The risk posed by the Chytrid Fungus to frogs on the project area is reduced as all streams within the project area are lower than 400 metres elevation (NRA 2017c).

16.5 Potential Impacts

The following discussion is informed by Chapter 8 (Flora and Fauna) and the associated technical report (NRA 2017c) which is included as Appendix 5 in the EIS. The topic is complicated on account of apparent contradictions, for example, weeds may provide habitat for native fauna; measures taken to manage pest species, for example, wild dogs, may result in domestic cats and dogs encroaching into the vacated area.



16.5.1 Existing (pre-construction)

16.5.1.1 Non-Native Flora Species (Weeds)

As identified in NRA (2017c), the dominant weed species in the project area are Lantana, Giant Bramble and Sky Flower. These species are found largely in the forested habitats (approximately 86% of the project area). While these weed occurrences detract from habitat integrity, their presence is likely to benefit, or have a net-neutral effect, on some fauna species. Most other occurrences of weed species pose a minor threat to forested habitats, with the exception of Cat's Claw Creeper. A single infestation of Cat's Claw Creeper was found on the project area and, if left uncontrolled, it has the potential to spread and pose a serious threat to forest areas (NRA 2017c).

A description of Lantana, Giant Bramble, Sky Flower and Cat's Claw Creeper is provided below:

- Lantana is listed as a WoNS, a Category 3 Restricted Matter species under the Biosecurity Act and an 'Undesirable Plant' under the WTMP. Lantana is the only weed species found in the project area that is listed as a 'Priority Plant for Impact Reduction' in the MSC PMP (NRA 2017c). Lantana is a heavily branched shrub that grows in clumps, thickets or vines. It can smother native vegetation and form impenetrable stands; some varieties are also poisonous to livestock. Lantana is spread mostly by people and fruit-eating birds (Queensland Government 2016a).
- Giant Bramble is a vigorous, scrambling, perennial shrub capable of smothering other plants and forming dense thickets. It readily invades wet gullies, creekbanks, the perimeter of rainforest, pastures and roads, tracks and other clearings (Department of Natural Resources and Mines 2001). The weed is typically spread by fruit-eating birds. Localised spread and an increase in density occurs when canes (stems) take root and produce daughter plants (DAF 2016a).
- Sky Flower is listed as an 'Undesirable Plant' under the WTMP, and invades disturbed areas of native vegetation and road embankments. Sky Flower is a shrub or small tree up to 7 m tall with spiny and drooping branches, and is spread over long distances by birds and the dumping of garden waste (Queensland Government 2016b).
- Cat's Claw Creeper is listed as a WoNS, a Category 3 Restricted Matter species under the Biosecurity Act and an 'Undesirable Plant' under the WTMP (NRA 2017c). Cat's Claw Creeper is a large woody vine that climbs and creeps aggressively. It smothers native vegetation, including growing up over trees, and changes soil chemistry. Cat's Claw Creeper is spread by water and wind, with its tuberous roots also spread during floods and by humans (Queensland Government 2016c).

Aquatic weed species have the potential to occur in the project area, particularly in dams/waterbodies. Aquatic weed species often flourish when introduced, can exclude native flora species and reduce the quality of habitat for native fauna species. Aquatic weeds can be spread by flooding events moving plants to other waterways, the emptying of aquariums and ponds, and intentional introduction (EHP 2011).

16.5.1.2 Non-Native Fauna Species

The non-native fauna species, identified in Section 16.3, may potentially impact the native flora and fauna species present in the project area and the broader region.

Feral Pigs are present in the project area, though they are not noticeably abundant (NRA 2017c). The activities of Feral Pigs were evident in some areas of the project (that is digging and wallowing holes in riparian areas), and have the potential to decrease surface soil stability and contribute sediment (and associated contaminants) to the aquatic receiving environment (NRA 2017c). Feral Pigs could also possibly cause the secondary spread of *Phytophthora* in the project area (NRA 2017c).



The presence of Cane Toads in the project area, while not noticeably abundant, is of importance given that the Northern Quoll (*Dasyurus hallucatus*) may occur in the project area (NRA 2017c). The Northern Quoll, listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999*, is especially vulnerable to being poisoned by Cane Toads (DoEE 2017a).

The impacts of Wild Dogs and free-ranging Domestic Dogs on the local biota in the project area is difficult to predict. Dogs can have net-negative, net-positive or net-neutral effects depending on the species in question. While Wild Dogs may hunt small and medium sized animals, their presence may also suppress or alter the activities of other predators (that is Feral Cats). Wild Dogs also pose a threat to the Southern Cassowary (*Casuarius johnsonii*) and have probably contributed to their local demise. The presence of Wild Dog packs in the project area could be hampering the recolonization of the project area by the Southern Cassowary (NRA 2017c).

Wild Dogs are also likely to harass or kill Domestic Cats and Dogs that venture out of the urban space of the project area. The culling or suppression of the Wild Dog population in the project area may allow Domestic Cats and Dogs to encroach into the vacated space (NRA 2017c).

16.5.1.3 Aquatic Fauna Species

In the project area, non-native fish species have the potential to outnumber native fish populations and dominate aquatic communities, and can survive a broader range of environmental conditions than native fish (DAF 2017). Guppies, Platys and Swordtails are present in the project area, and there is potential for other non-native fish species to be introduced into the project area. These include Tilapia (*Tilapia mariae* and *Oreochromis mossambicus*) and Gambusia (*Gambusia* spp.). These species have established breeding populations in Northern Queensland with Tilapia present in Cairns and the Atherton Tablelands, and occurrence records of Eastern Gambusia (*Gambusia holbrooki*) in the region (ALA 2017). Tilapia and Eastern Gambusia are listed as Categories 3, 5, 6 and 7 *Restricted Matter* under the Biosecurity Act.

Native aquatic fauna species can have adverse impacts on the local environment if they are introduced to areas outside of their natural range. For example, Redclaw Crayfish (*Cherax quadricarinatus*) have been extensively stocked and translocated in far north Queensland, which is outside their natural range of the Gulf of Carpentaria and north-eastern Cape York (DAF 2010). Redclaw Crayfish are established in Tinaroo Dam on the Atherton Tablelands (DAF 2010) and have been recorded in other nearby waterways (ALA 2017). Redclaw Crayfish could potentially occur in the project area, with the introduction of this species to areas outside its natural range likely to have adverse consequences on native crustacean species and aquatic plants (WTMA 2004).

Non-native fish species, and other aquatic species, are introduced to waterways when they are intentionally or unintentionally dumped by members of the public into waterways (particularly unwanted aquarium fish), are introduced as sportfish, used as live bait or stocked in dams and ponds that overflow into other waterways (DAF 2016c).

Aquatic fauna species introduced to the project area have the potential to impact on native fauna species (aquatic and terrestrial) and the local environment. Non-native fish species can have negative impacts on aquatic communities through grazing or predation, interference competition (overcrowding) for food and space, as a vector of disease-causing pathogens, or by activities that lead to changes in the abiotic environment (for example loss of water quality, which may affect survivorship of native species) (Webb & Maughan 2007). Non-native fish species could potentially impact on native frog species in the project area through predation on eggs and larvae (DAF 2016c).



16.5.2 Other biosecurity risks

16.5.2.1 Tramp Ants

The project area is a high-risk area for invasions, with the Yellow Crazy Ant and Electric Ant occurring in the region. Tramp Ants can have severe impacts on a range of ecological processes and lead to significant loss of biodiversity, as well as have the potential to severely impact human health and social amenity (NRA 2017c, DAWR 2017a). The potential impacts of the Yellow Crazy and Electric Ant are outlined in Table 16-2.

Table 16-2: Potential impacts of Yellow Crazy Ant and the Electric Ant

Yellow Crazy Ant ¹	Electric Ant ²
Disrupts natural species, including native birds, animals and plants. Protects sap-sucking insects such as scale and mealy bugs. Can affect horticulture industries. Sprays formic acid, which may cause burning and irritate skin and eyes of animals and potentially humans.	Out-competes other ant species. Causes declines in numbers of invertebrates and small vertebrates. Inflicts painful stings on humans that cause painful, itchy, persistent pimples and, occasionally, severe allergic reactions. May sting, and possibly blind, domestic pets. May invade insides of houses. Dense infestations may leave backyards or pools unusable.

¹ Sourced from Queensland Government (2016d).

² Sourced from Queensland Government (2016e).

Electric Ants are carried in soil, potted plants, cuttings and fruit from plants, turf, mulch, baled hay or straw, animal manure and composted material. The ants can also be carried in any objects that come into contact with the ground (for example pot plants, garden furniture) and any material that is a product of quarrying (Queensland Government 2017). All of these potential methods to spread Electric Ants pose a risk to the environmental values of the site.

16.5.2.2 Domestic Cats and dogs

Domestic Cats and Dogs pose a threat to a variety of native fauna species, both directly via predation, and indirectly via competition, behavioural exclusion and as vectors for disease. Their impacts are usually most intense within the urban space where they live; however, the area of potential impact increases when they are permitted (deliberately and/or inadvertently) to roam outside of the urban space (becoming free-ranging or feral) (NRA 2017c).

16.5.2.3 Asian Honey Bees

Asian Honey Bees may compete with managed European Honey Bees for floral resources and steal honey from managed hives, possibly causing hives to die from starvation. Asian Honey Bees are also a natural host for Varroa Mites (*Varroa Jakobson*) and other pests and diseases. They are a major threat to Australia's honey bee industry (WTMA 2017a).

16.5.2.4 Phytophthora

Phytophthora cinnamomi and other species of *Phytophthora* are responsible for economic losses amounting to tens of millions of dollars annually in forestry, horticultural and agricultural activities. In natural ecosystems, these species pose a serious threat to the conservation of native flora species by



attacking healthy plant tissue and causing a subsequent physiological disruption of vascular activity. In susceptible plant species, infection may quickly result in dieback of foliage and eventual death (NRA 2017c). *Phytophthora cinnamomi* is often difficult to detect and its impact may be significant before it is detected. The disease is spread by any activity that moves soil, water and organic matter – this includes soil on tools, footwear and vehicles. Logging and road construction has also been implicated in infestations and patch deaths with possibly secondary spread by Feral Pigs (Gadek 1998).

16.5.2.5 Myrtle Rust

Myrtle Rust can cause deformed leaves, heavy defoliation of branches, reduced fertility, dieback, stunted growth, and plant death in native Australian trees and shrubs. The disease is spread via spores on contaminated clothing, hair, skin and personal items, infected plant material and equipment, as well as by insect/animal movement and wind dispersal. These characteristics make it extremely difficult to control and impossible to eradicate from natural settings (NRA 2017c).

16.5.2.6 Chytrid Fungus

Chytrid Fungus causes the infectious amphibian disease *Chytridiomycosis*. Spores of the Chytrid Fungus are transported via water and wet soil, with wet or muddy footwear, tools or equipment potentially contributing to the spread of the disease, as well as non-native and native fauna species (WTMA 2017b).

16.5.3 Project related

The project has the potential to result in a range of direct and indirect threats to the flora and fauna values; their impacts may extend beyond the development footprint and throughout the operational life of the project. These values have been evaluated and reported on in Chapter 8 (Flora and Fauna) based on information in the technical report (NRA 2017c) and the following is a summary.

The proposed development poses a direct threat and a range of indirect threats to flora and fauna values. Direct threats, in the form of authorised vegetation clearing, will be most pronounced during the construction phase. Direct loss of habitat (and subsequent displacement of wildlife), and direct mortality or harm during works. With respect to habitat loss, it is the loss of core, limiting, or critical habitat that poses the greatest direct threat.

Indirect threats refer to those secondary threats that may occur as a result of the development. The project development, during construction and operation, has the potential to result in new biosecurity incursions and/or contribute to the spread of existing infestations. Reduced habitat quality is a potential consequence of both scenarios. For example, during the construction and operation phases of the KUR-World project, the spread of the Yellow Crazy Ant and the Electric Ant from known/unknown infestations to the project area is of great concern. Yellow Crazy Ants can be spread through soil and produce from the agriculture and horticultural industry, in sea and air freight on timber, goods, packaging material and pallets and in contaminated commercial road transport. Distribution of timber, timber products and other construction materials is the most common way to spread Yellow Crazy Ants (Queensland Government 2016d). Other examples are (a) increased number of cats and dogs and subsequent incidence of attacks on native wildlife, and/or alteration of natural behaviours of native wildlife due to the presence of cats and dogs; (b) increased chance of wildlife colliding with vehicles; (c) sedimentation and contamination of the aquatic receiving environment poses a threat to a wide variety fauna; (d) pesticides and chemicals may be employed for the control of pest and nuisance species (pesticides and certain chemicals have the potential to impact native wildlife when the substance is consumed); (e) artificial lighting in urban environments, particularly when it is applied extensively and intensively, can alter the physiology and behaviour of many fauna species.



16.6 Mitigation and Management

The KUR-World project provides the opportunity to develop a range of management and mitigation measures with a focus on protecting conservation values rather than agricultural objectives to control non-native flora and fauna species. An environmental monitoring and management plan (EMP) has been prepared to provide strategies to manage and monitor issues, identified in the course of the EIS process, during the construction and operation phase. The aim of the EMP is to present and describe the objectives, actions, strategies and responsibilities (based on best practice) to be carried out during the project's lifetime and to mitigate potential negative impacts. The EMP is included as a separate Chapter in the EIS.

One of the issues requiring focus is biosecurity. A project-specific Biosecurity Management Plan (for construction and operation phases) will be developed. The plan will aim to ensure the spread of non-native flora and fauna species is minimised, and that existing non-native flora and fauna species are controlled. The plan will be developed by a suitably qualified person and consider project-related threats, local/regional threats and all values of the receiving environment.

16.6.1 Non-native flora species

The KUR-World project has the potential to spread weeds already established on the project area, and to introduce new weeds (including aquatic weeds) to the project area during the construction and operation phases. The importation and movement of people, plant material, machinery and goods into and around the project area, particularly during the construction phase, presents an opportunity for weed spread and/or introduction. A project-specific Weed Management Plan will be developed. The abundance or extent of weed species in the project area was recorded in NRA (2017c) and this will inform the Weed Management Plan, and act as the basis for the approach of the Weed Management Plan.

The following measures are proposed for the management of weeds in the project area:

- The dominant weed species (that is Lantana, Sky Flower and Giant Bramble) and weeds that pose the greatest environmental and economic threat (that is listed weeds) will be controlled.
- The existing infestation of Cat's Claw Creeper will be destroyed, and a programme to monitor the re-emergence or recovery of the species implemented. The weed will be re-treated, when required, to ensure eradication (NRA 2017c).
- Outlying individuals or populations of widespread and abundant weed species that are located along roads and drainages, and in locations where they are likely to be spread by construction and operation activities will be controlled. It may not be possible or feasible to eradicate these weed species from the project area due to their extent in the project area and abundance in neighbouring areas, but their spread can be managed.
- A weed management database to manage weed species, analyse results and report on outcomes will be designed. The database will include location, weed type, treatment type, chemical product (application details, that is rate, mode of application), date of treatment, man hours required, estimated cost and efficacy.
- Preventative methods to stop the introduction of new weeds to the project area will be implemented. For example, a wash-down facility will be constructed at the main site access point for construction vehicles, plant and machinery arriving and departing from the project area. These facilities will be designed to minimise the risk of weed spread (that is appropriate drainage, bunding). High risk personnel (that is personnel working outdoors traversing natural or disturbed environments) should also clean their boots and/or clothing prior to entry to the project area.



- Construction Environmental Management Plans will include provisions for routine monitoring of weed presence in and around work areas.
- Annual weed surveys will occur across the project area and be conducted by a suitably qualified person. The monitoring of non-native aquatic weed species will also be conducted during the annual weed surveys, with a focus on dams/waterbodies and areas identified as threatened frog habitat in the project area.
- Annual weed control planning and budgeting to ensure that weed management is undertaken in the most efficient and effective way should be undertaken.
- Weed control priorities will be reviewed annually, with changes to on-site weed occurrences (based on field surveys) and weed species status taken into account.
- During the operational phase of KUR-World, members of the public will be informed about reducing the risks of spreading aquatic weeds (that is correct disposal of aquarium plants).

16.6.2 Non-native fauna species

A project-specific Pest Management Plan will be developed to manage the existing non-native fauna species recorded on the project area and mitigate the other biosecurity risks identified during the desk-based review (NRA 2017c).

The KUR-World project should not increase the Feral Pig population nor facilitate the spread of Feral Pigs across the project area. Feral Pigs will be monitored and managed to reduce numbers. Access to creeks, for Feral Pigs, will be limited across the project area. The suitable control methods for managing Feral Pigs in the project area are identified as trapping and exclusion fencing (DAF 2016b). Cane Toads are recognised as an '*invasive biosecurity matter*' though are not listed as a *Prohibited* or *Restricted Matter* under the Biosecurity Act and are not managed under the MSC PMP. Monitoring and management actions for Cane Toads will be included in the Pest Management Plan.

The monitoring and management of Wild Dogs (that is whether control is needed and in what form) in the project area should be dictated by the specific values that require protection or enhancement. For example, one of the primary values of the proposed 'Environmental Area' is that it is potential Southern Cassowary habitat, and a potential corridor for the species' movement. Wild Dogs pose a threat to this value and on this basis Wild Dog control is recommended. Control programmes will follow best practice², particularly in regard to animal welfare considerations and risks associated with non-target impacts. The management of Wild Dogs will be reviewed during the preparation of the management plan for the 'Environmental Area'.

Domestic Dogs and Cats will be monitored and managed under the Pest Management Plan as they pose a threat to most native fauna species, particularly when the dogs and cats are feral or free-ranging. As per the recommendation provided by NRA (2017c), in the project area, cat ownership will be prohibited and dog ownership limited to small breeds or certified assistance dogs. Rules regarding pet ownership are to be developed, monitored and enforced (NRA 2017c).

Feral Cats, and wild Domestic Dogs, will be monitored and managed under the Pest Management Plan. A programme will be developed to monitor numbers of Feral Cats and wild Domestic Dogs in the project area and will include appropriate control measures.

² For example, the 'Model code of practice for the humane control of wild Dogs' [Available at: <https://www.pestsmart.org.au/model-code-of-practice-for-the-humane-control-of-wild-Dogs/>]



The use of toxic baits to control feral vertebrate fauna species such as Feral Pigs and Wild Dogs in the project area is discouraged. Toxic baits should only be considered if the potential for non-target impacts on native fauna species has been assessed by a suitably qualified person and if strategies to negate non-target impacts are available and implemented. For example, toxic baiting of Wild Dogs (if deemed necessary) may pose a threat to Northern Quolls, and the use of rodenticides can result in secondary poisoning (that is kill or harm) of higher order predators (for example Masked Owl) (NRA 2017c).

16.6.3 Aquatic fauna species

Aquatic fauna species (native and non-native) will be monitored and managed under the Pest Management Plan. The eradication of non-native fish species is rarely possible and therefore management efforts will focus on preventative measures, with contingencies in place for any potential incursions. If incursions are detected, non-native fish populations should be controlled with the aim to prevent further spread and minimise impacts. The following measures are proposed for the mitigation and management of non-native aquatic species in the project area.

- Laws relating to non-native fish species will be followed during the KUR-World development construction and operation phases. For example, under the *Fisheries Act 1994*, it is an offence to stock waterways and dams with fish that do not occur naturally in that area without a permit.
- A monitoring programme for non-native aquatic species will be implemented, and management measures to control non-native aquatic species developed. These management measures will include control methods for the current non-native fish population present in the project area.
- Members of the public will be informed about identifying non-native fish species, alternatives to ornamental fish for aquariums, preventing accidental escapes of fish and correct dumping of unwanted fish. Recreational fishers will also be educated about minimising the transfer of fish between waterways, and how to identify and dispose of non-native fish.

16.6.4 Other biosecurity risks

Yellow Crazy Ants and Electric Ants are of particular concern to the project area due to their current and former presence in the Kuranda area, and the threat they pose to the human population and natural environment. The following measures are proposed for the mitigation and management of Tramp Ants in the project area:

- Material brought to the project area during construction will be required to have written certification of being free of Tramp Ants.
- Areas of Kuranda, Cairns and the surrounding regions have been declared Electric Ant biosecurity zones. There are no declared Electric Ant biosecurity zones within the KUR-World development. The project should attempt to source materials outside of these biosecurity zones. The movement of any material defined as Electric Ant 'carriers' from properties and businesses within the Electric Ant biosecurity zones is required to have a biosecurity instrument permit.
- During construction, regular surveys for Tramp Ants will be conducted in the project area, with visual inspections, baiting and sniffer dogs used. Food lures and traps can be used to detect Electric Ant infestations and the regular checking of materials that could potentially harbour Yellow Crazy Ants can aid in early detection.
- A quick response procedure will be developed to guide operators in what actions to take if Tramp Ants are detected. The procedure will ensure a timely response and will outline actions such as immediately quarantining the area and eradicating the ants through baiting or spraying. Detection of Tramp Ants should be reported to Biosecurity Queensland immediately.



- During the operational phase of KUR-World, members of the public will be informed about reducing the risks of introducing tramp ants (and other pests), together with their obligations, such as the reporting of incursions.
- The other potential biosecurity risks identified for the project area – Asian Honey Bees, Myrtle Rust, Phytophthora and Chytrid Fungus – will be managed firstly through preventative measures with contingencies in place for any potential incursions. The following measures are proposed for the management of these potential biosecurity risks in the project area:
 - Preventative methods to stop the introduction/spread of Asian Honey Bees, Myrtle Rust, Phytophthora and Chytrid Fungus to the project area will be implemented. For example, any tools, vehicles or machinery entering the project area during construction should go through the wash-down facility. High risk personnel (that is personnel working outdoors traversing natural or disturbed environments during construction) should clean their boots and/or clothing prior to entry to the project area.
 - A monitoring programme for Asian Honey Bees will be implemented, and a procedure detailing the control and eradication of Asian Honey Bees developed. Any new incursions of the Asian Honey Bee should be reported to Biosecurity Queensland immediately.
 - During the construction period, the project area should be monitored annually (at a minimum) for plant dieback caused by Myrtle Rust and Phytophthora.
 - Myrtle Rust threatens trees and shrubs in the Myrtaceae family of plants. Any Myrtaceae plants brought to site during construction will be checked for Myrtle Rust, and Myrtaceae nursery stock should be certified by the nursery prior to release.
 - The Chytrid Fungus is likely to be present in the project area, and therefore the handling of native frogs should be avoided unless necessary. Hygiene and handling protocols will be developed for instances where native frogs need to be handled (for example during pre-clearing surveys) to avoid the transmission of infection.

16.7 Conclusions

Field and desk-based assessments were undertaken to ascertain the potential and actual biosecurity matters relevant to the KUR-World project area. Existent weed and pest species pose varying levels of threat in terms of their invasiveness, potential for spread and their potential to cause environmental, social and economic impacts. The dominant non-native flora species in the project area were Lantana, Giant Bramble and Sky Flower. A single infestation of Cat's Claw Creeper was found on the project area and, if left uncontrolled, it has the potential to spread and dominate the forest areas. The non-native fauna species recorded on the project area were Feral Pigs, Cane Toads and Dogs. Three non-native fish species were recorded on the project area. Other biosecurity risks are present in the region, including Yellow Crazy Ants and Electric Ants. Feral Pigs, Cane Toads and Dogs are not noticeably abundant in the project area. The impacts of these species vary but are currently small-scale due to their low abundance. The non-native fish species present in the project area and the other biosecurity risks present in the region (that is Tramp Ants) have the potential to impact the project area.

The project has the potential to impact on the flora and fauna values, weeds and pests being intrinsic to the consideration of values. Mitigation and management measures relevant to minimising the spread of non-native flora and fauna species, and controlling existing non-native flora and fauna species, have been identified herein. An environmental monitoring and management plan (EMP) (included as a separate Chapter in the EIS) has been prepared to provide strategies to manage and monitor issues, identified in the course of the EIS process, during the construction and operation phase. The aim of the EMP is to present



and describe the objectives, actions, strategies and responsibilities (based on best practice) to be carried out during the project's lifetime and to mitigate potential negative impacts.

The identified biosecurity issues prevail during the construction and operational stages of the project to varying extents. They are more readily managed and efficacy of management greater during the construction phase on account of the controls afforded to a construction site, for example, site access is restricted. Beyond the construction phase into operational phase during which site access is less restricted there is increased reliance on existing regulatory apparatus and mechanisms to manage and police biosecurity controls.

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