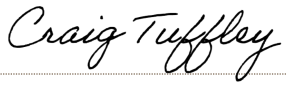
Hexham TSF Fauna and Flora Management Plan

8 August 2024

Plan Approval Table

Position	Name	Signature	Date
Regional Maintenance Manager	Craig Tuffley		09/08/2024

Revision History

Rev	Date	Author	Comments
1	20/02/15	Heath Anderson	DPE Approved
2	18/02/16	Heath Anderson	DIL and WWTP consistency
3	11/10/17	Heath Anderson	S1 Draft for review (third party)
4	20/05/19	Harry Egan	Update following completion of 2018 IEA
5	19/05/20	Harry Egan	Inclusion of turning angle details
6	01/10/21	Harry Egan	Annual Update
7	01/02/23	Harry Egan	Mod 2 Update
8	08/08/24	Harry Egan	Annual Update

Table of Contents

Table of Figures

Table of Tables

Glossary

Term	Definitions
the Approval	State Significant Infrastructure MP07_0171 MOD 1
Aurizon	Aurizon Operations Pty Ltd
BVT	Biometric Vegetation Types
CWR	Coal Washery Reject
DAF	Dissolved aeration floatation
DPE	Department of Planning and Environment
EEC	Endangered Ecological Communities
EPL	Environmental Protection Licence
EP&A Act	*Environmental Planning and Assessment Act 1979*
FFMP	Fauna and Flora Management Plan
OEMP	HEX Aurizon Hexham TSF Operational Environmental Management Plan
OEH	Office of Environment and Heritage
PASS	Potential acid sulphate soils
SEPP	State Environmental Planning Policies
the Site	Hexham Train Support Facility
SoC	Statement of Commitments
SSI	State Significant Infrastructure
WoNS	Weeds of National Significance

1.0 Introduction

1.1 Site Description

The Aurizon Operations Pty Ltd (Aurizon) Hexham Train Support Facility (the Site) has a total area of 255ha and is located at Hexham approximately 16km north-west of the Newcastle Central Business District.

The Site shares borders with the Main Northern Railway and Pacific Highway to the east and the New England Highway to the north. To the south and west rural properties and the Hexham Swamp Nature Reserve are adjacent. The Site is located within a predominantly industrial setting, with only a small number of residential dwellings within the local vicinity.

The Site's history as a coal handling facility has resulted in the southern portion of the site containing an abandoned rail loop corridor and coal washery reject (CWR). CWR is retained within vegetated stockpiles however it is also present extensively in sub surface deposits. Remediation completed during the construction of the TSF infrastructure has resulted in excavated CWR and Potential Acid Sulphate Soil (PASS) being stockpiled in the southern portion of the site

Brancourts Manufacturing and Processing Pty Ltd are currently licensed to use a portion of the site for a waste water treatment plant and effluent irrigation area under Environmental Protection Licence (EPL) 816. Effluent is irrigated over the above mentioned CWR stockpiles.

1.2 Operational Activities

The Site provides routine and ad hoc provisioning and maintenance services to outbound locomotives and wagons. The treatment of generated septic and operational waste water is undertaken onsite through the utilisation of a septic treatment plant and dissolved aeration floatation (DAF) plant.

Infrastructure associated with the Site and the above mentioned operational activities are restricted to approximately a 38 hectare portion of the Site and consists of:

- Seven train tracks (10.5 kilometres) parallel to the existing mainline, turning angle and a shunt track;
- operational depot and long term wagon stowage;
- a provisioning building, service vehicle garage and combined maintenance/administrative centre;
- surface water management infrastructure including retention basins;
- bulk fuel storage area; and
- A wastewater treatment plant with on-site effluent irrigation and DAF.

1.3 Legislative Context

The project was assessed and approved as State Significant Infrastructure (SSI) under Part 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Site approval history is as follows:

- The Site was approved by a delegate of the Minister for Planning and Infrastructure under MP07_0171, dated 10 October 2013.

- The Hexham TSF Turning Angle (the Turning Angle) Modification MP07_0171 MOD 1 (SSI-6090) was approved on the 09 October 2019.
- The Operational Depot and Long-Term Wagon Storage Modification MP07_0171 MOD 2 (SSI-6090) was approved in September 2022.

This Fauna and Flora Management Plan (FFMP) has been developed and implemented as required by the Condition C3 of the Approval. A matrix of the conditions of approval and Statement of Commitments (SoC) is included as Appendix A. This matrix identifies where these conditions/commitments have been addressed in the FFMP.

The FFMP has been developed with reference to the Guidelines for the Preparation of Environmental Management Plans (Department of Planning, 2004) and should be read in conjunction with the HEX Aurizon Hexham TSF Operational Environmental Management Plan (OEMP).

1.4 Purpose and Objectives

The FFMP has been prepared to support the on-going requirements of the OEMP and to meet all regulatory obligations. This FFMP details the key information and instructions to manage ecological impacts associated with the operational phases of the TSF.

2.0 Site Ecological Context

The Site is positioned in a highly fragmented landscape, which has been subject to historic agricultural, infrastructure and industrial land uses.

The site itself is highly fragmented, with small patches of isolated remnant vegetation such as the Swamp Oak Forest and areas of wetland occurring within a mostly disturbed/cleared areas often utilised as pasture for livestock. The Main Northern Railway Line, New England Highway, Pacific Highway and Hexham industrial area form barriers to movement to the east and north. Cleared pasture interspersed with low lying wetland areas occurs to the west.

The primary habitat connection to the Site occurs to the southwest, whereby the Site adjoins wetland habitats within Hexham Swamp (part of Hunter Wetlands National Park). Habitat within the National Park is characterised by generally non-woody freshwater or estuarine wetlands and is therefore only suitable for a restricted fauna assemblage (i.e. not suitable for forest/woodland dependant species).

Information detailed below has been sourced from the following assessments:

- Ecobiological (2008) Draft Ecological Assessment for Proposed Train Support Facility, Maitland Rs, Hexham NSW.
- Ecological (2013) Aurizon- train Support Facility, Hexham Ecological Investigations, Report ref: 10NEWECO-0017, 10 April 2013.
- Hexham TSF - Turning Angle Ecological Assessment (Jacobs, 23 May 2019).
- Hexham LTTSF Biodiversity Development Assessment Report Waiver Request (Jacobs, September 2021).

2.1 Site Biodiversity Values

A total of 168 fauna species were recorded with the Site boundary consisting of:

- 9 amphibian species;
- 128 avian species;
- 25 mammal species; and
- 6 Reptile species.

Of the recorded 168 fauna species, 21 were threatened or migratory fauna species that have either been recorded or are considered potential occurrences within the Site boundary.

A total of 268 flora species were recorded within the Site boundary with 86 of these being introduced species. These species contribute to the five identified broad vegetation types covering approximately 32% or 81 ha of the Site. Four of these vegetation types are considered to be native vegetation communities in variable condition.

Each of the identified vegetation types are considered to represent three respective Endangered Ecological Communities (EECs) listed under the *Threatened Species Conservation Act 1995*. The remaining Site is classed as either disturbed or as a vegetation rehabilitation area.

A summary of the key biodiversity values recorded or considered likely to occur within the Site boundary have been summarised in Table 1.

Table 1 - Site Biodiversity Values

Scientific Name	Common Name	TSC Act	EPBC Act	Likelihood of Occurrence
-	*Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions.*	EEC	-	Recorded
-	*Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions*	EEC	-	Recorded
-	*Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions*	EEC	-	Recorded
Zannichellia palustris	-	E	-	Potential
Litoria aurea	Green and Golden Bell Frog	E	V	Potential
Hieraaetus morphnoides	Little Eagle	V	-	Recorded
Anseranas semipalmata	Magpie Goose	V	M	Recorded
Botaurus poiciloptilus	Australasian Bittern	V	-	Recorded
Ephippiorhynchus asiaticus	Black-necked Stork	E	-	Marginal potential
Irediparra gallinacea	Comb-crested Jacana	V	-	Potential
Ixobrychus flavicollis	Black Bittern	V	-	Potential
Rostratula australis (a.k.a. R. benghalensis)	Painted Snipe (Australian subspecies)	E	V	Potential
Tyto capensis	Grass Owl	V	-	Recorded
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Potential
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Recorded
Miniopterus australis	Little Bent-wing Bat	V	-	Recorded
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V	-	Recorded

Scientific Name	Common Name	TSC Act	EPBC Act	Likelihood of Occurrence
Mormopterus norfolkensis	East Coast Freetail Bat	V	-	Recorded
Myotis adversus	Large-footed Myotis	V	-	Recorded
Pteropus poliocephalus	Grey-headed Flying-Fox	V	V	Recorded
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Potential
Scoteanax rueppellii	Greater Broad-nosed Bat	V	-	Recorded
Apus pacificus	Fork-tailed Swift	-	M	Potential
Haliaeetus leucogaster	White-bellied Sea-Eagle	-	M	Recorded
Hirundapus caudacutus	White-throated Needletail	-	M	Potential
Ardea alba	Great Egret	-	M	Potential
Ardea ibis	Cattle Egret	-	M	Potential

2.2 Biometric Vegetation Types

The Site consist of four Biometric Vegetation Types (BVT) which are described and mapped as part of the biodiversity field surveys and three communities corresponding to respective EECs. These communities and the impact resulting from the construction of the Site infrastructure are detailed in Table 1 below:

Table 2 - Biometric Vegetation Types and EEC

BVT	EEC	Surveyed Area (ha)	Impacted BVT (ha)	Impacted EEC (ha)
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney Basin and South East Corner bioregions*	Swamp Oak (*Casuarina glauca*)	28.65	8.26	4.00
	Nil (planted and not consistent with the EEC definition).	18.50	Nil	Nil
Coastal floodplain sedgelands, rushlands and forbs of the North Coast	*Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and*	9.69	2.07	2.07

BVT	EEC	Surveyed Area (ha)	Impacted BVT (ha)	Impacted EEC (ha)
Phragmites australis and *Typha orientalis* coastal freshwater wetlands of the Sydney basin	*South East Corner bioregions*	15.66	1.32	1.32
Saltmarsh in estuaries of Sydney basin and south east corner	*Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions*	9.24	0.35	0.35
Disturbed / Cleared Vegetation		172.03	Nil	Nil
Total		**254.00**	**12.00**	**7.74**

*Contains SEPP 14 wetland with half of this community meeting the definition of an EEC, the remainder is of poor-quality rehabilitation / planting.

The condition of Swamp Oak forest varies across the Site due to past disturbance and other areas which consist of predominantly Derived Grasslands. Historical rehabilitation areas containing Swamp Oak do not reflect the definition of Swamp Oak Floodplain Forest EEC due to introduced soil and floristic composition.

One vegetation area currently mapped as State Environmental Planning Policies (SEPP) 14 Wetland No. 833 is present in the central eastern portion of the site and comprises of a degraded remnant of Swamp Oak Swamp Forest. This area has been subject to clearing, grazing and waste water irrigation purposes for the several decades prior to Aurizon purchasing the land, and is considered to be in poor condition.

All remnant native vegetation on the Site (excluding the rehabilitation plantings of Swamp Oak Swamp Forest) is considered to meet the definition of Groundwater Dependence Ecosystems as described in NSW State Groundwater Dependent Ecosystem Policy (DLWC 2002) due to the likely interaction of the vegetation with shallow water table and periodic inundation of floodwater.

Site BVT and EEC boundaries are shown in Figure 1 below.

2.3 Green and Golden Bell Frog and Microchiroptera Bats

With the exception of the Green and Golden Bell Frog and hollow roosting bats, the Site generally constitutes foraging or intermittent refuge habitat.

Wetland habitats within the study area have the potential to support very occasional and intermittent movements and foraging by Green and Golden Bell Frog. However, several multiyear targeted surveys for the Green and Golden Bell Frog inclusive of quarterly monitoring completed during the first three years of the Site's operational phase (2015 – 2018) have been conducted resulting in no evidence of species' presence or habitat utilisation within the study area.

In terms of habitat for Microchiroptera bats (e.g. East Coast Freetail Bat, Large-footed Myotis and Greater Broad-nosed Bat), the area of remnant Swamp Oak swamp forest fringing estuaries in the north of the Site contains abundant hollow bearing trees, with the majority of hollows being in the small (<8cm class). These hollows have also been complemented by 26 bat boxes installed by Aurizon as per Condition E7 of the Approval.

2.4 Hollow Bearing Trees

A total of 682 trees (90% Casuarina glauca) that supported potential habitat hollows within the Site were identified, mapped and the size class of hollows recorded. All identified hollow bearing trees are located within a stand of Swamp Oak forest in the north of the Site. This area was not disturbed during construction.

With the exception of the remnant Swamp Oak Forest retained in the northern portion of the site, the vast majority of the Site contains few mature trees, although some tall shrubs and trees are evident in the southern and eastern portions of the Site. These trees are generally within regeneration areas, of a young age and poor quality, but still have the potential to provide some small hollow habitat value.

2.5 Offsets

Biodiversity offsets are required by Condition C4 of the Approval. In January 2016 the DPE informed Aurizon that it would not enter into a Planning Agreement with Aurizon to secure the northern and southern offsets on the Aurizon owned land at the Site.

To satisfy Condition C4, in consultation with the DPE and OEH, Aurizon purchased and retired offsite Bio Banking Credits (transaction #201607-TF-156) in August 2016.

As the former northern and southern offset areas have been identified as containing EEC impacts to these areas is not permitted unless approved by the DPE.

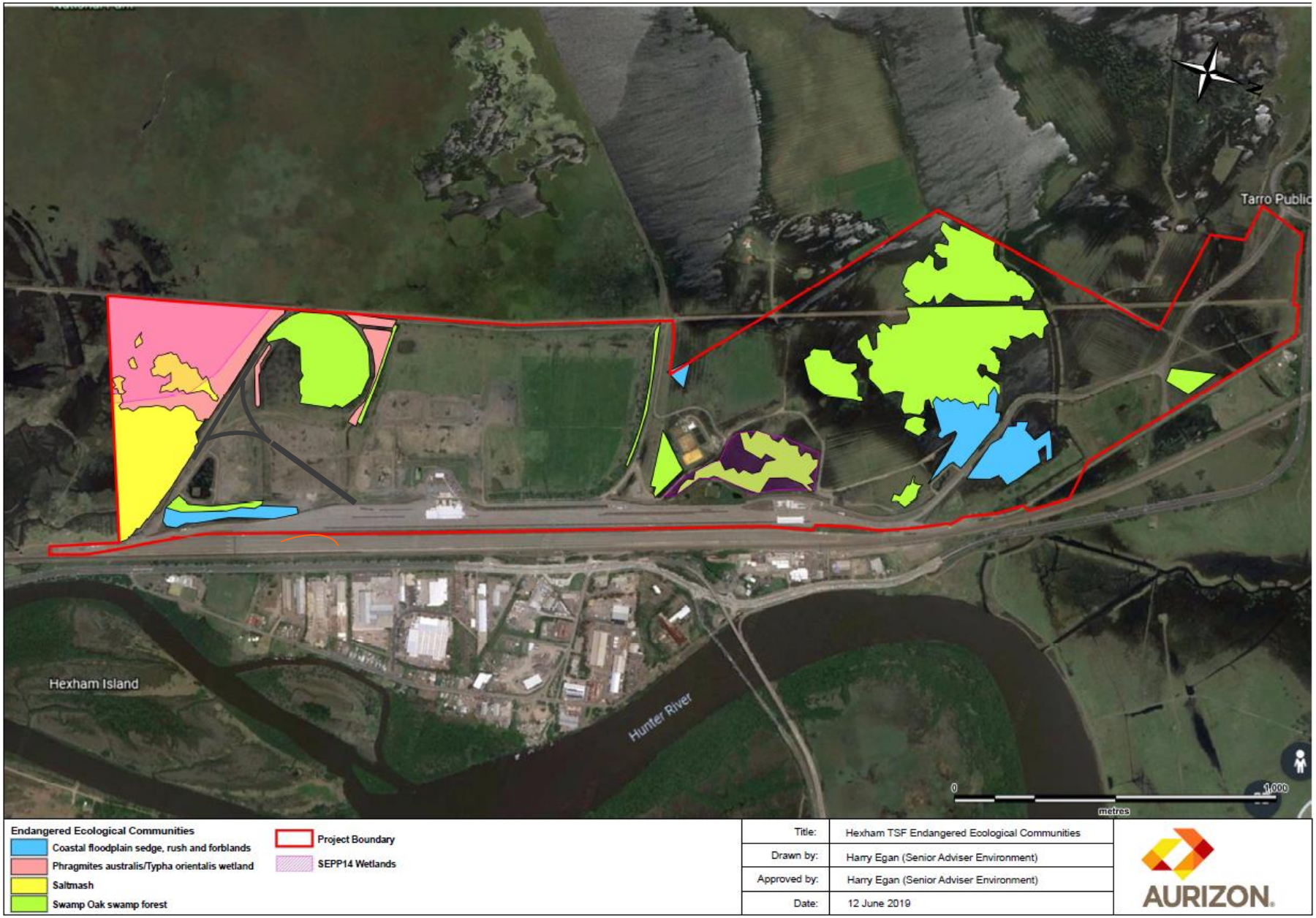


Figure 1 - BVT and EEC vegetation boundaries

3.0 Monitoring and Management Controls

3.1 Monitoring

Condition C3 of the Approval requires the design and implementation of an ecological monitoring program for the first three years of operation. As per correspondence included in Appendix B the Department of Planning and Environment has approved the suspension of the ecological monitoring program due to all prescribed performance conditions being met.

Additionally, due to the purchase and retirement of offsite Bio Banking Credits the monitoring of offset areas is not required as per Condition F2(d) of the Approval.

3.2 Rehabilitation

Rehabilitation of native vegetation areas impacted by approved site activities are to be undertaken immediately following the completion of works, where practicable. Areas subject to rehabilitation due to clearing during the construction phase (EECs) of the project are to be maintained throughout the operational lifetime of the facility.

Suitable species for revegetation purposes are presented in Appendix E and are divided into vegetation community specific species to provide for the best results. Additionally, another category has been provided specifically for local native species that are suitable for landscaping purposes. It is assumed that areas to be targeted for general landscaping will be elevated from the surrounding low-lying areas and as such will require native species that are not dependent on or restricted to wet area habitats.

Ongoing management of all rehabilitation areas are to include management of weeds, fencing, stock management and placement of coarse woody debris to create habitat for fauna.

3.3 SEPP 14 Wetland and EEC Vegetation

Identified significant vegetation (e.g. SEPP 14 wetland and EEC) adjacent to work areas inclusive of permanent structures or access routes is to be identified in Figure 1. This vegetation is to be designated and protected as required for the duration of the works to prevent impact.

Operational staff and contractors are to be made aware of these areas during Site inductions, where relevant. It should be noted that operational activities on-site are unlikely to require departure from designated sealed access roads and are unlikely to have a direct impact on these areas.

The following activities are prohibited within these areas:

- Vehicle parking;
- Liquid or refuse disposal;
- Machinery repairs and/or refuelling;
- Combustion of any material;
- Stockpiling of soil, rubble or debris;
- Storage and mixing of chemicals or materials;

- Any filling or excavation including trench line, topsoil skimming and/or surface excavation, is to be approved by the relevant authority; and

- Unauthorised pesticide, herbicide or chemical applications

3.4 Fauna Relocation

Where fauna species are located and require removal from Site, Hunter Wildlife Rescue (Native Animal Trust Fund) are to be contacted as required and the following steps are to be carried out:

- If fauna is venomous or dangerous then allow the animal to clear the area by way of observation and follow to ensure the animal has vacated the required area. If the animal is in an undesirable location and will not remove itself a contractor with the relevant expertise should be contacted to remove.

- Captured native fauna requiring relocation are to be released in suitable habitat areas in consultation with a wildlife carer, OEH staff or other specialist. Any translocation of wildlife must be done in accordance with OEH policy – Policy for the Translocation of Threatened Fauna in NSW (NPWS 2001).

- Where domestic stock (e.g. cattle, horse, domestic dog, etc.) are located on Site and are suspected as being from adjacent properties, facility management is to contact local landholders for immediate removal or containment from areas presenting potential danger to the animal, operations or rehabilitation areas.

Where a threatened species has been recorded on the Site, details of its location and method of removal (if the individual is in danger) are to be reported to OEH. Mitigation measures are to be reviewed to ensure the FFMP remains appropriate for the species.

3.5 Weed Management

As required by the *Noxious Weeds Act 1993 (NSW)* noxious weeds must be controlled by landowners. The study area contains a total of 86 introduced species, five of which are declared as noxious weeds in the Newcastle Local Government Area and five are regarded as Weeds of National Significance (WoNS).

Weed identification and removal should be undertaken by a suitably qualified individual. A list of the identified noxious weeds has been included in Appendix D with associated management measures.

General comments in regard to weed control are outlined below:

- Noxious, WoNS and highly invasive environmental weed species (ranked as very high or high) need to be controlled and managed on-site.

- Removed weeds may be retained and disposed of on-site by being buried under fill. Alternatively, weeds may be disposed of at a dedicated waste disposal facility.

- All significant weeds need to be effectively managed to prevent spreading into significant vegetation e.g. SEPP 14 wetland, EECs and the adjacent section of Hunter Wetland National Park.

- Environmentally sensitive herbicide such as Round up Biactive® should be utilized due to the site being located adjacent to wetland and SEPP14.

- Common and less invasive weed species biomass may be retained, broken down (i.e. via a mulching and seed sterilisation process) on site and reused for rehabilitation / revegetation purposes in pasture restoration areas.

A Noxious Weed Management Plan must be submitted to NCC two weeks prior to the removal of Noxious Weeds Classes 3 – 5 for approval. The characteristics, control objectives and control measures to be detailed in this management plan are detailed in Table 3.

Table 3 - Noxious Weeds

Class	Characteristics	Control Objectives	Controls
3 – Regionally Controlled	Pose a serious threat to primary production or the environment of an area to which the order applies, are not widely distributed in the area and are likely to spread in the area or to another area.	Reduce the area and the impact of those plants in parts of NSW.	Must be fully and continuously suppressed and destroyed
4 – Locally Controlled	Pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area.	Minimise the negative impact of those plants on the economy, community or environment of NSW.	Growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority.
5 – Restricted Plants	Plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the State.	Prevent the introduction of those plants into NSW, the spread of those plants within NSW or from NSW to another jurisdiction.	Must not be sold or purchased and must not be moved from the land.

4.0 Compliance and Reporting

4.1 External Reporting Requirements

Reporting will be undertaken as per Section 4 of the OEMP and any requirements stipulated by an approved Noxious Weed Management Plan.

4.2 Corrective Actions

As per the OEMP:

- Identified non-conformances with the FFMP, legislative or other requirement will be managed in accordance with *BSEMS-STD25 Operational Non Conformance & Incident Reporting*; and
- Corrective and preventative actions arising from non-conformances will be managed in accordance with *BSEMS-STD05 Effectiveness of Corrective & Preventative Actions*.

Non-conformances will be identified by the completion of routine inspections and audits of the Site undertaken as per the OEMP.

In the event that chronic exceedances of the prescribed management measures are recorded an investigation into the cause, potential impacts and feasible mitigation options will be triggered. The investigation will be undertaken by Aurizon in consultation with the DPE where required.

4.3 Document Review

The FFMP will be reviewed and updated as per the OEMP.

APPENDICIES

APPENDIX A – Minister Conditions of Approval MP07_0171 and Statement of Commitments

Relevant Minister Conditions of Approval

MCoA	Description	FFMP Section
F2 (d)	Where required, measures to monitor and maintain biodiversity offset measures implemented in accordance with condition C4 of this approval;	Section 3.0 Appendix B
F2 (e)	Measures to monitor and maintain the effectiveness of flora and fauna management measures, including revegetated areas, landscaped areas and the control of the spread of weeds.	Section 3.0 Appendix B
C3 (a) – (j)	Prior to the commencement of construction work that would result in the disturbance of any native vegetation, threatened flora and fauna or endangered ecological communities (EECs) and their habitats, the Proponent shall develop an Ecological Monitoring Program to monitor the effectiveness of the biodiversity mitigation measures implemented as part of the SSI. The Program shall be developed by a *NSW Government Department of Planning & Infrastructure* suitably qualified and experienced ecologist in consultation with the OEH. The Program shall include, but not necessarily be limited to: (a) – (j)	Section 3.1
C5	The Proponent shall ensure that groundwater dependent ecosystems outside the project footprint are not adversely affected by the design, construction and operation of the SSI.	Noted
C17	All temporary and permanent watercourse crossings shall be designed in consultation with the NoW, and with the DPI (Aquaculture and Fisheries) where the crossing has the potential to impact on fish passage. Where feasible and reasonable, the crossings shall be consistent with the NoW's *Guidelines for Controlled Activities* and *Policy and Guidelines for Fish Friendly Waterway Crossings* (NSW Fisheries, 2004) and *Policy for and Guidelines for Design and Construction of Bridges, Roads, Causeways, Culverts and Similar Structures* (NSW Fisheries, 1999).	Noted
E4	Any areas temporarily disturbed during construction (including access tracks and compound sites) shall be rehabilitated to a standard equal to or better than the existing condition, as soon as feasible and reasonable following the completion of construction activities in the affected location. Replanting of affected vegetation shall be undertaken using locally occurring native species.	Section 3.2
E5	The Proponent shall ensure that any coarse woody debris removed from the site, including timber from felled trees (particularly hollow bearing timber), shall be relocated to the Northern Offset site as identified in Appendix G of the document referred to in condition B1(c) of this approval, for the enhancement of the ecological values of that site.	Not applicable as no longer identified as an Offset area as per Section 3.0.

MCoA	Description	FFMP Section
E8	The Proponent shall prepare a management plan that identifies the strategies that would be implemented in the event that the Green and Golden Bell Frog is identified during construction. The plan shall be developed in consultation with the OEH and include details on the mitigation measures to be implemented to minimise the risk to this species, including direct and indirect impacts to its habitat. The plan is to be submitted to the Director-General at least one month prior to construction, unless otherwise agreed by the Director-General. Nothing in this condition precludes the inclusion of this plan in the Flora and Fauna Management Plan (condition E63 (b)).	Appendix C and D
E9	In the event that the Green and Golden Bell Frog is identified to occur during construction, all work in the vicinity of the sighting shall stop to the extent necessary to allow the procedures set out in the management plan (condition E8) to be implemented.	Appendix C and D

Statement of Commitments

SoC	Commitment	OEMP Section/Management Plan
Item 2	All licences, permits and approvals required by law to construct and operate the TSF will be obtained and maintained as required.	Appendix F
Item 3	Operation of the TSF will be undertaken in accordance with the Environmental Management Plan (EMP). The EMP will address all measures to be implemented to minimise and manage potential environmental impacts during the operation of the TSF. The EMP will include the following plans:	This OEMP
	A. Conservation Management Plan;	Not applicable. Bio-Banking credit transfer report 201607-TF-156).
Item 9	During construction and operation of the TSF, the Conservation Management Plan will be followed. The Conservation Management Plan will include: A. strategies to avoid or minimise impacts to flora and fauna; B. procedures to monitor and control weeds (with special methods for eradicating alligator weed); C. strategies to minimise the access route through Proposed Offset Area 2; D. contingency procedures or corrective actions to be followed should monitoring indicate that the identified objectives and outcomes are not being achieved.	Not applicable.
Item 10	The management of the Southern Offset Area will include: A. the establishment and fencing of the conservation area; B. entering into an appropriate arrangement for the security of the offset area such as a Voluntary Conservation Agreement; C. Management of habitat for existing terrestrial and aquatic, flora and fauna species; D. an annual monitoring program for the first five years;	Refer to Bio-Banking credit transfer report 201607-TF-156).

SoC	Commitment	OEMP Section/Management Plan
Item 11	The management of the Northern Offset Area will include: A. improving the condition of the Swamp Oak Forest and the Coastal Floodplain Sedgelands B. entering into an appropriate arrangement for the security of the offset area such as, a Voluntary conservation Agreement; and	

APPENDIX B – Regulatory Consultation

NSW GOVERNMENT | Planning & Environment

Harry Egan
Senior Advisor Environment
Aurizon
PO Box 437
MAYFIELD NSW 2304

Email: Harry.Egan@aurizon.com.au

Contact: Heidi Watters
Phone: (02) 6575 3401
Email: compliance@planning.nsw.gov.au
Our Ref: SSI 07_0171

Dear Mr Egan

Hexham Train Support Facility
Operational Compliance Report Number 3 (2018)

Reference is made to the Hexham Train Support Facility (Hexham TSF) Compliance Report Number 3 2018 (OCR), for the period 1 January 2018 to 31 December 2018, prepared as required by condition D5(c) of SSI 07_0171 (the approval) and Section 4.5.1 of the Operational Environmental Management Plan (OEMP), and submitted to the Department on 15 February 2019.

The OCR includes the 2018 Ecological Monitoring report (required by condition C3(j) of the approval) and the 2018 Surface and Groundwater Monitoring report (required by Section C19(j) of the approval.

The Department has reviewed the OCR and considers it to generally satisfy the requirements of the approval. However, under the provisions of condition B3 of the approval, the Department requests that the following information be included in future OCRs:

1. Figure 1 to include the location of the off-site offset areas; and
2. Complaints section to include:
    a. a summary of action(s) undertaken to address complaints
    b. a statement regarding any emerging trends identified in complaints received since operations commenced, and

The above Department requests should be tabulated within the next OCR, with specific reference as to where each request has been addressed within the document.

Please note that acceptance of the OCR is not an endorsement of the compliance status of the project. Non-compliances reported in the OCR have been assessed in accordance with the Department's Compliance Policy, with the Department on this occasion determining to record the breaches and at this stage, no further enforcement action is proposed. However, please note that recording the breach does not preclude the Department from taking alternative enforcement action, if it becomes apparent that an alternative response is more appropriate.

Finally, the Department notes that Aurizon has requested the suspension of ecological monitoring from 2019 onwards. Condition C3 of the approval requires an Ecological Monitoring Program to be undertaken *upon operation of the SSI (for operation/ongoing impacts) until such time as the effectiveness of mitigation measures can be demonstrated to have been achieved over a minimum of three successive monitoring periods after the commencement of operation*. The Department notes that the third year of operational monitoring under the Ecological Monitoring Program was conducted in 2018, and the results of the three years of ecological monitoring have demonstrated (where measurable) that the mitigation measures have been successful in meeting the prescribed performance indicators. Therefore, as per condition C3 of the approval, the Secretary (formerly Director-General) approves the suspension of the Ecological Monitoring Program, until further notice. Please note that the Secretary may direct the Ecological Monitoring Program to be reinstated in the future.

If you wish to discuss this further, please contact Heidi Watters on the details above or email compliance@planning.nsw.gov.au

Yours sincerely

9/3/19

Leah Cook
Team Leader - Compliance
as Nominee of the Secretary

APPENDIX C – Green and Golden Bell Frog Management Plan

LTTSF (Hexham)

Green and Golden Bell Frog Plan

1 Introduction

The following information is provided and is to be utilised if a Green and Gold Bell Frog (*Litoria aurea*) is located or suspected to be within the construction clearing zone for the TSF by construction staff. The strategies indicated in this document must be adhered by all construction staff.

Unless otherwise referenced, the management actions described were adopted from the Newcastle Coal Infrastructure Group (NCIG 2013) Green and Golden Bell Frog Management Plan, and the NCIG Kooragang Island Coal Export Terminal – Seasonal Ecological investigations – Green and Golden Bell Frog Survey report prepared by Connell Hatch in 2006.

2 Delineation of disturbance areas

In accordance with the project Flora and Fauna Management Plan, sensitive environmental areas including potential Green and Golden Bell Frog habitat areas adjoining the construction area are to be clearly marked to prevent accidental damage during construction and operation. All areas of native vegetation except for saltmarsh are considered potential GGBF habitat. The cleared areas and saltmarsh may provide for occasional foraging and movement. **Figure 1** in this Green and Gold Bell Frog plan shows GGBF habitat for protection.

If Green and Golden Bell Frog are recorded on the site an ecologist will advise on the location and need for additional fencing that prevents access by frogs onto the construction zone.

3 Contractor induction and training

In accordance with the Flora and Fauna Management Plan, all Aurizon personnel and contractors will undergo environmental induction training carried out by the Contractors Environmental Officer before commencing work on-site. Information addressed during this training would include:

- Green and Golden Bell Frog profile and identification.
- Identification of potential Green and Golden Bell Frog habitat areas within and adjacent to the construction footprint. Project personnel would be prohibited from entering Green and Golden Bell Frog habitat areas located outside the defined construction or operational areas.
- The correct procedures (as described in section 5 of this GGBF Management Plan) to follow in the event that Green and Golden Bell Frogs are found on site.

4 Pre-clearance surveys

Pre-clearance surveys would include targeted active searches of potential Green and Golden Bell frog habitat located within project disturbance areas. Pre-clearance surveys would be undertaken by a suitably qualified and licensed ecologist prior to construction each day, and would comply with the NSW Department of Primary Industries and Animal Research wildlife survey guidelines for amphibians.

The pre-clearance surveys (and if applicable relocation activities) would be conducted to minimise disruption to breeding activities and the need to relocate tadpoles or metamorphlings, where practicable (NCIG 2013). As a general precaution clearing would be kept to the minimum required, to minimise disturbance to frog habitats.

Habitat resources typically associated with the lifecycle components of the Green and Golden Bell Frog (e.g. ponded areas and rocks, logs, tussock forming vegetation and other cover) would be searched during a diurnal visual inspection (NCIG 2013).

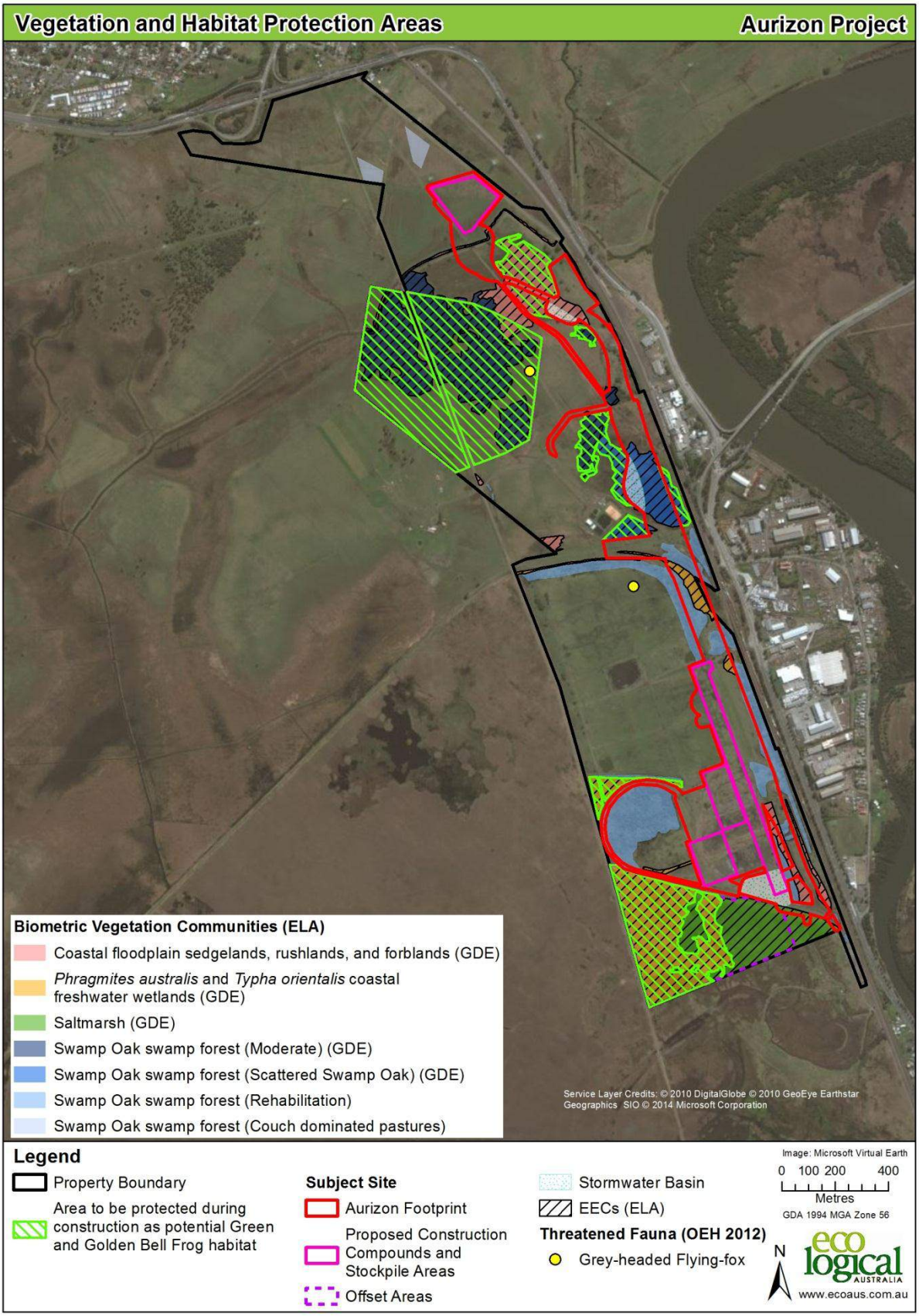


Figure 1 Green and Gold Bell frog habitat for protection

Following the diurnal habitat searches, a nocturnal search will be conducted to assess nocturnal usage (i.e. breeding/calling) in the habitat area. The nocturnal habitat searches shall be based on DEC (2009) Field Survey Methodology and is to include:

- Searching of habitat features which were searched during the day;
- Spotlighting; and/or
- Call playback.

In the event that any Green and Golden Bell Frogs are observed during the diurnal or nocturnal searches for the pre-clearance surveys, frogs would be relocated to adjacent habitat prior to the commencement of construction works and OEH notified immediately.

In the event that GGBF are found on the site a targeted GGBF survey will be undertaken in accordance with DEC (2004) Threatened Species Survey and Assessment Guidelines.

5 Frog relocation procedure

5.1 Relocation during pre-clearance surveys

In the event a Green and Golden Bell Frog is identified within the project disturbance areas during pre-clearance surveys, the following relocation procedure would be initiated:

1. The ecologist undertaking the pre-clearance survey would capture the frog. The use of clean gloves and / or freezer bags (or similar) should be utilised to capture the frogs to reduce the incidence of transfer of potentially toxic elements to frogs. New gloves or freezer bags should be utilised for each individual caught to reduce the potential for transfer of disease between individuals (as per the DECC 2008 Hygiene Protocol for the Control of Disease in Frogs). The bag is to be rinsed out with clean water. Bad should be inflated and knotted at the top.
2. If the frog appears to be healthy a release location would be determined by the ecologist, and the frog would be released into the relocation area. If GGBF are found in the northern half of the site, the ecologist will determine a suitable relocation area preferably in the northern offset area shown in Figure 2.2. The release area should be within 30m of standing freshwater if possible and in a cool and sheltered location. If the GGBF is found in the southern part of the site, the frog should be released into the southern offset area in the freshwater-dominated environment (i.e., not in the saltmarsh). The ecologist will however need to determine the best location given the activities being undertaken and the weather conditions on the day. Any frog to be relocated would be held in a cool, dark, moist place until nightfall (NCIG 2013). If the frog appears to be sick, or is dead, the procedures outlined in the section below would be followed.

Details of Green and Golden Bell Frog relocations (e.g. lifecycle stage and sex of individual, location where found and location of release) conducted during pre-clearance surveys would be recorded and reported to the NSW Office of Environment and Heritage as part of the project environmental management reporting.

5.2 Relocation at other times

In the event a Green and Golden Bell Frog is observed within the project site outside pre-clearance surveys (e.g. within an area already disturbed), the following relocation procedure would be initiated:

1. Works within the vicinity of the identified frog would cease temporarily.

2. The observer would notify the contractors Environmental Manager of the frog's location. The Contractor's Environmental Manager would then determine whether the frog would be likely to be harmed by works
3. If the frog would likely be harmed by the works, the Project Manager would temporarily suspend works to allow an ecologist to capture it. In handling the frog, the ecologist would adhere to the DECC (2008) guidelines for handling a frog in the field, as described in the Hygiene Protocol for the Control of Disease in Frogs (**Appendix A**) which can be found at: http://www.environment.nsw.gov.au/resources/nature/hyprfrog.pdf
4. If the frog appears to be healthy a release location would be determined the ecologist, and the frog would be released into the relocation area. Any frog to be relocated would be held in a cool, dark, moist place until nightfall, separate from any other frogs or animals captured. Containers such as an esky with no are appropriate but should be stored in cool environments and not in warm environments such as a car. If the frog appears to be sick, or is dead, the procedures outlined in Section 6 would be followed.
5. Details of the Green and Golden Bell Frog relocation (e.g. lifecycle stage and sex of individual, location where found and location of release) conducted would be recorded and reported to the NSW Office of Environment and Heritage as part of the project environmental management reporting (NCIG 2013).

5.3 Procedures for handling sick or dead frogs

Table 1 details the range of symptoms that may be exhibited by sick or dying frogs, while **Table 2** provides diagnostic behaviour tests which can be used to determine if a frog is sick (e.g. infected with chytrid fungus) (NCIG 2013).

Table 1: Symptoms of sick and dying frogs (Source: DECC 2008)

Appearance	Behaviour
• Darker or blotchy upper (dorsal) surface • Reddish/pink-tinged lower (ventral) surface and/or legs and/or webbing or toes • Swollen hind limbs • Very thin or emaciated • Skin lesions (sores, lumps) • Infected eyes • Obvious asymmetric appearance	• Lethargic limb movements, especially hind limbs • Abnormal behaviour (e.g. a nocturnal burrowing frog sitting in the open during the day and making no vigorous attempt to escape when approached) • Little or no movement when touched

Table 2: Diagnostic behaviour tests (Source: DECC 2008)

Sick frogs will fail one or more of the following tests:		
Test	**Healthy**	**Sick**
Gently touch with finger	Frog will blink	Frog will not blink
Turn frog on its back	Frog will flip over	Frog remain on its back
Hold frog gently by its mouth	Frog will use its forelimbs to try to remove grip	No response from frog

In the event a Green and Golden Bell Frog appears sick, or is dead, the following procedure would be followed (DECC 2008):

- Disposable gloves would be worn when handling any frog (i.e. healthy, sick or dead);
- To prevent cross-contamination, new gloves and a clean plastic bag would be used for each frog specimen;
- Sick frogs likely to survive transportation would be placed into either a moistened cloth bag with some damp leaf litter or into a partially inflated plastic bag with damp leaf litter. All frogs would be kept separate during transportation. These would be delivered to the appropriate frog carer for rehabilitation. Containers would be kept cool and labelled with the date, location and species of frog (if known);
- Dead frogs would be kept cool and delivered as soon as possible to the appropriate recipient for testing. A list of potential sick and dead frog recipients has been provided in Appendix A. The closest recipient is:

  Michael Mahoney

  School of Biological Sciences

  University of Newcastle

  CALLAGHAN NSW 2308

  Phone: 02 4921 6014

Details of sick or dead Green and Golden Bell Frogs found at the project would be recorded and reported to the NSW Office of Environment and Heritage.

6 Implementation of additional mitigation measures

If GGBF are found on the site, the Ecology Specialist is to advise on the need for additional mitigation measures specific to this species and the environment in which it was recorded. For example, fencing which prevents the movement of GGBF onto construction or operational areas may be temporarily or permanently erected if this measure will avoid fatalities of the GGBF but not prevent the species accessing important habitat resources.

Once mitigation measures are developed, specific GGBF monitoring will be designed to determine the effectiveness of the mitigation measures.

If GGBF are recorded on the site, annual monitoring of the population will be undertaken in accordance with DEC (2004) Threatened Species Survey Guidelines, with results reported in the annual Ecological Monitoring Report required under the Ecological Monitoring Program.

7 Species Identification

The Green and Golden Bell Frog is a relatively large, stout frog ranging in size from 45 – 100 mm (DEC 2005). Most individuals are a vivid pea-green splotched with a metallic brassy brown or gold, with a cream to white stripe extending from behind the eye almost to the groin (**Plate 1**). Variations in the amount of gold markings on the back occur, with some individuals

being almost entirely green, while in others the golden markings may dominate (DEC 2005). Tadpoles are relatively large (65 – 100 mm), with deep bodies, long tails, and a long tail fin that extends almost half-way along the body (**Plate 2**).

Plate 1: Adult Green and Golden Bell Frog (source: NCIG 2013)

Plate 2: Green and Golden Bell Frog tadpole (source: NCIG 2013)

Breeding predominantly occurs during spring and summer, with males calling between September and January. However, some males will call outside of this period during favourable conditions (NPWS 2003). Eggs are laid amongst aquatic vegetation, and typically hatch within three days of being laid. Metamorphosis can take from two to eleven months (Daly 1995), however, six weeks appears to be an average duration for the field. The adults are highly mobile, with strong colonising and dispersal capabilities (NPWS 2003). Often breeding and over-wintering sites are considerable distances apart.

The species utilises different habitats for breeding, foraging and over-wintering. Breeding habitat includes human-made or natural permanent and ephemeral sites. Examples are quarries, brickpits, mining sites, sewage treatment ponds, bunded or otherwise 'retained' areas, detention basins, drains, scrapes, depressions and farm dams along with coastal or floodplain wetland features such as swamps, ponded areas of intermittent creeklines, lagoons, billabongs and dune swales (NPWS 2003). Foraging habitat requirements include tall, dense grassy vegetation and tussock-forming vegetation. Over-wintering sites provide protection during the cooler months when individuals enter a period of quiescence and become torpid. Such sites include the bases of dense vegetation beneath tussocks, beneath rocks, timber, within logs or beneath ground debris including human refuse such as sheet iron. Over-wintering sites may be adjacent to the breeding sites but may also be some distance away (NPWS 2003).

In the Hunter River estuary the frog species is known to occur at Kooragang and Ash Islands, and Hexham Swamp.

8 References

Connell Hatch. 2006. NCIG Kooragang Island Coal Export Terminal – Seasonal Ecological investigations – Green and Golden Bell Frog Survey. Revision 2.

Daly, G. 1995. Observations on the Green and Golden Bell Frog *Litoria aurea* (Anura: Hylidae) in Southern NSW. *Herpetofauna* 25(1):1-9.

DEC (Department of Environment and Conservation NSW). 2005. Draft Recovery Plan for the Green and Golden Bell Frog (*Litoria aurea*). DEC NSW, Hurstville, NSW.

NCIG (Newcastle Coal Infrastructure Group). 2013. Green and Golden Bell Frog Management Plan. Newcastle Coal Infrastructure Group Coal Export Terminal Document No. GGBFMP-R02-B.DOC. Accessed at http://www.ncig.com.au/Portals/2/files/planningdocs/Planning%20Documents/NCIG_GGBFMP%202013.pdf

DECC (Department of Environment and Climate Change NSW), 2008. Hygiene protocol for the control of disease in frogs. Information Circular Number 6. Sydney NSW

NPWS (National Parks and Wildlife Service). 2003. *Green and Golden Bell Frog Litoria aurea (Lesson, 1829) Environmental Impact Assessment Guidelines*. Threatened Species Unit Conservation Programs and Planning Division, Hurstville.

APPENDIX D – Weed Management Control and Guidelines

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
Alternanthera philoxeroides	Alligator Weed	Class 3 Noxious Weed – Regionally Controlled (WoNS)	Moderate	Very High	This species is widely dispersed across the site, but generally occurs in dense aggregations. Physical control (deep manual digging) is required with some initial chemical control (herbicide treatment) for use in environmentally sensitive areas (e.g. Round up Biactive) to kill above-ground plant growth as per best management practices provided in the Alligator Weed Control Manual (DPI 2009). As a fair proportion of the TSF and adjacent areas are of pasture, there is potentially some success of reducing the spread of the species in damp to wet grassy meadow areas by grazing cattle / horses. Must be controlled in areas in the near vicinity (~5 m) of significant vegetation (e.g. SEPP 14 wetland and EECs). All cleared topsoil containing this species is not to be reused as topsoil, but may be used as fill or disposed of correctly at a licensed waste management facility.
Ageratina adenophora	Crofton Weed	Class 4 - Noxious Weed (locally Controlled)	Low	High	The species is not widely dispersed and is restricted to some small clumps / stands in the south eastern disturbed section of the TSF. The application of a registered herbicide for use in environmentally sensitive areas (e.g. Round up Biactive), as per label instructions is recommended. Physical/mechanical removal of small clumps and outliers (including the root system) by hand is a suitable alternative method. The plant must be prevented from growing within 5 metres of a property boundary or watercourses, addition it must be controlled or managed within or near areas of retained significant vegetation (e.g. SEPP 14 wetland and EECs).

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
Bryophyllum delagoense	Mother of millions	Class 4	Low	High	Present as scattered clumps in highly modified and disturbed areas in the southern portion of the site. The application of a registered herbicide for use in environmentally sensitive areas (e.g. Round up Biactive), as per label instructions. Physical/mechanical removal provides best results - by hand for small clumps and isolated individuals and bagging and disposal; or by machinery (removing the topsoil) and then disposal as part of fill to be used on site or disposed of correctly at\ a licensed waste management facility. The plant must be prevented from growing within 5 metres of a property boundary and in the vicinity of areas of significant remnant native vegetation (e.g. SEPP 14 wetland, and EECs))
Lantana camara	Lantana	Class 5	Low	High	Generally located as small to medium clumps in the highly modified southern portion of the study area. Physical/mechanical removal by hand (i.e. cut and paint) may be the most effective method; alternatively larger clumps may need to be sprayed with herbicide. The application of a registered herbicide for use in environmentally sensitive areas (e.g. Round up Biactive), as per label instructions. The plant must be prevented from growing within 5 metres of a property boundary or in the vicinity of areas of significant remnant native vegetation (e.g. SEPP 14 wetland, EECs).
Rubus fruticosus sp. agg.	Blackberry complex	Class 4	Low	High	Scattered locations across the TSF site, although no large dense aggregations generally associated with the highly disturbed southern portion of the site. Physical/mechanical removal by hand (i.e. cut and paint) may be the most effective method; alternatively larger clumps may need to be sprayed with herbicide.

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
					Machinery may be useful in dense aggregations (e.g. tractor, backhoe, etc.). The plant must be prevented from growing within 5 metres of a property boundary or watercourse.
Araujia sericifera	Moth Vine		Low	High	Generally located as primarily isolated individuals in the highly modified southern portion of the study area, although scattered plants are present across the site. Hand removal of small plants and cut and paint (or spray) for larger individuals. Aerial seed should be removed and destroyed (by methods such as incineration, disposal at a dedicated waste management facility or buried on site as where fill is utilised). The plant must be prevented from growing within 5 metres of the boundary of areas of significant remnant native vegetation e.g. SEPP 14 wetland, EECs).
Juncus acutus	Sharp Rush		Low / Moderate	High	Primarily located in the southern portion of the site within and adjacent to the southern boundary of Aurizon's landholdings (this area has a particularly dense population), although some scattered individuals are dispersed across the site. This species will need to be managed, likely by a combination of hand removal of small individuals and spraying or cut and painting of larger individuals. The plant must be prevented from growing within 5 metres of a property boundary or in the vicinity of areas of significant remnant native vegetation e.g. SEPP 14 wetland, EECs).
Senecio	Fireweed	(WoNS)	Moderate	Moderate	This species is widely dispersed across the site in all areas containing pasture, Swamp Oak Swamp

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
madagascariensis					Forest, although it seldom appears to be in dense stands. Hand-pulling individual plants and using spot spraying herbicide application (e.g. Round up Biactive or similar product). Difficult species to eradicate, but some effort must go into managing the species.
Acacia saligna	Golden Wreath Wattle		Moderate	Moderate	Present as a rehabilitation / stabilisation species, across most vegetated non pasture or wetland areas of site. Species will need specific control where reestablishment of native woodland /open forest habitats or native landscaping is to be recreated. Hand pull seedlings and cut and paint more mature individuals. Control as necessary where in close proximity to areas of significant remnant native vegetation e.g. SEPP 14 wetland, EECs).
Hydrocotyle bonariensis	Pennywort		Low / Moderate	Moderate	
Aster subulatus	Wild Aster		Low / Moderate	Moderate	
Gomphocarpus fruticosus	Narrow leaved Cotton Bush		Low / Moderate	Moderate	Control as necessary where in close proximity to areas of significant remnant native vegetation e.g. SEPP 14 wetland, EECs).
Cirsium vulgare	Spear Thistle		Low	Moderate	
Cotula coronopifolia	Water Buttons		Low	Moderate	

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
Cinnamomum camphora	Camphor Laurel		Low	Moderate	Cut and paint or hand pull small individuals. Larger plants will need to be frilled or drilled and with the application of herbicide.
Ligustrum sinense	Small-leaved Privet		Low	Moderate	
Phytolacca octandra	Inkweed		Low	Moderate	Potentially invasive weed that will need to be removed and controlled, either by hand or mechanically.
Conyza sp.			Moderate	Low	General control as necessary across the TSF site, although specific treatment may be required in locations in close proximity to areas of significant remnant native vegetation e.g. SEPP 14 wetland, EECs).
Sida rhombifolia	Paddy's Lucerne		Moderate	Low	
Pennisetum clandestinum	Kikuyu Grass		Moderate	Low	
Chloris gayana	Rhodes Grass		Moderate	Low	
Axonopus fissifolius	Narrow leafed Carpet Grass		Moderate	Low	
Tagetes minuta	Stinking Roger		Low / Moderate	Low	
Verbena bonariensis	Purpletop		Moderate	Low	

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
Phyla nodiflora	Carpet Weed		Moderate	Low	
Cyperus congestus			Low / Moderate	Low	
Rumex crispus	Curled Dock		Low / Moderate	Low	
Lolium perenne	Perennial Ryegrass		Low / Moderate	Low	
Ehrharta erecta	Panic Veldtgrass		Low / Moderate	Low	
Paspalum dilatatum	Paspalum		Low / Moderate	Low	
Anagallis arvensis	Scarlet/Blue Pimpernel		Low / Moderate	Low	
Solanum mauritianum	Wild Tobacco Bush		Low / Moderate	Low	
Schinus areira	Pepper Tree		Low	Low	
Erechtites valerianifolius	Brazilian Fireweed		Low	Low	
Euchiton sp.	Cudweed		Low	Low	

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
Hypochaeris radicata	Catsear		Low	Low	
Bidens pilosa	Cobbler's Pegs		Low	Low	
Ambrosia tenuifolia	Lacy Ragweed		Low	Low	
Ambrosia psilostachya	Perennial Ragweed		Low	Low	
Conyza albida	Tall Fleabane		Low	Low	
Conyza bonariensis	Flaxleaf Fleabane		Low	Low	
Galinsoga parviflora	Potato Weed		Low	Low	
Heterotheca grandiflora	Telegraph Weed		Low	Low	
Taraxacum officinale	Dandelion		Low	Low	
Capsella bursapastoris	Shepherd's Purse		Low	Low	
Atriplex prostrata			Low	Low	Will need to be removed / controlled (physical hand removal / spot spraying with (e.g. Round up Biactive or similar) if in the vicinity of Saltmarsh EEC areas.

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
Euphorbia peplus	Petty Spurge		Low	Low	General control as necessary across the TSF site, although specific treatment may be required in locations in close proximity to areas of significant remnant native vegetation e.g. SEPP 14 wetland, EECs.
Trifolium repens	White Clover		Low	Low	
Trifolium fragiferum	Strawberry Clover		Low	Low	
Centaurium erythraea	Common Centaury		Low	Low	
Romulea rosea var. *australis*	Onion Grass		Low	Low	
Cotoneaster sp.	Cotton Easter		Low	Low	
Malva sp.			Low	Low	
Modiola caroliniana	Red-flowered Mallow		Low	Low	
Hibiscus sp.			Low	Low	
Plantago lanceolata	Lamb's Tongues		Low	Low	
Hordeum leporinum	Barley Grass		Low	Low	

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
Echinochloa crusgalli	Barnyard Grass		Low	Low	
Eragrostis curvula	African Lovegrass		Low	Low	
Setaria gracilis	Slender Pigeon Grass		Low	Low	
Melinis repens	Red Natal Grass		Low	Low	
Andropogon virginicus	Whisky Grass		Low	Low	
Briza maxima	Quaking Grass		Low	Low	
Holcus lanatus	Yorkshire Fog		Low	Low	
Setaria verticillata	Whorled Pigeon Grass		Low	Low	
Sporobolus africanus	Parramatta Grass		Low	Low	
Persicaria orientalis (cultivated form)	Princes Feathers		Low	Low	

Scientific Name	Common Name	Noxious Weed Classification	Frequency	Priority Ranking	Management Measures
Portulaca sp.			Low	Low	
Portulaca pilosa			Low	Low	
Verbascum virgatum	Twiggy / Green Mullein		Low	Low	
Solanum nigrum	Black-berry Nightshade		Low	Low	
Verbena rigida	Veined Verbena		Low	Low	
Lilium formosanum	Formosan Lily		Low	Low	Treatment (either hand dig or high concentration herbicide on scraped stems) will be required in locations in close proximity to areas of significant remnant native vegetation e.g. SEPP 14 wetland, EECs.

APPENDIX E – Recommended Revegetation Species

Family	Scientific Name	Common Name	Swamp Sclerophyll Forest	Swamp Oak Swamp Forest	Saltmarsh	Freshwater Wetland	General Landscaping*
Acanthaceae	*Brunoniella australis*	Blue Trumpet					
Adiantaceae	*Pellaea falcata*	Sickle Fern					
Adiantaceae	*Cheilanthes sieberi*						
Adiantaceae	*Adiantum aethiopicum*	Common Maidenhair					X
Aizoaceae	*Tetragonia tetragonioides*	New Zealand Spinach			X		
Alismataceae	*Alisma plantago-aquatica*	Water Plantain				X	
Amaranthaceae	*Alternanthera denticulata*	Lesser Joyweed					
Apiaceae	*Apium prostratum*	Sea Celery			X		
Apiaceae	*Centella asiatica*	Pennywort	X	X			X
Apiaceae	*Actinotus minor*	Lesser Flannel Flower					X
Apiaceae	*Hydrocotyle peduncularis*		X	X			
Apiaceae	*Hydrocotyle laxiflora*	Stinking Pennywort	X	X			
Araliaceae	*Polyscias sambucifolia*	Elderberry Panax					X
Bignoniaceae	*Pandorea pandorana*	Wonga Wonga Vine	X				X
Campanulaceae	*Wahlenbergia gracilis*	Australian Bluebell					X
Casuarinaceae	*Casuarina glauca*	Swamp Oak	X	X			X
Casuarinaceae	*Allocasuarina littoralis*	Black Sheoak					X
Chenopodiaceae	*Sarcocornia quinqueflora*				X		
Chenopodiaceae	*Einadia hastata*	Berry Saltbush	X				
Chenopodiaceae	*Einadia trigonos*	Fishweed	X				
Commelinaceae	*Commelina cyanea*	Native Wandering Jew	X	X			X
Cunoniaceae	*Ceratopetalum gummiferum*	Christmas Bush					X
Cyperaceae	*Bolboschoenus caldwellii*					X	
Cyperaceae	*Fimbristylis dichotoma*	Common Fringe-sedge	X				
Cyperaceae	*Eleocharis minuta*					X	
Cyperaceae	*Baumea articulata*	Jointed Twig-rush	X			X	

Family	Scientific Name	Common Name	Swamp Sclerophyll Forest	Swamp Oak Swamp Forest	Saltmarsh	Freshwater Wetland	General Landscaping*
Cyperaceae	*Baumea rubiginosa*		X			X	
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge	X			X	
Cyperaceae	*Lepidosperma laterale*						
Cyperaceae	*Schoenoplectus mucronatus*					X	
Dennstaedtiaceae	*Histiopteris incisa*	Bat's Wing Fern	X				X
Dicksoniaceae	*Calochlaena dubia*	Common Ground Fern	X				
Dilleniaceae	*Hibbertia aspera*	Rough Guinea Flower					X
Ericaceae	*Epacris pulchella*						X
Euphorbiaceae	*Homalanthus populifolius*	Bleeding Heart	X	X			X
Fabaceae (Faboideae)	*Gompholobium latifolium*	Golden Glory Pea					X
Fabaceae (Faboideae)	*Pultenaea paleacea*						X
Fabaceae (Faboideae)	*Bossiaea obcordata*	Spiny Bossiaea					X
Fabaceae (Faboideae)	*Hardenbergia violacea*	False Sarsaparilla	X				X
Fabaceae (Faboideae)	*Glycine microphylla*		X				X
Fabaceae (Mimosoideae)	*Acacia longifolia* subsp. *longifolia*	Sydney Golden Wattle	X				X
Fabaceae (Mimosoideae)	*Acacia suaveolens*	Sweet Wattle					X
Fabaceae (Mimosoideae)	*Acacia terminalis*	Sunshine Wattle					X
Fabaceae (Mimosoideae)	*Acacia ulicifolia*	Prickly Moses					X

Family	Scientific Name	Common Name	Swamp Sclerophyll Forest	Swamp Oak Swamp Forest	Saltmarsh	Freshwater Wetland	General Landscaping*
Haloragaceae	*Gonocarpus teucrioides*	Raspwort					X
Haloragaceae	*Gonocarpus micranthus* subsp. *micranthus*		X				X
Iridaceae	*Patersonia sericea* var. *sericea*						X
Juncaceae	*Juncus kraussii*	Sea Rush		X	X		
Juncaceae	*Juncus subsecundus*			X		X	
Juncaceae	*Juncus continuus*			X		X	
Juncaceae	*Juncus planifolius*			X		X	
Juncaceae	*Juncus prismatocarpus*			X		X	
Juncaginaceae	*Triglochin striatum*	Streaked Arrowgrass				X	
Juncaginaceae	*Triglochin microtuberosum*					X	
Lobeliaceae	*Pratia purpurascens*	Whiteroot	X	X			X
Lomandraceae	*Lomandra glauca* subsp. *glauca*						X
Lomandraceae	*Lomandra obliqua*						X
Lomandraceae	*Lomandra confertifolia* subsp. *rubiginosa*						X
Lomandraceae	*Lomandra filiformis* subsp. *filiformis*						X
Lomandraceae	*Lomandra longifolia* var. *longifolia*		X				X
Myrtaceae	*Melaleuca linariifolia*	Flax-leaved Paperbark	X				
Myrtaceae	*Corymbia maculata*	Spotted Gum					X
Myrtaceae	*Eucalyptus tereticornis*	Forest Red Gum	X				X
Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark	X	X		X	X

Family	Scientific Name	Common Name	Swamp Sclerophyll Forest	Swamp Oak Swamp Forest	Saltmarsh	Freshwater Wetland	General Landscaping*
Myrtaceae	*Melaleuca styphelioides*	Prickly-leaved Tea Tree	X				X
Myrtaceae	*Eucalyptus acmenoides*						X
Myrtaceae	*Eucalyptus robusta*	Swamp Mahogany	X	X			X
Myrtaceae	*Angophora costata*	Sydney Red/Rusty Gum					X
Myrtaceae	*Melaleuca armillaris*	Bracelet Honey-myrtle	X			X	X
Myrtaceae	*Kunzea ambigua*	Tick Bush					X
Myrtaceae	*Melaleuca hypericifolia*	Hillock bush					X
Myrtaceae	*Callistemon citrinus*	Crimson Bottlebrush	X				X
Myrtaceae	*Eucalyptus acmenoides*	White Mahogany					X
Myrtaceae	*Callistemon salignus*	Willow Bottlebrush	X				X
Myrtaceae	*Melaleuca decora*		X				X
Myrtaceae	*Melaleuca nodosa*	Ball Honeymyrtle					X
Myrtaceae	*Melaleuca sieberi*		X				X
Myrtaceae	*Melaleuca thymifolia*		X				X
Myrtaceae	*Corymbia gummifera*	Red Bloodwood					X
Myrtaceae	*Syncarpia glomulifera*	Turpentine					X
Myrtaceae	*Leptospermum polygalifolium* subsp. *cismontanum*						X
Myrtaceae	*Leptospermum trinervium*	Slender Tea-tree					X
Phormiaceae	*Dianella caerulea* var. *caerulea*		X	X			X
Pittosporaceae	*Billardiera scandens*	Appleberry	X				X
Poaceae	*Phragmites australis*	Common Reed		X	X	X	
Poaceae	*Paspalum vaginatum*	Salt-water Couch		X	X		

Family	Scientific Name	Common Name	Swamp Sclerophyll Forest	Swamp Oak Swamp Forest	Saltmarsh	Freshwater Wetland	General Landscaping*
Poaceae	*Echinopogon caespitosus*	Bushy Hedgehog-grass					X
Poaceae	*Dichelachne micrantha*	Shorthair Plumegrass					X
Poaceae	*Isachne globosa*	Swamp Millet	X			X	
Poaceae	*Poa labillardieri*	Tussock					X
Poaceae	*Entolasia stricta*	Wiry Panic	X				
Poaceae	*Themeda australis*	Kangaroo Grass					X
Poaceae	*Microlaena stipoides* var. *stipoides*		X				X
Poaceae	*Austrostipa pubescens*		X				X
Polygonaceae	*Persicaria decipiens*	Spotted Knotweed	X			X	
Polygonaceae	*Persicaria lapathifolia*	Pale Knotweed	X			X	
Polygonaceae	*Persicaria hydropiper*	Water Pepper	X			X	
Proteaceae	*Banksia integrifolia* subsp. *integrifolia*	Coastal Banksia					X
Proteaceae	*Grevillea sericea*						X
Proteaceae	*Hakea dactyloides*	Finger Hakea, Broad-leaved Hakea					X
Proteaceae	*Lambertia formosa*	Mountain Devil					X
Proteaceae	*Lomatia silaifolia*	Crinkle Bush					X
Proteaceae	*Petrophile pulchella*	Conesticks					X
Proteaceae	*Banksia oblongifolia*	Fern-leaved Banksia					X
Proteaceae	*Banksia serrata*	Old-man Banksia					X
Proteaceae	*Isopogon anethifolius*						X
Proteaceae	*Banksia spinulosa* var. *collina*						X
Ranunculaceae	*Ranunculus inundatus*	River Buttercup	X			X	

Family	Scientific Name	Common Name	Swamp Sclerophyll Forest	Swamp Oak Swamp Forest	Saltmarsh	Freshwater Wetland	General Landscaping*
Ranunculaceae	*Clematis glycinoides*	Headache Vine					X
Restionaceae	*Lepyrodia scariosa*		X	X		X	
Rubiaceae	*Opercularia varia*	Variable Stinkweed	X				
Rubiaceae	*Pomax umbellata*						X
Rutaceae	*Zieria smithii*	Sandfly Zieria					X
Sapindaceae	*Cupaniopsis anacardioides*	Tuckeroo					X
Sapindaceae	*Dodonaea triquetra*	Large-leaf Hop-bush					X
Smilacaceae	*Smilax glyciphylla*	Sweet Sarsaparilla	X				X
Sterculiaceae	*Lasiopetalum ferrugineum* var. *ferrugineum*						X
Thymelaeaceae	*Pimelea linifolia* subsp. *linifolia*						X
Typhaceae	*Typha orientalis*	Broad-leaved Cumbungi				X	
Violaceae	*Viola hederacea*		X	X			X
Vitaceae	*Cissus antarctica*	Water Vine	X				X

APPENDIX F – Bio Banking Credits (#201607-TF-156)

BioBanking

BioBanking Information Management System

Credit transfer report

Effective date: 29-July-2016

Transaction number: 201607-TF-156

Sellers' details:

Seller ID: 262

Name of seller: Angophora Holdings Pty Ltd

Other owner(s):

No other owners

Buyers' details:

Buyer ID: 299

Name of buyer: Aurizon Operations Limited

NSW GOVERNMENT Office of Environment & Heritage

Ecosystem credit(s) transferred

Number of credits	Credit profile ID	Agreement ID	Vegetation code	Vegetation type	CMA subregion	% surrounding vegetation	Patch size	Vegetation formation(see key)	Price per credit
15	2,238	212	NR149	NR149/Coastal floodplain sedgelands, rushlands, and forblands of the North Coast	Macleay Hastings - Northern Rivers	>70%	>100 ha	FRW	$2,636.36
372	2,235	212	NR217	NR217/Paperbark swamp forest of the coastal lowlands of the NSW North Coast Bioregion and Sydney Basin Bioregion	Macleay Hastings - Northern Rivers	>70%	>100 ha	FRW	$2,636.36
								Total sale price (excluding GST)	**$1,020,271.32**

Key to vegetation formations

Code	Vegetation formation
ALP	Alpine complex
ASA	Arid shrublands (Acacia)
ASC	Arid shrublands (Chenopod)
DSG	Dry sclerophyll forests (shrub/grass)
DSS	Dry sclerophyll forests (shrubby)
FRW	Forested wetlands
FWW	Freshwater wetlands
GLD	Grasslands
GRW	Grassy woodlands
HLD	Heathlands
MES	Miscellaneous ecosystems
RFT	Rainforests
SAW	Saline wetlands
SWG	Semi-arid woodlands (grassy)
SWS	Semi-arid woodlands (shrubby)
WSG	Wet sclerophyll forests (grassy)
WSS	Wet sclerophyll forests (shrubby)

The credit register provides further information about credit holdings and reports about credit trading activity. To view this information, please visit the public register website at www.environment.nsw.gov.au/bimspr/index.htm

For more information, please contact the BioBanking Scheme Manager - phone (02) 9995 6753; email biobanking@environment.nsw.gov.au

NSW GOVERNMENT | Planning & Environment

Mr Mark Harris
Environment Manager
Aurizon
PO Box 456
Brisbane QLD 4000

Our ref: SSI 07_0171

Dear Mr Harris

Hexham Train Support Facility (SSI 07_0171) Biodiversity Offsets (Condition C4)

I refer to your correspondence dated 22 January 2016 and subsequent supporting documentation requesting Secretary's approval of the Biodiversity Offsets Package for the above project.

The Department has reviewed preliminary documentation relating to the purchase of ecosystem credits for the Biodiversity Offsets Package and notes endorsement by the Office of Environment and Heritage for this approach. The Department is satisfied that it addresses the requirements of Condition C4, subject to provision of a final, consolidated package that includes evidence of retired credits.

It is acknowledged that the previously proposed northern and southern offset sites have been withdrawn from the package. The Department therefore requests information from Aurizon stating how the sites will be managed to ensure that their conservation is not diminished in the future. This information should be included as an amendment to the Vegetation Management Plan and the Ecological Monitoring Plan. A copy of the amended Plans should be provided to the Department to confirm that appropriate management measures are provided.

Should you have any further queries, please do not hesitate to contact Mick Fallon of the Department of Planning and Environment on (02) 9228 2083.

Yours sincerely

23/6/2016

Karen Harragon
Director, Social and Other Infrastructure Assessments
as delegate of the Secretary