

Department of Planning, Industry and the Environment
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12 Darcy Street
Parramatta NSW 2150
Attention: Sheelagh Laguna
Email: sheelagh.laguna@planning.nsw.gov.au

Dear Sheelagh,

Date 04/01/2022

Hydro Kurri Kurri Aluminium Smelter Remediation-Modification 2 (SSD-6666-Mod-2): Response to Agencies' Comments

Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) has reviewed the request for additional information issued by the Department of Planning, Industry and the Environment (the department) dated 21 October 2021 and the issues raised in the submissions from the following agencies:

- NSW Environment Protection Authority (EPA) (letter dated 18 October 2021)
- Department of Planning, Industry and Environment (DPIE) Water and the Natural Resources Access Regulator (NRAR) (letter dated 19 October 2021)
- Biodiversity and Conservation Division (BCD) of DPIE (letter dated 20 October 2021)
- Cessnock City Council (Public Authority Response posted 20 October 2021)
- Heritage NSW (Public Authority Response posted 22 October 2021).

Table 1 lists the issues from the agencies and Hydro's response.

In response to the department's comments regarding the revised Project boundary and the perceived potential for issues associated with Hydro's obligations under the RAP, RWEMP, VPA and the conditions of consent for SSD 6666 (as applicable), Hydro has removed the proposed amendment of the Project boundary from the Modification Application.

As a result, the Project boundary would remain as defined under the development consent for SSD 6666, however the amount of native vegetation clearance within the approved Project area (and the associated biodiversity credits to be retired) has been revised.

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This revised vegetation clearance (and associated amendment of Condition B41 from the development consent for SSD 6666 to reflect the revised biodiversity credits to be retired), the remediation of the northern area east of the Clay Borrow Pit, and the removal of Condition B38 from the development consent for SSD 6666 remain as the proposed modification.

Please feel free to give me a call if you wish to discuss.

Yours sincerely

A handwritten signature in black ink, appearing to be "ST", with a long horizontal line extending to the right.

Shaun Taylor

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Agency Issue	Hydro Response
DPIE The Department notes the request to amend the site boundary and remove several distinct areas of land from the remediation project footprint. It also appears that an additional area (northern area east of the Clay Borrow Pit) is to be included in the remediation activities. Further information is required to clarify and support the description of the modification and it is suggested this be provided in the form of a consolidated overview, preferably in table format. This information should include details of: • The current remediation status of each area discussed in Section 2.1 of the SEE (including the archaeological deposit area) and timing for completion	In response to the issues raised by the Department in response to Modification Application, and in other discussions regarding the Voluntary Planning Agreement, Hydro has removed the amendment to the Project boundary from the modification. This will address the Department's issues listed below. Remediation of the area containing the northern area east of the Clay Borrow Pit has not commenced: Hydro is awaiting approval of the proposed modification (due to the requirements of Condition B38 of the development consent for SSD 6666). Additional test pitting in this area is required to complete delineation of the contaminated area requiring remediation. The land surrounding the Containment Cell did not require remediation. <i>As noted in Section 2.1.1 of the SEE "The majority of the area in the south and southwest of the Smelter did not require remediation. Where remediation was required under SSD 6666, the validation consultant undertook validation sampling, analysis and reporting. This reporting was provided to the Site Auditor who has issued Interim Audit Advice (in advance of the Site Audit Statement) covering these areas, advising that they are satisfied with the remediation and validation activities undertaken in these areas, and that they are suitable for the proposed future industrial land use.</i> <i>In accordance with the Contaminated Site Management Plan (part of the Soil and Water Management Plan, which in turn forms part of the Remediation Works Environmental Management Plan) these areas have been flagged or fenced off to restrict access and to avoid recontamination."</i>

Agency Issue	Hydro Response
- The evidence to be provided demonstrating that remediation has been satisfactorily completed at each area (e.g. Independent Engineer sign off, advice from Site Auditor, legal documents etc) - The full implications of each component of the modification in terms of the Applicant's obligations under the RAP, RWEMP, VPA and the conditions of consent for SSD 6666 (as applicable). The information provided should be specific about each obligation and detail the relevant clauses in each document. Please also provide a site plan clearly marking the location of each area of the site discussed in the consolidated overview. Please provide justification for removing the remnant vegetation area (the area now not being cleared) from the project footprint, noting it may be possible to reduce the number of biodiversity credits without amending the project boundary at the containment cell	The process for providing evidence for satisfactory completion of remediation within the northern area east of the Clay Borrow Pit will be consistent with the remainder of the Project site, and as described in conditions B10, B11 and B12 of the development consent for SSD 6666 (as applicable). The primary evidence for the completion of remediation where it is required within the Project site will be a Remediation Validation Report prepared by the Validation, and an associated Site Audit Report and Site Audit Statement prepared by the Site Auditor. Removal of the revised Project boundary from the proposed modification will avoid any changes to obligations under the VPA. The RWEMP will be amended to reflect the proposed modification (removal of the PAD designation of the northern area east of the Clay Borrow Pit, and the remediation activities in this area). This will primarily be amendment of figures: the management measures to be implemented in remediating the northern area east of the Clay Borrow Pit are consistent with those described in the RWEMP, the RAP and the EIS. Hydro assumes that as the Project boundary will remain unchanged this site plan is no longer required. As previously discussed Hydro no longer proposes amendment of the Project boundary but will reduce the area of vegetation clearance within that boundary, and the associated number of biodiversity credits that require retirement.
NSW EPA The EPA does not object to the works, provided that the soil investigation/validation and remediation works are completed as per the Remediation Works Environmental Management Plan (RWEMP), the Smelter Site Remediation Action Plan (RAP) and Section 8.6 of the Environmental Impact Statement (EIS), and the proposed remediation works in the northern area east of the Clay Borrow Pit	Noted. The remediation of the northern area east of the Clay Borrow Pit will be undertaken consistent with remediation activities in the remainder of the Project site, in accordance with the RWEMP, the RAP and the EIS.

Agency Issue	Hydro Response
Any contaminated material awaiting placement in the Containment Cell should be managed appropriately and in a timely manner to prevent leachate pollution of water.	Hydro has prepared a Soil and Water Management Plan (SWMP) for the decommissioning, demolition and remediation activities at the Smelter and within Hydro land. The requirements described in the SWMP, including the specific requirements of the Contaminated Soil Management Plan and Leachate Management Plan that form appendices to the SWMP, will be implemented to minimise potential impacts from any stockpiled contaminated material.
DPIE (Water) and NRAR	Noted
BCD	The ecological consultant, GHD, has revised the "<i>Biodiversity Assessments - Hydro Site: Hydro Aluminium Kurri Kurri Smelter Remediation and Demolition - Modification to Biobanking Offset Calculations</i>", having reassessed the impacts on koala and recalculated the species credits. The revised report is attached.
Cessnock City Council	The biodiversity credits had been recalculated to reflect the reduced vegetation clearance area. As discussed, in response to comments from BCD GHD, has revised the "<i>Biodiversity Assessments - Hydro Site: Hydro Aluminium Kurri Kurri Smelter Remediation and Demolition - Modification to Biobanking Offset Calculations</i>", having reassessed the impacts on koala and recalculated the species credits.
Biodiversity credits should be appropriately recalculated to reflect the modified impact of the development During any works, the applicant be required to take caution and should any Aboriginal relics be uncovered then works should cease and advice be sort from the relevant Department	Hydro has prepared an Aboriginal Heritage Management Plan for the decommissioning, demolition and remediation activities at the Smelter and within Hydro land. The unexpected finds protocol described in this plan would be implemented in the event a potential Aboriginal relics is unearthed.
The Remedial Action Plan be updated to reflect the proposed additional material and works be undertaken in accordance with the relevant construction management plans and RAP	Hydro does not propose to revise the RAP. The remediation within the northern area east of the Clay Borrow Pit will be undertaken in

Agency Issue	Hydro Response
Heritage NSW Heritage NSW has no additional comments. Note: in separate correspondence (email to heritage consultant, AECOM, dated 26 October 2021), Heritage NSW notes that “<i>The Status of Recorded Aboriginal Site 37-6-3872 has now been changed to ‘not a site’</i>”.	accordance with the methodology described in the RAP (as applicable). A separate Validation Report will, however, be prepared for this area that will inform the relevant SAS. Noted



Hydro Aluminium Kurri Kurri Pty Ltd

Biodiversity Assessments - Hydro Site
Hydro Aluminium Kurri Kurri Smelter Remediation and
Demolition - Modification to Biobanking Offset Calculations

December 2021

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- Appendix A – Biodiversity credit report
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Glossary of terms and acronyms

Term	Definition
BAM	Biodiversity Assessment Methodology
BBAM	The NSW BioBanking Assessment Methodology (OEH 2014)
BC Act	<i>Biodiversity Conservation Act 2017 (NSW)</i>
BCD	Biodiversity Conservation Division of NSW Department of Planning, Industry and Environment, formerly NSW Office of Environment and Heritage (OEH). Note that data maintained by the current BCD appears on the internet as published by OEH and is referenced as such in this report.
BCT	NSW Biodiversity Conservation Trust (BCT, formerly Nature Conservation Trust)
Biobank site	Land that is designated by a biobanking agreement under Part 7A of the former TSC Act to be a biobank site (see Biodiversity Stewardship Site – BSS).
Biobanking agreement	An agreement entered into between the landowner and the NSW Environment Minister under Part 7A of the former TSC Act for establishing a biobank site (see Biodiversity Stewardship Agreement – BSA).
Biodiversity credit	A unit of biodiversity value to measure specific development impacts or conservation gains in accordance with the FBA, the BBAM or the BAM. Includes ecosystem credits or species credits.
Biodiversity credit report	Specifies the number and type of biodiversity credits required to offset the impacts of a Major Project in accordance with the FBA or that would be generated through conservation and management of an offset site under a BioBanking agreement or a BSA.
Biodiversity offsets	Specific measures that are put in place to compensate for impacts on biodiversity values.
Biodiversity Stewardship Agreement (BSA)	An agreement entered into between the landowner and the Minister under Part 5 of the <i>Biodiversity Conservation Act 2016</i> (BC Act) for establishing a Biodiversity Stewardship Site.
Biodiversity Stewardship Site (BSS)	Land that is designated by a Biodiversity Stewardship Agreement to be a Biodiversity Stewardship Site. Equivalent to the former 'biobank site'.
Biodiversity values	The composition, structure and function of ecosystems, including native species, populations and ecological communities, and their habitats.
Ecosystem credit	The class of biodiversity credits created or required for the impact on EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur within a vegetation type according to the BBAM, FBA and BAM.
EEC	Endangered ecological community
EIS	Environmental Impact Statement
ELA	EcoLogical Australia Pty Ltd
EPBC Act	The Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cth)
EPBC Act-listed biota	Threatened species and communities and migratory species listed under the EPBC Act.
FBA	The Framework for Biodiversity Assessment (OEH 2014a). The methodology to assess impacts on biodiversity that is used to assess all biodiversity values on the development site for a Major Project under the NSW <i>Environmental Planning and Assessment Act 1979</i> (EPA Act) and in accordance with The NSW Biodiversity Offsets Policy for Major Projects (OEH 2014a).
Food tree	A tree species that is recognised as being of value as a foraging resource for a given fauna species.
GIS	Geographic information systems
Habitat tree	A tree that is recognised as being of value as a shelter, roosting and/or nesting resource for fauna species. Includes hollow-bearing trees, stags (standing dead trees) and trees with nests or other signs of fauna occupancy.
Migratory species	Species that are listed as migratory under the EPBC Act.
NSW-listed biota	Threatened species, populations and communities listed under the NSW BC Act or FM Act.

Term	Definition
OEH	Former NSW Office of Environment and Heritage now Biodiversity Conservation Division of NSW Department of Planning, Industry and Environment. Note that data maintained by the current BCD appears on the internet as published by OEH and is referenced as such in this report.
PCT	Plant community type
The Project	The remediation of the former Hydro Aluminium Smelter located at Hart Road in Loxford, NSW that is the subject of this report.
Project modification area	The area that would be subject to direct impacts arising from the Project modification and that is the subject of this report.
Retired (credits)	Means biodiversity credits that have been used to offset the impacts of a particular development or to facilitate private land conservation and that are not available to offset the impacts of a development.
Species credit	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates according to the BBAM, FBA and BAM.
Species-credit type threatened species	Threatened species that are linked to species credits according to the BBAM (rather than ecosystem credits) because they cannot be reliably predicted to use an area of land based on habitat surrogates according to the BBAM.
TEC	Threatened ecological community listed under the EPBC Act and/or the BC Act.
The EPBC Act Offsets Policy	The <i>Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy October 2012</i> (DSEWPac 2012).
The locality	Land within a 10 km radius of the Project modification area.
Threatened biota	Threatened species, populations or communities listed under the EPBC Act, BC Act or FM Act.
TSC Act	The <i>Threatened Species Conservation Act 1995</i> (NSW), which was repealed and replaced by the BC Act in August 2017.

1. Introduction

1.1 Project background

Hydro Aluminium Kurri Kurri Pty Ltd (Hydro) is in the process of remediating the former Hydro Aluminium Smelter (the Project). The Project involves the demolition of redundant smelter buildings and structures, remediation of the site and design, construction, and operation of a waste management facility. The Project is located at Hart Road in Loxford, NSW.

The Project was determined to be State Significant Development (SSD) requiring approval under Division 4.7 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). An Environmental Impact Statement (EIS) was prepared in July 2016 (*Former Hydro Aluminium Kurri Kurri Smelter Demolition and Remediation*) to assess the potential impacts of the Project in accordance with the Secretary's Environmental Assessment Requirements (SEARs) (dated 18 November 2014). Approval for the Project was granted by the Department of Planning, Industry and Environment (DPIE) on 20 December 2020 (SSD-6666).

As part of the EIS for the Project an ecological assessment was completed (ELA 2016). This assessment detailed the potential impacts of the Project on biodiversity values and calculated the biodiversity credits required to offset these impacts in accordance with the Biobanking Assessment Methodology (BBAM) (OEH 2014).

The project was referred to the Australian Government Minister for the Environment and Energy under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) due to the potential of impacts to threatened species listed under the EPBC Act. The Australian Minister for the Environment determined on 29 March 2016 that the Project was not deemed to be a controlled action. No additional assessment, approval or biodiversity offsets are required under the EPBC Act.

1.2 Proposed modification

Hydro is proposing to modify the Project planning approval SSD 6666 under section 4.55 (1a) of the EP&A Act. The proposed modification includes:

- Revision of the vegetation clearance area, and the associated re-calculated biodiversity credit requirements

This *Hydro Aluminium Kurri Kurri Smelter Remediation and Demolition - Biobanking Offset Calculations Modification Report* (report) forms part of the application for the proposed modification to the Project approval, and informs the assessment of the revision of the vegetation clearance area.

The proposed modification has resulted in a reduced quantum of impact to biodiversity values. This includes a reduction in the extent of native vegetation that would be removed and a reduction to the number of threatened flora and area of threatened fauna habitat that would be impacted as a result of the Project.

In relation to biodiversity the proposed modification would require the modification of Condition of Approval B41.

1.3 Purpose and scope of this report

GHD has been engaged to assess the impacts of the revised Project boundary on biodiversity values and recalculate the offset requirements for the Project in accordance with the BBAM. The purpose of this Biobanking Offset Calculations Modification Report is to:

- Describe the background and legislative context for the assessment
- Outline the methods used in the assessment and the relationship to the previous ecological assessment (ELA 2016)
- Update the impact assessment for the Project including a description of measures to reduce impacts on biodiversity values and summary of the quantum of residual impacts
- Complete a revised BioBanking assessment with reference to the FBA and based on the reduced quantum of impact associated with the Project modification and updated field survey data and other information related to the assessment of impacts on threatened biota
- Calculate the biodiversity credits that would need to be retired to offset the residual impacts of the Project modification

This report forms part of the modification report for the Project (as described in Section 1.2).

1.4 SEARs

The EIS for the project was prepared in accordance with the SEARs issued on 18 November 2014. Relevant SEARs relating to biodiversity requirements are provided in Table 1-1.

Note that not all of these SEARs are applicable to this assessment as the purpose of this report is to assess the reduction in offset requirements associated with the proposed modification.

Table 1-1 Secretary's Environmental Assessment Requirements Scenario 2 requirements relevant to biodiversity

Requirements	Where addressed
1. The environmental assessment should include a detailed biodiversity assessment, including assessment of impacts on threatened biodiversity, native vegetation and habitat. This assessment should address the matters included in the following sections:	This report
2. A field survey of the site should be conducted and documented in accordance with relevant guidelines, including: • Threatened Biodiversity Survey and Assessment: Guidelines for Development and Activities – Working Draft • Threatened Species Survey and Assessment Guidelines: Field Survey Methods for Fauna – Amphibians • Threatened species survey and assessment guideline	This requirement is not applicable to this modification. These matters were addressed in the Project ecological assessment (ELA 2016)
3. The EA should contain the following information as a minimum:	
a) The requirements set out in the <i>Guidelines for Threatened Species Assessment</i> (Department of Planning July 2005)	N/A
b) Description and geo-referenced mapping of the study area	Figure 1
c) Description of survey methodologies used, including timing, location and weather conditions	Section 2
d) Details including qualifications and experience of all staff undertaking surveys, mapping and assessment of impacts as part of the EA	Section 2
e) Detailed descriptions of all vegetation communities (both forested and non-woody e.g. derived grasslands including classification and methodology used to classify) including all plot data. Plot data should be supplied to the OEH in electronic format (e.g. MS-Excel) and organised by vegetation community. Copies	Refer to Project EIA Appendix 10 Section 5.2 and Appendix B. This requirement is not applicable to this modification.

Requirements	Where addressed
of all plot data (quadrat/transect sheets should also be provided)	
f) Identification of national and state listed threatened biota known or likely to occur in the study area and their conservation status	Section 3
g) Description of the likely impacts of the proposal on biodiversity and wildlife corridors, including direct and indirect and construction and operation impacts. Wherever possible, quantify these impacts such as the amount of each vegetation community or species habitat to be cleared or impacted, or any fragmentation of a wildlife corridor	This requirement is not applicable to this modification. Refer to Project EIS Appendix 10 Section 6
h) The proposal should provide an assessment of the cumulative impacts of the proposal in relation to other nearby developments	This requirement is not applicable to this modification. Refer to Project EIS Appendix 10 Section 6
i) Identification of the avoidance, mitigation and management measures that will be put in place as part of the proposals to avoid or minimise impacts, including details about alternative options considered and how long-term management arrangements will be guaranteed	Section 3.1
j) Description of the residual impacts of the proposal. If the proposal cannot adequately avoid or mitigate impacts on biodiversity then a biodiversity offset package is expected (see the requirements for this at point 6 below)	Section 4.5 and Section 4.6
k) Provision of specific Statement of Commitments relating to biodiversity	This requirement is not applicable to this modification.
4. As assessment of direct and indirect impacts of the proposal must be undertaken for threatened biodiversity known or considered likely to occur in the study area based on the presence of suitable habitat. This assessment must take into account:	
a) The factors identified in s.5A of the EP&A Act, and	Section 3.1.4
b) The guidance provided by the <i>Threatened Species Assessment Guideline – the Assessment of Significance</i>	Section 3.1.5
5. Where an offsets package is proposed by a proponent for impacts to biodiversity (as a BioBanking Statement has not been sought) this package must be developed in accordance with the NSW offset principles for major projects (state significant development and infrastructure), which may be guided by the NSW OEH interim policy on assessing and offsetting biodiversity impacts of Part 3A State significant development (SSD) and State significant infrastructure (SSI) projects.	Section 4
6. Where appropriate, likely impacts (both direct and indirect) on any adjoining and/or nearby National Parks and Wildlife Service estate or any marine and estuarine protected areas	This requirement is not applicable to this modification.
7. With regard to the Commonwealth Environment Protection and Biodiversity Conservation Act 1999, the assessment should identify any relevant Matters of National Environmental Significance and whether the proposal has been referred to the Commonwealth or already determined to be a controlled action	Refer to Project EIA Appendix 10 and Project Referral (ELA 2015). The modification has resulted in a reduction to impacts to MNES and has not

Requirements	Where addressed
	changed the conclusion of the referral.

1.5 Scope and limitations

This report: has been prepared by GHD for Hydro Aluminium Kurri Kurri Pty Ltd and may only be used and relied on by Hydro Aluminium Kurri Kurri Pty Ltd for the purpose agreed between GHD and the Hydro Aluminium Kurri Kurri Pty Ltd as set out in section 1.3 of this report.

GHD otherwise disclaims responsibility to any person other than Hydro Aluminium Kurri Kurri Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report refer section 5. of this report GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Hydro Aluminium Kurri Kurri Pty Ltd, EcoLogical Australia, Daracon and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

GHD has not been involved in the preparation of the *Statement of Environmental Effects: Modification 2 to SSD 6666 – Project Boundary and Aboriginal Heritage Amendments* (Ramboll, 2021) (MOD 2 SEE) and has had no contribution to, or review of the MOD 2 SEE other than this Modification to Offset Calculations Report. GHD shall not be liable to any person for any error in, omission from, or false or misleading statement in, any other part of the MOD 2 SEE.

2. Methodology

2.1 Desktop assessment

The Project area and surrounding land was assessed as part of the ecological assessment completed for the Project Environmental Assessment (Project EIA) (ELA 2016). This report was reviewed along with the BBAM plot data collected as part of the ELA assessment and BioBanking credit calculations for the Project (Biobanking proposal case ID 0080/2015/1896D).

2.2 Geographical Information System (GIS) analysis

Vegetation mapping and threatened species data that was completed in 2016 was provided to GHD as shape files (ELA 2016). This data was imported into ArcGIS software to calculate revised areas of impact to native vegetation and threatened biota known or assumed to occur within the Project area.

GIS analysis was also used to plot the assessment circles surrounding the modified Project area in which landscape scores are calculated. Native vegetation cover, extent and connectivity were assessed using aerial photography and GIS data supplied by ELA that was used for their assessment.

The assessment circles and GIS area calculations were used to enter information about landscape value and to determine the change in Landscape Value score by assessing the impact of the modified Project on native vegetation cover and connectivity as well as the size of adjacent remnant vegetation.

2.3 Threatened flora surveys

Targeted threatened flora surveys were completed within the Project modification area by two GHD ecologists on 8 October 2020. The purpose of this survey was to ground-truth threatened species points for *Eucalyptus parramattensis* subsp. *decadens* and *Grevillia parviflora* subsp. *parviflora* that were collected during the 2016 ecological survey of the site (ELA 2016). During this survey transects spaced five metres apart were walked throughout the revised Project area and any threatened flora recorded using an ArcGIS collector program.

2.4 Threatened fauna habitat assessments

To assist with the refinement of threatened fauna species polygons, habitat assessments were completed within the revised Project area for the following fauna species that were identified in the Project ecological assessment as requiring species credit calculations:

- Regent Honeyeater (*Anthochaera phrygia*)
- Green-thighed Frog (*Litoria brevipalmata*)
- Southern Myotis (*Myotis macropus*)
- Koala (*Phascolarctos cinereus*).

2.5 BioBanking assessment

Biodiversity credits were calculated according to the methodology presented in the *BBAM and Credit Calculator Operational Manual* (DECC 2009) and the *Draft Operational Manual for using the BioBanking Credit Calculator v2.0* (OEH 2014). The credit calculator is the software version of the methodology. Landscape values, vegetation zones, geographic habitat features and BBAM plot data previously used in the BBAM credit calculator to determine offset requirements for the approved Project was duplicated for the assessment of the revised area (data extracted from proposal ID 0080/2015/1896D). Revised areas for vegetation impacts and threatened fauna species polygons were calculated using GIS and entered into the BBAM calculator.

2.6 Staff qualifications

This report was prepared by Arien Quin (BBAM accreditation 0120) using credit calculator Version 4.0. The credit calculations have been submitted to the Biodiversity Conservation Division (BCD) and the biodiversity credit report is included as Appendix A.

The experience and qualifications of staff involved in the preparation of this report are provided in Table 2-1.

Table 2-1 Staff qualifications

Name	Position / Project Role	Qualifications	Years of experience
Ben Harrington	Technical director - Biodiversity Technical Review	BSc, MSc Accredited BBAM assessor Accredited BAM assessor	17+
Arien Quin	Senior ecologist BBAM credit calculations Reporting	BA/BSc (Botany major) Accredited BBAM assessor Accredited BAM assessor	14+
Alejandro Barreto	Senior ecologist Targeted flora surveys	BSc Biotechnology Accredited BAM Assessor	6+
Brayden Luke	Ecologist Targeted flora surveys	BSc	3+
Fiona MacKay	Senior GIS technician GIS analysis and calculations	Engineering Drafting Certificate	15 +

2.7 Assumptions

Calculations used in this report have relied upon Biobanking Assessment Methodology (BBAM) plot/transect data collected during the field surveys associated with the ecological assessments completed for the Project EIA (ELA 2016). It has also used data contained in the BBAM calculator (proposal ID 0080/2015/1896D) that was provided by the Biodiversity Conservation Division (BCD). These data have not been independently verified by GHD. It is assumed that field data that was used to inform the Project EIS is accurate.

As part of detail design of the Project the project footprint was reduced to avoid areas of native vegetation that were approved for clearing. A ground survey of the revised footprint was completed by Dracon prior to vegetation clearing commencing, this data was provided to GHD as a DWG file that was then used to map the extent of vegetation clearing and determine project impacts on biodiversity. These data have not been ground-truthed or otherwise independently verified by GHD. It is assumed that this survey data is accurate.

3. Impact assessment

3.1 Impact avoidance

Section 6.1 of the ecological assessment completed as part of the Project EIA outlines the measures undertaken to avoid and minimise impacts to native vegetation and threatened biota (ELA 2016).

The proposed Project modification has resulted in further avoidance of impacts to additional areas of native vegetation, threatened flora species and habitat for threatened fauna. The reduced quantum of residual impact to biodiversity values are described below.

3.2 Residual impacts

3.2.1 Native vegetation

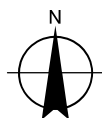
The Project EIA determined that the Project would result in a residual impacts to 2.5 hectares of native vegetation. Including 1.35 hectares of Parramatta Red Gum -Narrow Leaved Apple- Prickly-leaved Paperbark Shrubby Woodland in the Cessnock- Kurri Kurri Area (HU 847) and 1.35 hectares of Spotted Gum-Red Ironbark- Narrow-leaved Ironbark -Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814). Vegetation in the impact area comprises part of local occurrences of endangered ecological communities (EECs) as summarised in in Table 3-1.

Avoidance of additional areas of native vegetation during detailed design has reduced the area of native vegetation to be cleared to 1.53 hectares. This includes 0.97 hectares of Parramatta Red Gum -Narrow Leaved Apple- Prickly-leaved Paperbark Shrubby Woodland in the Cessnock- Kurri Kurri Area (HU 847) and 0.56 hectares of Spotted Gum-Red Ironbark- Narrow-leaved Ironbark -Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814). A summary of the reduced impacts to native vegetation associated with the modification is provided in Table 3-1.



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 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 56



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Project modification

Figure 3-1

Table 3-1 Summary of reduced impacts to native vegetation within the Project area

Vegetation Community	Conservation Status	Approved area of impact (ha)	Revised area of impact (ha)	Reduction in impact area (ha)
Parramatta Red Gum -Narrow Leaved Apple-Prickly-leaved Paperbark Shrubby Woodland in the Cessnock- Kurri Kurri Area (HU 847)	Kurri Sand Swamp Woodland in the Sydney Basin Bioregion EEC	1.35	0.97	0.38
Spotted Gum-Red Ironbark- Narrow-leaved Ironbark - Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814)	Lower Hunter Spotted Gum - Ironbark Forest in the Sydney Basin Bioregion EEC	1.15	0.56	0.59
TOTAL		2.50	1.53	0.97

3.2.2 Threatened flora

The Project EIA determined that the proposal would impact four (4) *Eucalyptus parramattensis* subsp. *decadens* individuals (listed as a vulnerable species under the *Biodiversity Conservation Act 2016* (BC Act)) and a single clump of *Grevillea parviflora* subsp. *parviflora* consisting of five (5) stems (listed as vulnerable species under the BC Act).

The reduction to the Project vegetation clearance requirements associated with the modification has subsequently resulted in the avoidance of all impacts to *Grevillea parviflora* subsp. *parviflora* and a reduction in impacts to *Eucalyptus parramattensis* subsp. *decadens* to one (1) individual.

3.2.3 Threatened fauna

The avoidance of 0.97 hectares of native vegetation has also resulted in reduced impacts to habitat for threatened fauna including species credit species identified as having potential to occur in the Project area (ELA 2016). These reduced impacts are summarised in Table 3-2. It should be noted that the reduction in impact area for Southern Myotis also reflects supplementary habitat assessments conducted by GHD ecologists with reference to guidelines for the mapping of species polygons for threatened bats (OEH 2018) that were published after the original ecological assessment was completed (ELA 2016). Further discussion regarding impacts to these species is provide in Section 4.4.

Table 3-2 Summary of reduced impacts to species credit species within the Project area

Threatened biota	Habitat assessed as impacted in Project EIA (ha) (ELA 2016)	Revised impacts to habitat associated with modification (ha)	Reduction in impact area (ha)
Regent honeyeater	1.15	0.56	0.59
Green-thighed Frog	1.46	0.36	1.10
Southern Myotis	14.23	0.4	13.83
Koala	1.35	0.97	0.38

3.3 Assessment under S5A of the EP&A Act

The proposed modification has not resulted in any changes to the conclusions of the Assessments of Significance that were completed for threatened biota listed under the BC Act (then *Threatened Species Conservation Act 1995*) as part of the ecological assessment completed for the Project EIA. The Project modification would not result in any significant impacts to threatened biota listed under the BC Act.

3.4 Assessment under the EPBC Act

The proposed modification has resulted in reduced impacts to threatened biota listed under the EPBC Act identified as occurring or having potential to occur within the project area (ELA 2016).

The proposed modification has not resulted to any changes to the determination by the Australian Minister for the Environment of March 2016 that the Project was not a controlled action. The Project modification would not result in any significant impacts to MNES listed under the EPBC Act. No additional assessment, approval or biodiversity offsets are required under the EPBC Act.

3.5 Cumulative impacts

The proposed modification would not change the results of the cumulative impact assessment described in the Section 6.2 of the ecological assessment prepared for the Project EIA (ELA 2016).

4. Revised BioBanking assessment

4.1 Overview

The BioBanking assessment that was completed as part of the Project EIA (ELA 2016) has been reviewed and required offsets recalculated based on the revised vegetation clearance requirements. The results of this assessment are provided below.

4.2 Landscape assessment

4.2.1 Assessment circles

The area of native vegetation within the 100 hectares and 1000 hectare assessment circles surrounding the Project modification area was calculated using ArcGIS. Approximately 41 hectares of native vegetation occurs within the 100 hectare buffer area. The proposed removal of 1.5 hectares of native vegetation would reduce the percentage cover to 39.5 percent, therefore the amount of vegetation within the 100 hectare circle would be reduced by one cover class after development (i.e. reduced to 36-40 % native vegetation cover).

The native vegetation cover within the 1000 hectare circle was calculated to be approximately 606 hectares. This represents a cover class between 56-60 percent. The removal of 1.5 hectares would not result in any changes to the cover class after development.

Table 4-1 summarises the results of the assessment for each circle before and after development. The assessment circles and landscape assessment for the revised Project area are shown in Figure 1.

The changes to cover class outlined above are consistent with those outlined in the Project EIA (ELA 2016) reflecting a minor reduction in the quantum of impact at the landscape scale.

Table 4-1 Area of vegetation in each assessment circle before and after development

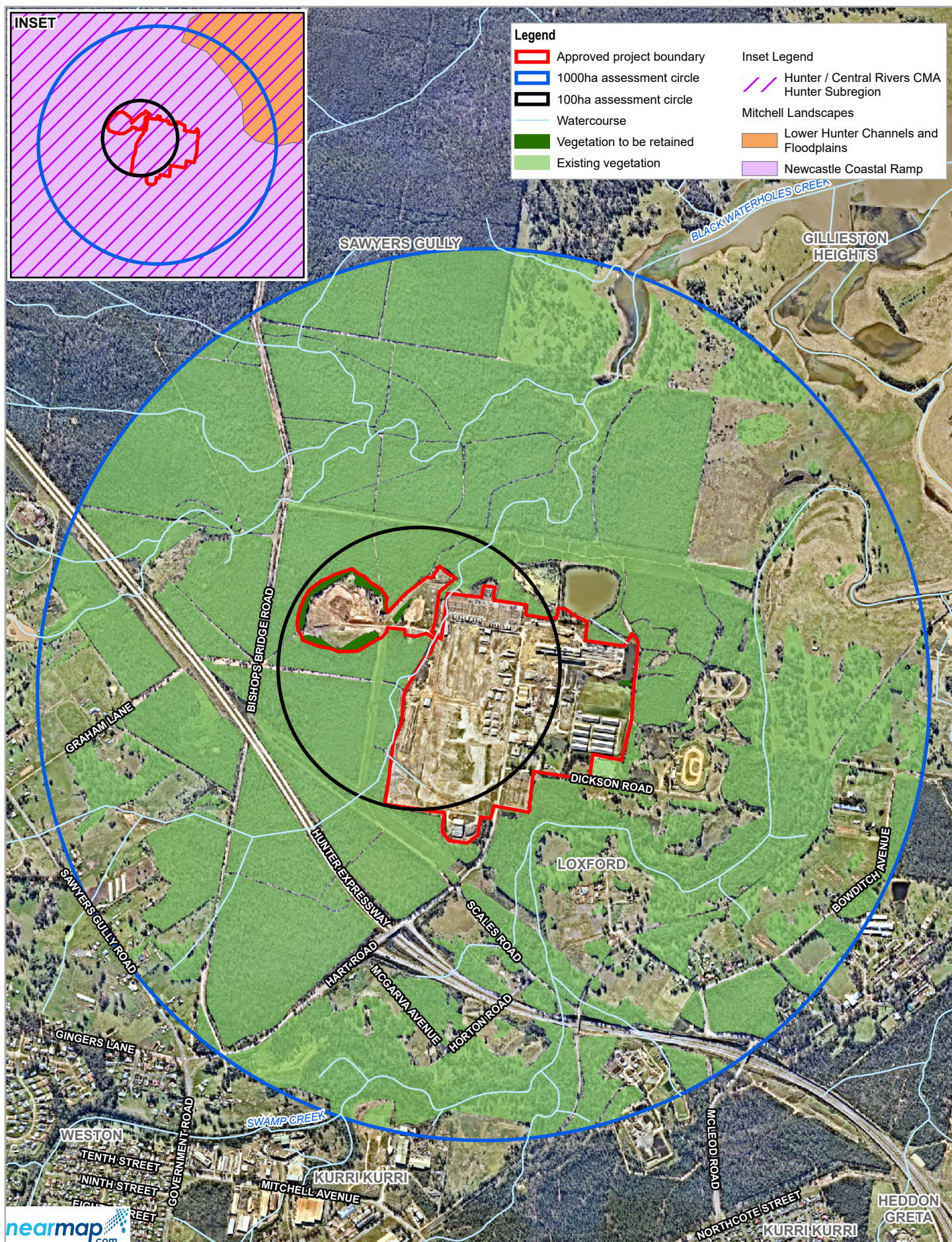
Assessment Circle	Before development	After development
100 hectare	41-45%	36-40%
1000 hectare	56-60%	56-60%

4.2.2 Connectivity assessment

The proposed modification has not resulted in any changes to the connectivity assessment completed as part of the Project EIA (ELA 2016). The connectivity value (width) would remain within the >30-100 metre width class before and after development.

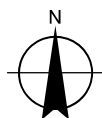
4.2.3 Patch size

The proposed modification has not resulted in any changes to patch size. Patch size for the assessment would remain at > 201 hectares.



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



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Landscape assessment

Figure 4-1

4.3 Vegetation zones

Impacts associated with the proposed modification include the removal of 1.53 hectares of native vegetation. This comprises impacts to two vegetation zones in the Project modification area:

- 0.97 hectares of Parramatta Red Gum -Narrow Leaved Apple- Prickly-leaved Paperbark Shrubby Woodland in the Cessnock- Kurri Kurri Area (HU 847) in moderate/good condition
- 0.56 hectares of Spotted Gum-Red Ironbark- Narrow-leaved Ironbark -Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814) in moderate/good condition

Both vegetation zones comprises occurrences of EECs listed under the BC Act.

Vegetation zones within the Project modification area are summarised in Table 4-2 and are shown in Figure 2. Plot data for each vegetation zone was copied from the BBAM calculator (proposal ID 0080/2015/1896D) (ELA 2016).

Table 4-2 Vegetation zones within the Project modification area

Veg Zone ID	Vegetation Type	Condition	Conservation Status	Area (ha)
1A	Parramatta Red Gum - Narrow Leaved Apple- Prickly-leaved Paperbark Shrubby Woodland in the Cessnock- Kurri Kurri Area (HU 847)	Moderate/good	Kurri Sand Swamp Woodland in the Sydney Basin Bioregion EEC	0.97
5A	Spotted Gum-Red Ironbark- Narrow-leaved Ironbark -Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814)	Moderate/good	Lower Hunter Spotted Gum - Ironbark Forest in the Sydney Basin Bioregion EEC	0.56

4.4 Assessment of threatened species

4.4.1 Predicted species

The proposed modification would result in impacts to the same vegetation types, patch size and connectivity widths and therefore the same suite of threatened species to those outlined in the Project EIA are predicted to occur within the revised vegetation clearance area (refer to Appendix B).

4.4.2 Candidate flora species

As outlined in Section 3.2.2 the proposed modification has resulted in reduced impacts to two threatened flora species that were recorded within the approved Project area. This includes:

- Avoidance of all impacts to *Grevillea parviflora subsp parviflora*
- A reduction in impacted from five (5) *Eucalyptus parramattensis subsp. decadens* individuals to one (1) individual

4.4.3 Candidate fauna species

As outlined in Section 3.2.3 the proposal has resulted in reduced impacts to fauna species identified as species credit species. These revised impacts are discussed below.

Regent Honeyeater

Within the proposed modification area habitat for the Regent Honeyeater is associated with Spotted Gum-Red Ironbark- Narrow-leaved Ironbark -Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814). The species polygon for this species has been mapped and re-calculated based on a reduced impact on this vegetation type from 1.15 hectares to 0.56 hectares.

The revised species polygon for the Regent Honeyeater is shown in Figure 3.

Green-thighed Frog

Targeted surveys completed during the ecological assessment completed for the EA did not record this species (ELA 2016). However due to the species being recorded to the north of the Project area during a previous survey completed in 2004, the Project EIA determined that there may be some marginal habitat for the Green-thighed Frog with a small number of sparsely vegetated retention ponds located along the edge of the Project area. The species polygon also included disturbed and hardstand area within the former smelter site that is unlikely to provide habitat for this species.

The supplementary habitat assessment and the proposed modification has resulted in a reduction of impacts to Green-thighed Frog habitat from 1.43 hectares to 0.36 hectares.

The revised species polygon for the Green-thighed Frog is shown in Figure 3.

Southern Myotis

The species polygon for Southern Myotis presented in the ecological assessment for the Project EIA includes 14.23 hectares of habitat for this species. The majority of this area is disturbed land and hardstand that would not provide habitat for this species (ELA 2016).

The species polygon for the Southern Myotis was refined with reference to the “species credit” threatened bats and their habitat: NSW survey guidelines for the Biodiversity Assessment Method (BAM) (OEH 2018). In accordance with this guideline the polygon boundaries have been aligned to native vegetation (equivalent to Plant Community Types under the BAM) within the proposed modification area that are associated with the Southern Myotis and that occur within 200 metres of waterbodies with pools/stretches of water 3 metres or wider.

The revised species polygon for Southern Myotis is shown on Figure 3.

Koala

The ecological assessment that was completed for the approved Project has assumed that the Project site contains 1.35 hectares of Koala habitat. This assumption has been based on an historic BioNet Atlas Koala record from 1980 to the west of the Project area (although the report states that this record has an accuracy of 10 km and this record would not, alone, indicate high Koala activity in the area). Habitat for the species was assumed to be present on the site due to the presence of Kurri Sand Swamp vegetation (Parramatta Red Gum -Narrow Leaved Apple-Prickly-leaved Paperbark Shrubby Woodland in the Cessnock- Kurri Kurri Area (HU 847). Parramatta Red Gum is known to be an important Koala feed tree in the Port Stephens area (ELA 2016). There is little information known about the Koala population within the Cessnock Local Government Area and it is not known whether this tree species is an important food source for the Koala within the Cessnock area.

The Koala habitat information base combined with habitat assessments of the site have been used to determine the likelihood that the revised vegetation clearance area would provide habitat for the Koala.

A review of the habitat within the site along with mapping provided in the Koala Habitat Information Base on the NSW Government SEED portal (DPIE 2019) indicates that the modified vegetation clearance area is unlikely to contain koala habitat due to:

- The lack of recent Koala records in the locality (DPIE 2010)
- The site not being within an area of mapped regional Koala significance
- The site occurs within an area mapped to be of low habitat suitability for Koala (0-0.1) (with a high confidence)
- The likelihood of occurrence of koala within the revised project site is modelled as low (DPIE 2019)

Assessment of the above information combined with lack of recent local records and the disturbed nature of the vegetation within the revised vegetation clearance area indicates that this vegetation has low likelihood of providing habitat for Koalas.

Despite the low likelihood of occurrence of Koalas at the site due to the lack of survey for the species they have been assumed present within areas of Parramatta Red Gum - Narrow Leaved Apple - Prickly-leaved Paperbark Shrubby Woodland in the Cessnock - Kurri Kurri Area (HU 847).

The supplementary habitat assessment and the proposed modification has resulted in a reduction of potential impacts to Koala habitat from 1.35 hectares to 0.97 hectares.

The revised species polygon for the Koala is shown in Figure 3.

4.4.4 Credit calculations

Revised credit calculations for the modification were completed by Arien Quin (accredited assessor 0120) using the BBAM calculator (version 4.0). The credit calculations have been submitted to BCD and the biodiversity credit report is included as Appendix A and summarised below.

The quantum of biodiversity credits required to offset the residual impacts of the proposed modification are based on BioBanking calculations and expressed as BBAM credits. If offsets are secured from a stewardship site assessed under the BAM, then a credit equivalence statement would need to be obtained from the BCD to confirm the quantum of offset.

4.4.5 Ecosystem credits

Table 4-3 outlines the approved and revised areas of impact to native vegetation and the associated credit requirements that were included in the conditions of approval and that would be required as a result of the modification.

Table 4-3 Ecosystem credits required to offset the impacts associated with the Project modification

Veg zone	Biometric Vegetation Type	PCT ID	Approved impact area (ha)	Revised Impact area (ha)	Credits conditioned to be retired	Revised credit requirement	Difference
1a	Parramatta Red Gum - Narrow Leaved Apple-Prickly-leaved Paperbark Shrubby Woodland in the Cessnock-Kurri Kurri Area (HU 847)	1633	1.35	0.97	94	68	-26
5a	Spotted Gum-Red Ironbark-Narrow-leaved Ironbark - Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814)	1600	1.15	0.56	61	30	-31

4.4.6 Species credits - Flora

The revised flora species credits required to offset the impacts of the proposed modification are provided in Table 4-4.

Table 4-4 Flora species credits required to offset the impacts associated with the proposed modification

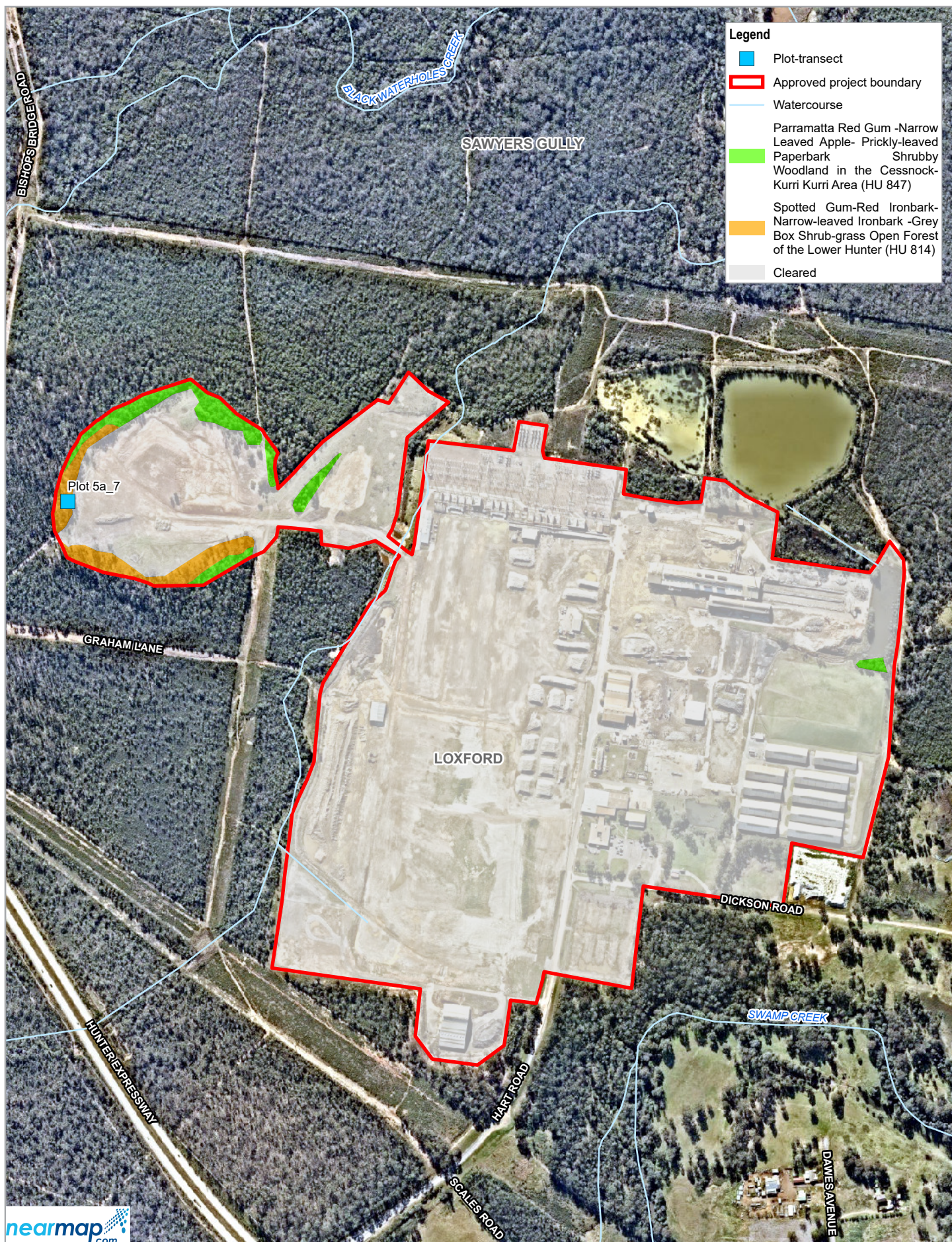
Species	Approved impact (no of individuals)	Revised Impact area (no of individuals)	Credits conditioned to be retired	Revised credit requirement	Difference
<i>Eucalyptus parramattensis</i> subsp <i>decades</i>	4	1	56	14	-42
<i>Grevillea parviflora</i> subsp <i>parviflora</i>	5	0	70	0	-70

4.4.1 Species credits - Fauna

The revised fauna species credits required to offset the impacts of the proposed modification are provided in Table 4-5.

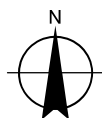
Table 4-5 Fauna species credits required to offset the impacts associated with the proposed modification

Species	Approved impact area (ha)	Revised Impact area (ha)	Credits conditioned to be retired	Revised credit requirement	Difference
Regent Honeyeater	1.15	0.56	89	43	-46
Green-thighed Frog	1.46	0.36	19	5	-14
Southern Myotis	14.23	0.4	313	9	-304
Koala	1.35	0.97	35	25	-10



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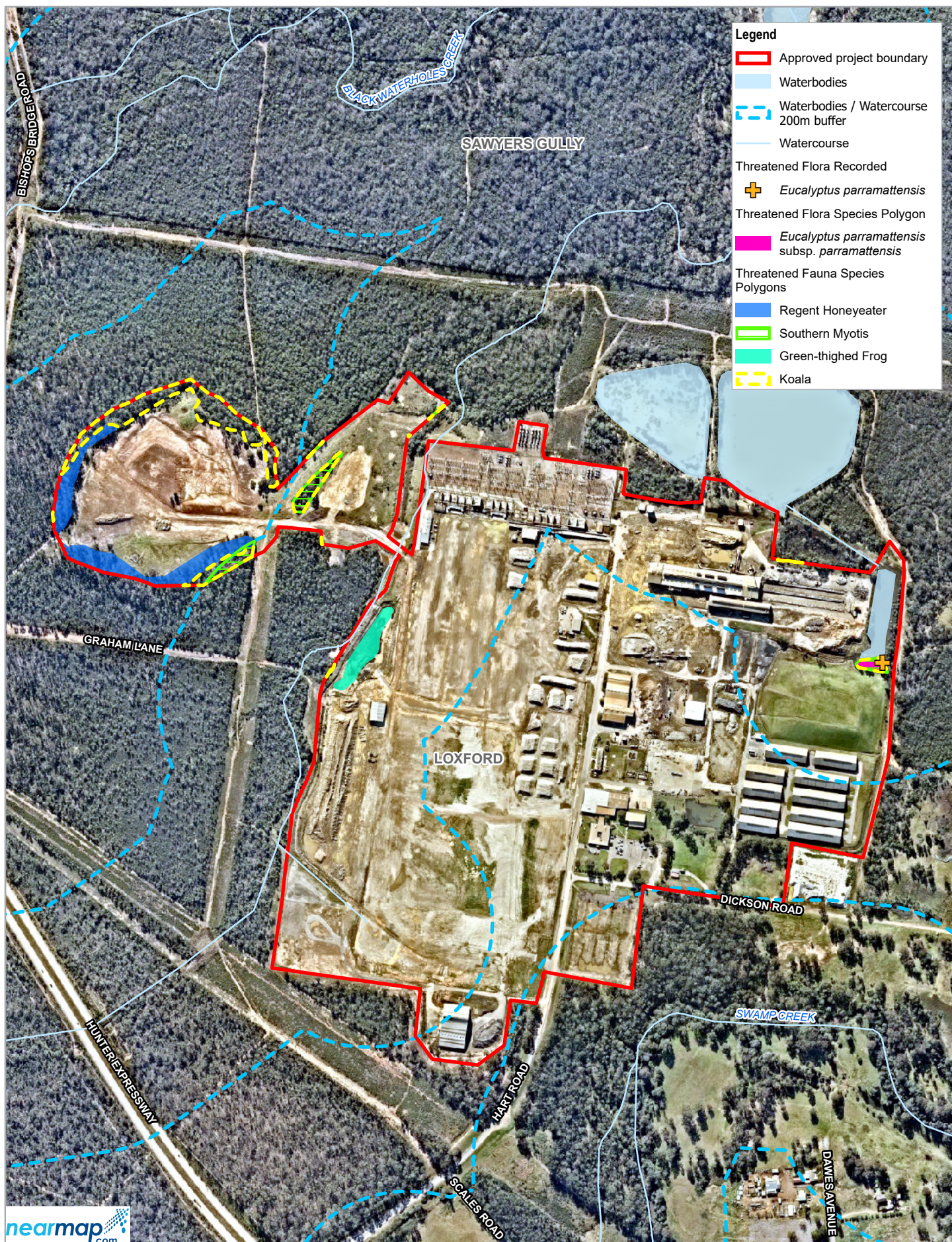


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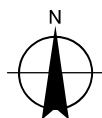
Vegetation zones

Figure 4-2



Paper Size ISO A4
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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 56



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Species polygons

Figure 4-3

5. Conclusion

Hydro is proposing to modify the Project planning approval SSD 666 under section 4.55 (1a) of the EP&A Act. The proposed modification includes:

- Revision of the vegetation clearance area, and the associated re-calculated biodiversity credit requirements

This assessment forms part of a proposed modification to the Project approval and informs the assessment of the revision of the vegetation clearance area.

The proposed modification has resulted in reduced impacts to biodiversity values. This includes a reduction in the extent of native vegetation required to be removed as well as a reduction to the number of threatened flora and area of threatened fauna habitat impacted as a result of the Project. The impacts of the Project modification include:

- Removal of 0.97 hectares of Parramatta Red Gum - Narrow Leaved Apple - Prickly-leaved Paperbark Shrubby Woodland in the Cessnock - Kurri Kurri Area (HU 847)
- Removal of 0.56 hectares of Spotted Gum-Red Ironbark- Narrow-leaved Ironbark -Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814)
- Removal of one *Eucalyptus parramattensis* subsp. *decadens* individual
- Removal of 0.56 hectares of Regent Honeyeater habitat
- Removal of 0.4 hectares of Southern Myotis habitat
- Removal of 0.36 hectares of Green-thighed Frog habitat
- Removal of 0.97 hectares of Koala habitat

The credits required to offset the impacts of the revised Project have been calculated with reference to the BBAM using plot/transect data and GIS files supplied by ELA and building upon the original ecological assessment for the project (ELA 2016).

The residual impacts of the Project modification would require the purchase and retirement of the following credits:

- 68 ecosystem credits to offset impacts to 0.97 hectares of Parramatta Red Gum - Narrow Leaved Apple - Prickly-leaved Paperbark Shrubby Woodland in the Cessnock - Kurri Kurri Area (HU 847)
- 30 ecosystem credits to offset impacts to 0.56 hectares of Spotted Gum-Red Ironbark - Narrow-leaved Ironbark - Grey Box Shrub-grass Open Forest of the Lower Hunter (HU 814)
- 14 species credits to offset impacts to of one *Eucalyptus parramattensis* subsp. *decadens* individual
- 43 species credits to offset impacts to 0.56 hectares of potential Regent Honeyeater habitat
- Nine species credits to offset impacts to 0.4 hectares of potential Southern Myotis habitat
- Five species credits to offset impacts to 0.36 hectares of potential Green-thighed Frog habitat
- 25 species credits to offset impacts to 0.97 hectares of potential Koala habitat

The quantum of biodiversity credits required to offset the residual impacts of the Project modification are based on BioBanking calculations and expressed as BBAM credits. If offsets are secured from a stewardship site assessed under the BAM, then a credit equivalence statement would need to be obtained from the BCD to confirm the quantum of offset.

6. References

Department of Planning, Industry and Environment (DPIE) (2010) *Koala Sightings – BioNet*. [data set]. https://datasets.seed.nsw.gov.au/dataset/nsw-bionet-data-collection-koala-sightings/resource/data_quality_report/pdf. Department of Planning, Industry and Environment

Department of Planning, Industry and Environment (DPIE) (2019) *Koala Habitat Information Base*. [data set]. https://datasets.seed.nsw.gov.au/dataset/koala-habitat-information-base/resource/data_quality_report/pdf. Department of Planning, Industry and Environment

ELA (2016) *Hydro Aluminium Kurri Kurri Smelter Remediation and Demolition, Ecology Assessment*. Report prepared for Hydro Aluminium, Published as Appendix 10 in Project Environmental Impact Statement

OEH (2014) *BioBanking Assessment Methodology*. NSW Department of Environment and Climate Change, Sydney

OEH (2018) *'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method*. Office of Environment and Heritage, Sydney, NSW

Ramboll Environ (2016) *Hydro Aluminium Kurri Kurri Smelter Remediation and Demolition, Environmental Impact Statement*, report prepared for Hydro Aluminium

Appendices

Appendix A – Biodiversity credit report

Biodiversity credit report



This report identifies the number and type of biodiversity credits required for a major project.

Date of report: 10/11/2021

Time: 2:30:47PM

Calculator version: v4.0

Major Project details

Proposal ID:	0120/2021/5109MP
Proposal name:	Hydro SSD - Smelter Remediation
Proposal address:	Hart Road Loxford NSW 2326
Proponent name:	Hydro Aluminium Australia Pty Ltd
Proponent address:	Hart Road Loxford NSW 2326
Proponent phone:	+10249371555
Assessor name:	Arien Quin
Assessor address:	Level 3 24 Honeysuckle Drive Newcastle NSW 2300
Assessor phone:	0405 443 341
Assessor accreditation:	0120

Summary of ecosystem credits required

Plant Community type	Area (ha)	Credits created
Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area	0.97	68.00
Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter	0.56	30.00
Total	1.53	98

Credit profiles

1. Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter, (HU814)

Number of ecosystem credits created	30
IBRA sub-region	Hunter

Offset options - Plant Community types	Offset options - IBRA sub-regions
Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter, (HU814) Melaleuca decora low forest of the central Hunter Valley, Sydney Basin Bioregion, (HU564) Slaty Red Gum grassy woodland on hinterland foothills of the southern North Coast, (HU619) Grey Ironbark - Broad-leaved Mahogany - Forest Red Gum shrubby open forest on Coastal Lowlands of the Central Coast, (HU802) Spotted Gum - Broad-leaved Mahogany - Grey Gum grass - shrub open forest on Coastal Lowlands of the Central Coast, (HU803) Spotted Gum - Narrow-leaved Ironbark-Red Ironbark shrub - grass open forest of the central and lower Hunter, (HU815)	Hunter and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

2. Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area, (HU847)

Number of ecosystem credits created	68
IBRA sub-region	Hunter

Offset options - Plant Community types	Offset options - IBRA sub-regions
Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area, (HU847) Rough-barked Apple - Narrow-leaved Ironbark - Blakely's Red Gum - Bull Oak - Coast Banksia woodland on sands of the Warkworth area, (HU872)	Hunter and any IBRA subregion that adjoins the IBRA subregion in which the development occurs

Summary of species credits required

Common name	Scientific name	Extent of impact Ha or individuals	Number of species credits created
Eucalyptus parramattensis subsp. decadens	Eucalyptus parramattensis subsp. decadens	1.00	14
Green-thighed Frog	Litoria brevipalmata	0.36	5
Southern Myotis	Myotis macropus	0.40	9
Koala	Phascolarctos cinereus	0.97	25
Regent Honeyeater	Anthochaera phrygia	0.56	43

Appendix B – Predicted threatened species

Threatened species predicted on site

Proposal ID : 0120/2021/5109MP
Proposal name : Hydro SSD - Smelter Remediation
Assessor name : Arien Quin
Assessor accreditation number : 0120
Tool version : v4.0
Report created : 20/04/2021 22:31

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common name	Scientific name	Vegetation type(s)
Barking Owl	Ninox connivens	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis subsp. gularis	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Brown Treecreeper (eastern subspecies)	Climacteris picumnus subsp. victoriae	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Bush Stone-curlew	Burhinus grallarius	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area

Common name	Scientific name	Vegetation type(s)
Corben's Long-eared Bat	Nyctophilus corbeni	HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Diamond Firetail	Stagonopleura guttata	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Eastern False Pipistrelle	Falsistrellus tasmaniensis	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Eastern Freetail-bat	Mormopterus norfolkensis	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Gang-gang Cockatoo	Callocephalon fimbriatum	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Glossy Black-Cockatoo	Calyptorhynchus lathami	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Greater Broad-nosed Bat	Scoteanax rueppellii	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Grey-crowned Babbler (eastern subspecies)	Pomatostomus temporalis subsp. temporalis	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area

Common name	Scientific name	Vegetation type(s)
Hooded Robin (south-eastern form)	Melanodryas cucullata subsp. cucullata	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Little Eagle	Hieraaetus morphnoides	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Little Lorikeet	Glossopsitta pusilla	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Masked Owl	Tyto novaehollandiae	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Painted Honeyeater	Grantiella picta	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Powerful Owl	Ninox strenua	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Scarlet Robin	Petroica boodang	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter
Speckled Warbler	Chthonicola sagittata	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter

Common name	Scientific name	Vegetation type(s)
Speckled Warbler	<i>Chthonicola sagittata</i>	HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Square-tailed Kite	<i>Lophoictinia isura</i>	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Squirrel Glider	<i>Petaurus norfolcensis</i>	HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Swift Parrot	<i>Lathamus discolor</i>	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Turquoise Parrot	<i>Neophema pulchella</i>	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Varied Sittella	<i>Daphoenositta chrysoptera</i>	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area
Yellow-bellied Glider	<i>Petaurus australis</i>	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area

Common name	Scientific name	Vegetation type(s)
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	HU814 - Spotted Gum - Red Ironbark - Narrow-leaved Ironbark - Grey Box shrub-grass open forest of the lower Hunter HU847 - Parramatta Red Gum - Narrow-leaved Apple - Prickly-leaved Paperbark shrubby woodland in the Cessnock-Kurri Kurri area

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