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HERITAGE ACT 1977

Order under Section 57 (2) to Grant Site Specific Exemptions from Approval

Gladesville Bridge
Victoria Road, Drummoyne, Huntleys Point
SHR No. 1935

I, the Minister for Heritage, on the recommendation of the Heritage Council of New South Wales, in pursuance of section 57 (2) of the Heritage Act 1977, do, by this my order, grant an exemption from section 57 (1) of that Act in respect of the engaging in or carrying out of any activities described in Schedule "C" by the owner of the bridge structure described in Schedule "B" on the item described in Schedule "A".

Sydney, 24th day of September 2014.

The Hon. ROB STOKES, M.P.,
Minister for Heritage

SCHEDULE "A"

The item known as the Gladesville Bridge, situated on the land described in Schedule "B".

SCHEDULE "B"

The bridge structure (including arch and northern and southern abutments) as shown on the plan catalogued HC 2625 in the office of the Heritage Council of New South Wales.

SCHEDULE "C"

1. Maintenance and minor repairs necessary to preserve and maintain the functioning of the structure as a transport corridor, including pavement resurfacing; maintenance and repair of roadside kerbing; maintenance and replacement of deck joints; concrete coring and testing; traffic management; relocation and maintenance of signage; and replacement of signage (up to a 50% increase in size) in the original sign area.
2. Works and activities associated with the maintenance and repair of the pedestrian walkway, including maintenance and repair of safety fencing; maintenance and repair of pedestrian signage and plaques; and maintenance and repair of the pedestrian footpath.
3. Works and activities associated with the maintenance and repair of services and utilities including communications and electricity.
4. Temporary works, not exceeding 12 months, including containment areas, scaffolding and enclosures necessary for the carrying out of maintenance, enhancement or upgrading works.
5. Minor works that do not alter the structure's overall form or shape or significantly change the appearance of bridge elements.
6. Minor works necessary to preserve and maintain bridge lighting including the upgrade of existing lighting fixtures.
7. Use of anti-graffiti treatments including sacrificial coatings, where it is known that this activity would not harm the heritage values of the structure.
8. Installation of signage, excluding commercial signs; modular sign structures; cantilever sign structures; new signage on gantries; and signage over 2m2 in size.

9. Temporary and reversible works, not exceeding 6 weeks, for the operation of special events including the use of temporary event lighting.
10. Minor works necessary to preserve and enhance the security of the structure, including security fencing, video surveillance and detection systems.
11. Works that, in the opinion of the Heritage Council or its Delegate, are required for the security of the bridge and bridge users, and that need to remain confidential.

Note: ***Maintenance*** means 'the continuous protective care of the fabric and setting of a place'.

HERITAGE ACT 1977

Direction Pursuant to Section 32 (1) to List an Item on the State Heritage Register

Gladesville Bridge
Victoria Road, Drummoyne, Huntleys Point
SHR No. 1935

IN pursuance of section 32 (1) of the Heritage Act 1977, I, the Minister for Heritage, having considered the recommendation of the Heritage Council of New South Wales and the other matters set out at section 32 (1), direct the Council to list the item of environmental heritage specified in Schedule "A" on the State Heritage Register. This listing shall apply to the curtilage or site of the item, being the bridge structure described in Schedule "B".

Sydney, 24th day of September 2014.

The Hon. ROB STOKES, M.P.,
Minister for Heritage

SCHEDULE "A"

The item known as Gladesville Bridge, situated on the land described in Schedule "B".

SCHEDULE "B"

The bridge structure (including arch and northern and southern abutments) as shown on the plan catalogued HC 2625 in the office of the Heritage Council of New South Wales.

THREATENED SPECIES CONSERVATION (BIOBANKING ASSESSMENT METHODOLOGY) ORDER 2014

Order Made Pursuant to Section 127C (3) of the Threatened Species Conservation Act 1995 and Clause 6 of the Threatened Species Conservation (Biodiversity Banking) Regulation 2008

I, Robert Gordon Stokes, Minister for the Environment, in pursuance of section 127C (3) of the Threatened Species Conservation Act 1995 and Clause 6 of the Threatened Species Conservation (Biodiversity Banking) Regulation 2008, replace the rules known as the Biobanking Assessment Methodology established by the Threatened Species Conservation (Biobanking Assessment Methodology) Order 2008 as amended by the Threatened Species Conservation (Biobanking Assessment Methodology) Amendment Order 2008 ("Existing BioBanking Assessment Methodology") with the the rules set out in Schedule 1 to this Order.

The rules set out in Schedule 1 to this Order establish the matters specified in section 127B of the Threatened Species Conservation Act 1995 and are to be known as the *BioBanking Assessment Methodology 2014*.

In making this Order, I certify pursuant to Clause 6 (1) (c) of the Threatened Species Conservation (Biodiversity Banking) Regulation 2008 that the replacement of the Existing BioBanking Assessment Methodology with the BioBanking Assessment Methodology 2014 is made as a consequence of a review of that methodology carried out in accordance with Clause 6 (1) (a) of the Threatened Species Conservation (Biodiversity Banking) Regulation 2008.

Signed this 19th day of August 2014.

ROBERT GORDON STOKES, M.P.,
Minister for the Environment

SCHEDULE 1

BIOBANKING ASSESSMENT METHODOLOGY 2014

BioBanking Assessment Methodology 2014

September 2014

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1 Background to the BioBanking Assessment Methodology

1.1 NSW Biodiversity Banking and Offset Scheme

1.1.1.1 The NSW Biodiversity Banking and Offset Scheme (the BioBanking Scheme) is established under Part 7A of the *Threatened Species Conservation Act 1995* (TSC Act).

1.1.1.2 A central element of the BioBanking Scheme is the establishment of the BioBanking Assessment Methodology (the BBAM) under section 127B of the TSC Act. The BBAM is made by order of the Minister for the Environment and published in the *NSW Government Gazette*.

1.1.1.3 The BBAM is used to assess the biodiversity values of a development site for the purpose of obtaining a biobanking statement, or a biobank site for the purpose of entering into a biobanking agreement.

1.1.1.4 Further information on the BioBanking scheme can be found at www.environment.nsw.gov.au/biobanking/index.htm.

1.2 Relationship to the NSW planning legislation

1.2.1.1 A proponent may obtain a biobanking statement to assess the biodiversity values of any development according to section 127ZJ of the TSC Act.

1.2.1.2 The effect of issuing a biobanking statement has the same meaning as set out in section 127ZO and section 127ZP of the TSC Act.

1.2.1.3 The BBAM can be used to describe the biodiversity values present on an offset site proposed as part a development application for a State Significant Development or State Significant Infrastructure under the *Environmental Planning and Assessment Act 1979* (EP&A Act).

1.3 Relationship to the *Environment Protection and Biodiversity Conservation Act 1999*

1.3.1.1 Matters of National Environmental Significance (MNES) are protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.3.1.2 The BBAM requires proponents to identify and assess the impacts on all nationally listed threatened species and threatened ecological communities that may be on the development site. Other MNES are not considered by the BBAM.

1.3.1.3 A proponent may need to obtain approval under the EPBC Act for development that has, will have or is likely have a significant impact on MNES.

1.4 Savings and transitional provisions

1.4.1.1 The rules known as the ***BioBanking Assessment Methodology*** established by the *Threatened Species Conservation (BioBanking Assessment Methodology) Order 2008* as amended by the *Threatened Species Conservation (Biobanking Assessment Methodology) Amendment Order 2008* continue to apply to any application for a biobanking agreement that is submitted on, or before, 31 October 2014.

1.4.1.2 Accordingly, any such application is to be dealt with as if the rules known as the ***BioBanking Assessment Methodology*** established by the *Threatened Species Conservation (BioBanking Assessment Methodology) Order 2008* as amended by the *Threatened Species Conservation (Biobanking Assessment Methodology) Amendment Order 2008* are in force when the application is determined.

1.4.1.3 The rules known as this BBAM (other than those rules referred to in 1.4.1.1) apply to all applications for:

(a) biobanking statements submitted, or determined, on or after publication of this BBAM in the NSW Government Gazette; and

(b) biobanking agreements submitted on or after 1 November 2014.

2 Overview of the BioBanking Assessment Methodology

2.1 Purpose and structure of the BBAM

2.1.1.1 The BBAM sets out:

(a) requirements for a reliable and transparent assessment of biodiversity values on land in order to:

(i) identify the biodiversity values on land subject to a proposed development or land proposed as a biobank site

(ii) determine the impacts of developments on biodiversity as part of an application for approval to undertake the development under NSW planning legislation

(iii) quantify and describe the biodiversity credits required for the unavoidable impacts of developments on biodiversity values

(iv) quantify and describe the biodiversity credits that can be created at a biobank site from the improvement in biodiversity values from management actions undertaken at the site.

2.1.1.2 The BBAM must be used by a proponent to assess all biodiversity values on the development site where a biobanking statement is sought by a proponent. It must also be used to assess the biodiversity values on land proposed as a biobank site.

2.2 Administration of the BBAM

2.2.1 Assessor accreditation

2.2.1.1 For the purpose of preparing a Biodiversity Assessment Report (BAR) as part of an application for a biobanking agreement or a biobanking statement, the application of the BBAM to determine the number of biodiversity credits required at a development site or to be created at a biobank site must be made by a person accredited in accordance with section 142B(1)(c) of the *Threatened Species Conservation Act 1995* (TSC Act).

2.2.2 Use of certified more appropriate local data

2.2.2.1 When preparing a BAR, an assessor is required to make use of the following databases maintained by the Office of Environment and Heritage (OEH):

(a) NSW Vegetation Information System Classification Database (VIS Classification Database)

(b) Threatened Species Profile Database

(c) Vegetation Benchmarks Database

(d) Over-cleared landscapes database (Mitchell landscapes)

(e) NSW Wildlife Atlas.

2.2.2.2 The Directory of Important Wetlands of Australia (DIWA), maintained by the Australian Government, is also used in the BBAM.

2.2.2.3 The Chief Executive of OEH may certify that more appropriate local data can be used in an application for a biobanking agreement or a biobanking statement instead of the data in the databases listed at Paragraphs 2.2.2.1 and 2.2.2.2.

2.2.2.4 An assessor may use more appropriate local data if the Chief Executive of OEH is of the opinion that it more accurately reflects local environmental conditions than the data in the databases. In certifying the use of more appropriate local data, the Chief Executive must provide reasons for this opinion and publish these reasons on the OEH website.

2.2.2.5 More appropriate local data that is used to develop a benchmark for a plant community type (PCT) may be collected by an assessor from local reference sites, or obtained from relevant published sources using the procedures set out in Appendix 3.

2.2.2.6 The certified local data can then be used in applying the BBAM in accordance with any procedures outlined in the Operational Manual.

2.2.3 Updates to the Credit Calculator and databases

2.2.3.1 An assessor must use the Credit Calculator to undertake an assessment of the impacts of the development on biodiversity values and to prepare a BAR. The Credit Calculator must be used by an assessor to undertake an assessment of the biodiversity values of a development site or a biobank site.

2.2.3.2 The databases listed in Subsection 2.2.2, which are used in the BBAM and the Credit Calculator, are updated periodically in response to increased knowledge about biodiversity values and relevant biodiversity data. Changes to the databases may require an updated version of the Credit Calculator to be issued by OEH. OEH will notify assessors when an updated version of the Credit Calculator is available.

2.2.3.3 The most recent version of the Credit Calculator must be used when using the BBAM to assess a development site or a biobank site unless OEH has provided approval in writing for a previous version of the Credit Calculator to be used.

2.3 Environmental values not assessed under the BBAM

2.3.1.1 Threatened species not assessed under the BBAM include:

(a) marine mammals

(b) wandering sea birds

(c) biodiversity that is endemic to Lord Howe Island.

2.3.1.2 In addition, the BBAM does not assess the direct impacts of a project that are not associated with clearing of vegetation. Examples of these impacts include, but are not limited to:

(a) bird and bat strike associated with wind farm developments

(b) vehicle strike

(c) subsidence and cliff falls associated with mining developments

(d) downstream impacts on hydrology and environmental flows on surface vegetation and groundwater dependent ecosystems

(e) impacts on karst ecosystems.

2.3.1.3 A separate assessment of the biodiversity values in Paragraph 2.3.1.1 and the impacts of development not covered in the BBAM may be required under the TSC Act or the EP&A Act.

Stage 1 – Biodiversity assessment

3 Introduction to Stage 1

3.1.1.1 The BAR (Stage 1):

(a) may be provided to OEH in draft form for consultation before the applicant proceeds to Stage 2 (optional); and/or

(b) combined with the requirements from Stage 2 and submitted as part of an application for a biobanking statement.

3.2 Format and content of the BAR

3.2.1.1 The outcomes of Stage 1 are documented in a BAR. The BAR must be prepared by an assessor and must contain the matters identified in Appendix 9.

3.2.1.2 The assessor must include in the BAR two base maps which are to be based on digital aerial photography (such as ADS–40 imagery) or the best available imagery of the development site or biobank site:

(a) a *Site Map* of the development site or biobank site(s), recommended at a scale of 1:1,000 or finer, showing:

(i) boundary of the development site or biobank site

(ii) cadastre

(b) a *Location Map* recommended at a scale of 1:10,000 or finer and showing:

(i) all landscape features assessed in Chapter 4

(ii) boundary of the development site or biobank site

(iii) additional relevant detail such as local government area boundaries or other base data relevant at this scale.

3.2.1.3 The extent of the Location Map must, at the minimum, include the area covered by the outer assessment circle according to Appendix 4 for a development site and Appendix 6 for a biobank site, or the buffer area surrounding the development footprint according to Appendix 5 for a development site.

3.2.1.4 The digital shape-files for all maps and spatial information contained in the BAR must be provided as part of the application for a biobanking statement or agreement.

3.3 Assessment of biodiversity values

3.3.1.1 The assessor must undertake an assessment of the biodiversity values of the development site for an application for a biobanking statement or biobank site for an application for a biobanking agreement by assessing the:

(a) landscape value of the development site or biobank site in accordance with Chapter 4, and

(b) biodiversity values of native vegetation on the development site or biobank site in accordance with Chapter 5, and

(c) biodiversity values of threatened species at the development site or biobank site in accordance with Chapter 6.

Sections within Stage 1

4 Assessing landscape features

4.1 Identifying landscape features

4.1.1.1 In this section, a range of landscape features must be identified. These landscape features will:

(a) include features that are protected under legislation, regulation, policy or inter-governmental agreement, and therefore have a range of biodiversity values that are important to assess

(b) help guide the location and delineation of vegetation zone boundaries.

4.1.1.2 The following features should be shown on both the Site Map and Location Map:

(a) IBRA bioregions and IBRA subregions

(b) Mitchell landscapes

(c) rivers and streams

(d) wetlands

(e) extent of native vegetation in the outer assessment circle or the buffer area surrounding the development footprint.

IBRA bioregions and IBRA subregions

4.1.1.3 All IBRA bioregions and IBRA subregions within the development site or biobank site must be identified and shown on the Site Map.

4.1.1.4 Any other regions within the outer assessment circle must be identified and shown on the Location Map.

Mitchell landscapes

4.1.1.5 All Mitchell landscapes within the development site or biobank site must be identified and shown on the Site Map.

4.1.1.6 Any other Mitchell landscapes that occur within the outer assessment circle must be identified and shown on the Location Map.

4.1.1.7 This is relevant to assessing the landscape value of the development site or biobank site.

Rivers, streams and estuaries

4.1.1.8 All rivers, streams and estuaries that occur within the development site or biobank site, and their riparian buffer areas, must be identified and shown on the Site Map.

4.1.1.9 All other rivers, streams and estuaries that occur within the outer assessment circle, and their riparian buffer areas, must be identified and shown on the Location Map.

4.1.1.10 The mapped rivers and streams must be classified according to their stream order. The riparian buffer areas for rivers, streams and estuaries must be applied according to Appendix 2.

Wetlands

4.1.1.11 All important wetlands and local wetlands that occur within the development site or biobank site must be identified and shown on the Site Map.

4.1.1.12 Any other important wetlands and local wetlands that are adjacent to or downstream from the development site or biobank site and within the outer assessment circle must be identified and shown on the Location Map.

4.1.1.13 Important wetlands must also be separately identified and shown on the Site Map and the Location Map.

Native vegetation extent (outer assessment circle or buffer area surrounding the development footprint)

4.1.1.14 The extent of native vegetation within the outer assessment circle, or the buffer area surrounding the development footprint, must be mapped onto digital aerial photography (such as ADS–40 imagery) or the best available imagery of the development site or biobank site, and shown on the Location Map.

4.1.1.15 The capture scale for native vegetation extent should be 1:1,000 – 1:5,000, and preferably not greater than 1:10,000.

State or regionally significant biodiversity links

4.1.1.16 All state or regionally significant biodiversity links that occur within the development site or biobank site must be identified and shown on the Site Map.

4.1.1.17 All state or regionally significant biodiversity links that occur within the outer assessment circle must be identified and shown on the Location Map.

4.2 Determining landscape value

4.2.1 Assessment requirements

4.2.1.1 To determine the landscape value of a development site or biobank site an assessor must assess the following landscape attributes of the site, in accordance with Subsections 4.2.2 to 4.2.6:

(a) percent native vegetation cover in the landscape

(b) connectivity value

(c) patch size

(d) area to perimeter ratio, and

(e) strategic location of a biobank site.

4.2.2 Assessing percent native vegetation cover

4.2.2.1 For a development that is a site-based development:

(a) the current percent native vegetation cover, and

(b) the future percent native vegetation cover

of the development site must be assessed in accordance with Appendix 4.

4.2.2.2 For a development that is a linear shaped development or a multiple fragmentation impact development:

(a) the current percent native vegetation cover, and

(b) the future percent native vegetation cover

of the development site must be assessed in accordance with Appendix 5.

4.2.2.3 For a biobank site:

(a) the current percent native vegetation cover, and

(b) the future percent native vegetation cover

must be assessed in accordance with Appendix 6.

4.2.3 Assessing the connectivity value

4.2.3.1 For a development that is a site-based development the connectivity value score of the development site or biobank site must be assessed in accordance with Appendix 4.

4.2.3.2 For a development that is a linear shaped development or multiple fragmentation impact development, the connectivity value score of the development site must be assessed in accordance with Appendix 5.

4.2.3.3 For a biobank site the connectivity value score of the biobank site must be assessed in accordance with Appendix 6.

4.2.4 Assessing the patch size

4.2.4.1 For a development that is a site-based development the patch size score must be assessed in accordance with Appendix 4.

4.2.4.2 For a development that is a linear shaped development or a multiple fragmentation impact development the patch size score must be assessed in accordance with Appendix 5.

4.2.4.3 For a biobank site the patch size score must be assessed in accordance with Appendix 6.

4.2.5 Assessing the area to perimeter ratio

4.2.5.1 For a development that is a linear shaped development, or a multiple fragmentation impact development, the area to perimeter ratio must be assessed in accordance with Appendix 5.

4.2.6 Assessing the strategic location of a biobank site

4.2.6.1 The assessor must identify a biobank site as occurring within a strategic location if all or part of the biobank site is located within:

(a) an area of land identified by the assessor as being part of a state significant biodiversity link and in a plan approved by the Chief Executive OEH, or

(b) an area of land identified by the assessor as being part of a regionally significant biodiversity link and in a plan approved by the Chief Executive OEH, or

(c) the riparian buffer area of a 3rd order stream or higher, an important wetland or an estuarine area.

5 Assessing native vegetation

5.1 Mapping native vegetation extent on the development site or biobank site

5.1.1.1 The extent of native vegetation within the development site or biobank site must be mapped onto digital aerial photography (such as ADS–40 imagery) or the best available imagery of the development site or biobank site, using existing maps of native vegetation in the area and an assessment of the site. The capture scale should be 1:1,000 – 1:5,000, and not greater than 1:10,000.

5.1.1.2 The native vegetation extent on the development site or biobank site must be shown on the Site Map, which must include all land in the development site or biobank site.

5.1.1.3 Areas that are not native vegetation (i.e. land not included in native vegetation extent) do not require further assessment in the BBAM except where:

(a) it is proposed as part of an offset (refer to Stage 3)

(b) it is assessed as habitat for threatened species according to Section 6.4.

Changes to the mapped native vegetation extent

5.1.1.4 The extent of native vegetation within a development site or biobank site may have changed since the satellite or ortho-rectified aerial image was made. For example, clearing may have been permitted under the *Native Vegetation Act 2003* (NV Act) or the EP&A Act. Where there are changes in the extent of native vegetation, the assessor may map the native vegetation extent to reflect the current situation and confirm this by field survey.

5.1.1.5 The assessor must identify any areas of native vegetation extent that are different to the satellite or ortho-rectified aerial image on the Site Map and provide the reasons for the change in the extent of native vegetation in the BAR.

5.2 Stratifying native vegetation on the development site or biobank site

5.2.1 Identifying native PCTs and ecological communities

5.2.1.1 An assessor must identify and map the distribution of PCTs on a development site or biobank site according to the NSW PCT classification as described in the VIS Classification Database.

5.2.1.2 A detailed description of each PCT and its geographic distribution is contained within the VIS Classification Database and is publicly available from www.environment.nsw.gov.au/research/vegetationinformationsystem.htm.

5.2.1.3 The assessor should review any existing data and information that is currently available on native vegetation that is relevant to the development site or biobank site and land in the outer assessment circle. This includes:

(a) survey data that is held in the VIS Classification Database, or

(b) existing maps of native vegetation in the area such as those held by OEH, or a local government authority, or

(c) existing data or information in ecological reports, soil surveys or previous native vegetation surveys that are relevant to the development site or biobank site.

5.2.1.4 Using the information collected in Paragraph 5.2.1.3, the assessor can develop a survey design and survey extent for determining PCTs on the development site or biobank site based on:

(a) an assessment of the expected environmental variation

(b) the scale of further assessment required for PCT identification

(c) gaps in existing mapping and site information

(d) the survey extent.

5.2.1.5 The assessor must undertake a plot-based full floristic survey of the development site or biobank site that is stratified and targeted to assess the expected environmental variation and any areas with gaps in existing mapping and site information.

5.2.1.6 The assessor must include a description of the stratified and targeted survey in the BAR, that demonstrates:

(a) the survey design and survey extent of the development site or biobank site, and

(b) the review of existing data and information on native vegetation, and

(c) that field-based vegetation activities were conducted systematically using explicit and repeatable processes, and

(d) the survey effort of the development site or biobank site was commensurate with the expected environmental variation, and

(e) the plot-based full floristic survey intensity has sampled the expected environmental variation between stratified environmental units, and

(f) that the survey effort was targeted to filling any gaps in the existing mapping and site information.

5.2.1.7 The plot-based full floristic survey is based on a 20 m × 20 m quadrat (or 400 m^2 equivalent for linear areas). The assessor must assess the plot for the information contained in Table 1 and include this data in the BAR.

Table 1: Floristic survey data collected at the development site or biobank site

Attribute	Survey requirement
Stratum (& layer)	Stratum & layer in which each species occurs
Growth form	Growth form for each recorded species
Species name	Scientific name and common name
Cover	A measure or estimate of the appropriate cover measure for each recorded species; recorded from 1–5% and then to the nearest 5%. If the cover of a species is less than 1% and the species is considered important, then the estimated cover should be entered (e.g. 0.4)
Abundance rating	A relative measure of the number of individuals or shoots of a species within the plot. Use the following intervals; numbers above about 20 are estimates only: 1,2,3,4,5,6,7,8,9,10,20,50,100,500,1000 or specify a number greater than 1000 if required

5.2.1.8 The assessor must provide justification in the BAR of evidence used to identify a PCT at the development site or biobank site. This includes:

(a) evidence of a quantitative analysis of existing and new site survey data, and

(b) matching the outputs of the quantitative analysis of existing and new site survey data to PCTs in the VIS Classification Database

(c) a map showing the distribution of the PCTs on the development site or biobank site.

5.2.1.9 The assessor must identify any threatened ecological communities that are associated with a PCT, and map the distribution of the ecological community on the development site or biobank site. The VIS Classification Database indicates where a PCT may be associated with a threatened ecological community.

5.2.1.10 The assessor must also record the estimated percent cleared value of the PCT based on the associated biometric vegetation type for the PCT in the major catchment area.

5.2.1.11 The assessor must only identify PCTs on the development site or biobank site that are described in the VIS Classification Database as derived or secondary vegetation communities where the assessor cannot determine the original PCT.

5.2.2 Identifying vegetation zones

5.2.2.1 The assessor must use the map of PCTs referred to in Subsection 5.2.1, to identify and map the area of each PCT into a vegetation zone on the development site or biobank site.

5.2.2.2 In Section 5.3 a *vegetation zone* means an area of native vegetation on a development site or biobank site that is the same PCT and has a similar broad condition state.

5.2.2.3 In order to stratify the development site or biobank site into vegetation zones, the assessor may first stratify the extent of a PCT on the site into areas that are in low condition and areas that are in moderate to good condition.

5.2.2.4 The assessor must stratify areas of the same PCT that are in different broad condition states into separate vegetation zones.

5.2.2.5 In identifying areas that are in a similar broad condition state, the assessor may consider areas of the PCT that have a similar over-storey cover, mid-storey cover, ground cover, weediness or combinations of these.

5.2.2.6 A vegetation zone must not contain a mix of vegetation in low condition and vegetation in moderate to good condition.

5.2.2.7 A vegetation zone may comprise a number of discontinuous areas, provided the vegetation within the zone is the same PCT and in a similar broad condition state.

5.3 Assessing site value (vegetation condition)

5.3.1.1 In this section references to *the map* mean the map of the development site or biobank site prepared under Subsection 5.2.1.

5.3.1.2 The assessor must survey each vegetation zone identified on the map to obtain a quantitative measure for each zone of each of the 10 site attributes listed in Table 2.

Table 2: Scoring and weighting of the site attributes

Site attribute		Site attribute score (see notes below)				Weighting for site attribute score
		0	1	2	3	
a)	Native plant species richness	0–10%	>10 – <50% of benchmark	50 – <100% of benchmark	≥ benchmark	25
b)	Native over-storey cover	0 – 10% or >200% of benchmark	> 10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	10
c)	Native mid-storey cover	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	10
d)	Native ground cover (grasses)	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	2.5
e)	Native ground cover (shrubs)	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	2.5
f)	Native ground cover (other)	0 – 10% or >200% of benchmark	>10 – <50% or >150 – 200% of benchmark	50 – <100% or >100 – 150% of benchmark	within benchmark	2.5
g)	Exotic plant cover (calculated as percentage of total ground and mid-storey cover)	>66%	>33 – 66%	>5 – 33%	0 – 5%	5
h)	Number of trees with hollows	0 (unless benchmark includes zero)	>0 – <50% of benchmark (or if zero included)	50 – <100% of benchmark	≥ benchmark	20
i)	Proportion of over-storey species occurring as regeneration	0	>0 – <50%	50 – <100%	100%	12.5
j)	Total length of fallen logs	0 – 10% of benchmark	>10 – <50% of benchmark	50 – <100% of benchmark	≥ benchmark	10

In this table:

'**within benchmark**' means a measurement that is within and including the range of measurement for attributes that are assessed by percent foliage cover, or equal to/or greater than the number for attributes assessed by a number or length that is identified as the benchmark that PCT

'**<benchmark**' means a measurement that is less than the minimum measurement in the benchmark range

'**> benchmark**' means a measurement that is greater than the maximum measurement in the benchmark range.

5.3.1.3 The assessor must assess the 10 site attributes listed in Table 2 for each zone against benchmark data for the relevant PCT, except where the zone is derived vegetation, in which case it must be assessed against the benchmark data which in the opinion of the assessor is the most likely original PCT, or against the benchmark data for the vegetation class of the most likely original PCT.

5.3.1.4 The assessor must calculate the site value score for each vegetation zone on the development site or biobank site, in accordance with Subsection 5.3.3.

5.3.1.5 For the purposes of Section 5.3, the assessor must use benchmark data from the Vegetation Benchmarks Database unless benchmark data is obtained from local reference sites or from relevant published sources in accordance with Appendix 3.

5.3.2 Plot and transect surveys

5.3.2.1 Line transects must be used to assess site attributes that can be measured by percent foliage cover.

5.3.2.2 Site attributes that are not measured by percent foliage cover must be assessed by plots. Native plant species richness is assessed within a 20 m × 20 m plot. The number of trees with hollows and the total length of fallen logs is assessed within a 50 m × 20 m plot.

5.3.2.3 Floristic data collected in Section 5.2.1 can be used to assess the native plant species richness attribute at the site where the plot used in Section 5.2.1 is also used to determine the site value score.

5.3.2.4 The number of trees with hollows is estimated by counting the number of trees with hollows visible from the ground in the 50 m × 20 m plot.

5.3.2.5 The total length of fallen logs is the total length of woody material greater than 10 cm in diameter that is on the ground in the 50 m × 20 m plot.

5.3.2.6 Regeneration is measured as the proportion of over-storey species that are regenerating. Regeneration must be assessed across the entire vegetation zone.

5.3.2.7 The level of survey effort across the vegetation zone must be consistent with the practice of random stratified sampling.

5.3.2.8 Plots and transects must be established randomly, or stratified randomly within a vegetation zone, accounting for the level of variation in broad condition of the vegetation zone.

5.3.2.9 Establishing or stratifying plots and transects randomly may be done by:

(a) marking points randomly on the map of vegetation zones in the assessment area and establishing plots and transects at all or some of these points, or

(b) pacing a random distance into the vegetation zone. The survey data must be collected from that point, with the process repeated elsewhere within the vegetation zone.

5.3.2.10 The minimum number of transects and plots detailed in Table 3 must be used for each vegetation zone.

5.3.2.11 If the broad condition state of the vegetation is more variable across the zone, additional transects and plots to the number specified in Table 3 may be required to ensure a representative sample is taken for the vegetation zone.

Table 3: Minimum number of transects/plots required per zone area

Vegetation zone area (ha)	Minimum number of transects/plots
0–4	1 transect/plot per 2 ha (or part thereof) or 1 transect/plot if vegetation is in low condition
> 4–20	3 transects/plots or 2 transects/plots if vegetation is in low condition
> 20–50	4 transects/plots or 3 transects/plots if vegetation is in low condition
> 50–100	5 transects/plots or 3 transects/plots if vegetation is in low condition
> 100–250	6 transects/plots or 4 transects/plots if vegetation is in low condition
> 250–1000	7 transects/plots or 5 transects/plots if vegetation is in low condition More transects/plots may be needed if the condition of the vegetation is variable across the zone
> 1000	8 transects/plots or 5 transects/plots if vegetation is in low condition or in a homogenous landscape in the Western Division More transects/plots may be needed if the condition of the vegetation is variable across the zone

5.3.3 Assessing the current site value score

5.3.3.1 Using the plot and transect survey data collected for a vegetation zone, the assessor must determine the site attribute score for each site attribute within a vegetation zone on the development site or biobank site in accordance with Table 2.

5.3.3.2 The assessor must then use those site attribute scores to calculate the site value score for each vegetation zone on the development site or biobank site using Equation 1 as set out in Appendix 1, except to the extent provided otherwise below:

(a) If the lower benchmark value for any site attribute is zero, and the measure of that attribute on the site is zero, then the site attribute score for that attribute against the benchmark is 3.

(b) If the *only* benchmark value for any site attribute is zero, then the attribute is not included in Equation 1 and *c* (that is, the maximum total where the relevant attributes are in benchmark condition) is scaled accordingly.

(c) The multipliers for 'native over-storey cover × proportion of over-storey species occurring as regeneration' and 'number of trees with hollows × total length of fallen logs' may be omitted from Equation 1 (and *c* is recalculated accordingly) for determining site value at a site if the PCT is from one of the following vegetation formations:

(i) Grasslands

(ii) Heathlands

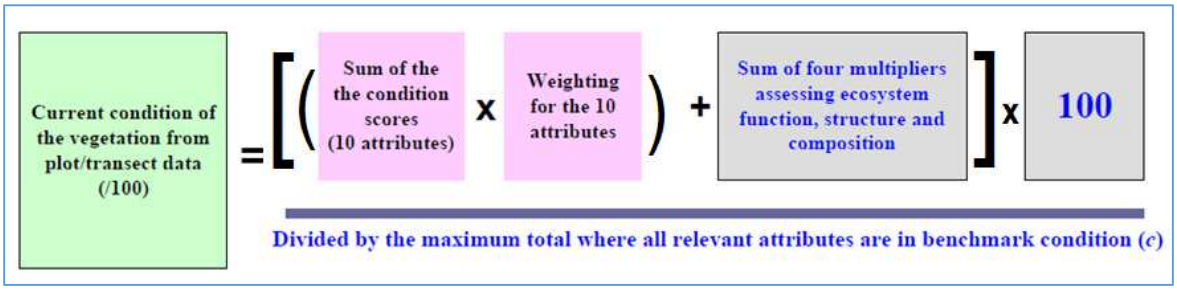
(iii) Alpine Complex

(iv) Freshwater Wetlands

(v) Saline Wetlands

(vi) Arid Shrublands.

Summary of Equation 1: Determine the current site value score for a vegetation zone



Note to reader: To assist reader understanding, a simplified, diagrammatic representation is provided for each equation used in the BBAM. Full mathematical representations of all equations are presented in Appendix 1. The simplified, diagrammatic representations do not form part of the BBAM.

6 Assessing threatened species and populations

6.1 Threatened Species Profile Database

6.1.1.1 The assessor must obtain the following information from the Threatened Species Profile Database:

(a) description of each threatened species, its habitat, ecology and threats, including the threatened species profile

(b) the class of credit for the threatened species

(c) description of the habitat requirements and/or constraints for each threatened species

(d) breeding, foraging or habitat information contained in the profile for the threatened species

(e) IBRA subregions within which the distribution of each threatened species is either known or predicted to occur (the distribution of a species is not associated with an IBRA subregion if the species is identified by the database as being vagrant in that subregion)

(f) PCTs with which each threatened species is associated

(g) the percent native vegetation cover class in the outer assessment circle with which the threatened species is associated

(h) minimum patch size in hectares, including low condition vegetation, with which the threatened species is associated

(i) whether the threatened species is able to occupy low condition vegetation

(j) any specific habitat features associated with the occurrence of the threatened species

(k) the management actions for each threatened species that are to be undertaken at a biobank site

(l) the ability of a threatened species to respond to improvement in site value or other habitat improvement at a biobank site due to the management actions (the T_G value)

(m) any geographic characteristics associated with the occurrence of the threatened species

(n) whether the threatened species is a species that cannot withstand further loss

(o) the months of the year that the species is identifiable through survey.

6.1.1.2 An assessor may use more appropriate local data instead of data from the Threatened Species Profile Database for the purpose of obtaining the information required at Paragraph 6.1.1.1, if:

(a) in the opinion of the assessor, the local data more accurately reflects the local environmental conditions of the development site or biobank site, and

(b) the Chief Executive of OEH certifies the use of that data as more appropriate local data.

6.1.1.3 If the assessor uses more appropriate local data, the assessor must include the reasons for the use of more appropriate local data in the BAR.

6.2 Species that can be predicted by habitat surrogates (ecosystem credits)

6.2.1.1 Threatened species that require ecosystem credits must be assessed in conjunction with biodiversity values using data from the Threatened Species Profile Database.

6.2.1.2 Species that require ecosystem credits have a high likelihood of being present on the site, as predicted by Step 1 in Section 6.3 below. Therefore, a threatened species survey is not required to assess threatened species that require ecosystem credits as they are predicted to occur based on the presence of habitat surrogates.

6.2.1.3 The likely impacts on these species from clearing and development are measured in biodiversity credits by the loss of site and landscape value from clearing on the development site, and gain in site and landscape value from the management actions undertaken on the biobank site.

6.2.1.4 Species that require ecosystem credits for the impacts of development are assessed according to the two steps below. Species that create ecosystem credits at a biobank site are assessed under Step 1.

6.3 Steps for identifying ecosystem credit species on an development site or biobank site

6.3.1.1 The assessor must identify ecosystem credit species on the development site or biobank site using the following steps.

Step 1: Identify predicted ecosystem credit species

6.3.1.2 Using the information obtained under Section 6.1, the assessor must identify a threatened species as being a predicted species if that species meets *all* of the following criteria:

(a) the distribution of the species includes the IBRA subregion in which the development site or biobank site is, in the opinion of the assessor, mostly located, and

(b) the species is associated with any of the PCTs identified by the assessor under Chapter 5 as occurring within the development site or biobank site, and

(c) except if the development is, or is part of, a linear shaped or multiple fragmentation development, the percent native vegetation cover class within the outer assessment circle as determined by the assessor in accordance with Appendices 4–6 (as relevant) is equal to or greater than the minimum class that is required for the species, and

(d) the condition of vegetation within any vegetation zone (as identified by the assessor under Chapter 5) within the development site or biobank site is equal to or greater than the minimum condition required for that species, and

(e) the patch size which the vegetation zone is part of is equal to or greater than the minimum specified for that species, and

(f) the species is identified as an ecosystem credit species in the Threatened Species Profile Database.

6.3.1.3 Where a vegetation zone is across one or more IBRA subregions, the IBRA subregion in which most of the proposal occurs must be used. This provision is not applicable to linear shaped developments.

6.3.1.4 If any one of the criteria at Paragraph 6.3.1.2 is not met for a particular species, then no further assessment under Section 6.3 is required for that species at a development site.

6.3.1.5 If any one of the criteria at Paragraph 6.3.1.2 relating to a biobank site is not met for a species, then no further assessment of the species is required at the biobank site.

Step 2: Assess presence of habitat components

6.3.1.6 The assessor may opt to undertake an additional assessment of the habitat components on the development site, or biobank site for a threatened species predicted to occur in Step 1.

6.3.1.7 The assessor must assess the habitat components for a predicted species using the habitat information in the profile for the species and any other habitat information in the Threatened Species Profile Database.

6.3.1.8 If the assessor determines that one or more of the habitat components for a predicted species is present in a vegetation zone, the assessor must identify the predicted species as being an ecosystem credit species present in a vegetation zone.

6.3.1.9 Where the assessor determines that none of the habitat components for the predicted species are present in a vegetation zone, the species does not need to be identified as being an ecosystem credit species present in the vegetation zone. The assessor must record the reasons for determining that a predicted species is not present in the vegetation zone in the BAR.

6.4 Assessing species that cannot be predicted by habitat surrogates (species credits)

6.4.1.1 Threatened species that cannot reliably be predicted to occur on a development site (or a biobank site) based on PCT, distribution and habitat criteria are identified by the Threatened Species Profile Database as species credit species. In some circumstances, the particular habitat components of species assessed for ecosystem credit species, such as the breeding habitat of a cave roosting bat, are also assessed for species credits.

6.4.1.2 An assessment of species for species credits is optional at a biobank site; however, species credits can only be created at a biobank site where the biobank site has been assessed in accordance with this section.

6.4.1.3 Species that require species credits to offset the impacts of a development on a development site, or that create species credits at a biobank site, must be identified and assessed in accordance with the five steps in Section 6.5.

6.5 Steps for identifying species credit species

6.5.1.1 The assessor must identify species credit species on the development site or biobank site using the following steps.

Step 1: Identify candidate species credit species

6.5.1.2 Using data from the Threatened Species Profile Database, the assessor must identify a threatened species as a candidate species for the development site or biobank site if:

(a) the species is identified as a species credit species in the Threatened Species Profile Database, and

(b) the geographic distribution of the species is known or predicted to include the IBRA subregion in which the development site or biobank site is located, and

(c) the development site or biobank site contains habitat features or components associated with the species, as identified in the Threatened Species Profile Database, OR

(d) past surveys undertaken at the development or biobank site indicate that the species is present at the development or biobank site.

These species are assessed under Step 2.

Step 2: Identify candidate species for further assessment

6.5.1.3 A candidate species is not considered to be present on the development site or biobank site where:

(a) after carrying out an assessment of the habitat components the assessor determines that the habitat is substantially degraded such that the particular species is unlikely to utilise the development site or the biobank site, or

(b) an expert report prepared in accordance with Subsection 6.6.2 states that the species is unlikely to be present at the development site, or

(c) the species is a vagrant species and unlikely to use habitat on the development site or biobank site, or

(d) records of the species presence in relation to the location of the development site or biobank site are at least 20 years old or, in the opinion of the assessor, have doubtful authenticity.

6.5.1.4 A candidate species that is not considered to be present on the development site or biobank site in accordance with Paragraph 6.5.1.3 does not require further assessment.

6.5.1.5 All other remaining candidate threatened species must be assessed further in accordance with Step 3 below.

6.5.1.6 The assessor must provide the reasons for determining that a candidate species is not present on the development site or biobank site in the BAR.

6.5.1.7 Where a development site contains any of the specified geographic attributes and the habitat features or habitat components associated with a species that is on the list of candidate species for assessment at Step 3, an assessor may opt to assume the species or breeding habitat component is present on the development site, instead of undertaking a threatened species survey or obtaining an expert report.

6.5.1.8 Where a species is assumed to be present, the assessor must still determine the location and area of the species polygon in accordance with Step 5 below. The calculation of the number of species credits for a species assumed to be present on a clearing or development site is based on the area of the species polygon, or the number of individuals or area for flora species.

6.5.1.9 Species that require species credits cannot be assumed to be present on a biobank site.

Step 3: Determine whether the candidate species is present

6.5.1.10 An assessor must establish whether any species that remains a candidate is present on a development site or biobank site, or is likely to use the potential habitat on the development site or biobank site, by either:

(a) assuming it is present (development sites only), or

(b) undertaking a threatened species survey in accordance with Section 6.6, or

(c) obtaining an expert report in accordance with Subsection 6.6.2.

6.5.1.11 If an assessor does not undertake a threatened species survey or obtain an expert report, an assessor must not assume that a species that remains a candidate is present on a biobank site.

6.5.1.12 Where the survey or expert report confirms that a remaining candidate species is present on a development site or biobank site, or is likely to use the potential habitat on the development site or biobank site, the remaining candidate species is a species credit species present on the development site or biobank site and must be assessed further under Steps 4 and 5.

6.5.1.13 Where the survey or expert report confirms that a candidate species is:

(a) not present or unlikely to be present on a development site or biobank site, or

(b) unlikely to use habitat on a development site or biobank site

no further assessment is required and an assessor:

(c) may assume that the remaining candidate species, or its habitat, is not present on the development site

(d) must assume that the remaining candidate species, or its habitat, is not present on the biobank site.

Step 4: Identify if the development site or biobank site contains any threatened species that cannot withstand further loss

6.5.1.14 Using the information obtained under Section 6.1, the assessor must determine whether the species credit species is a species that cannot withstand further loss in the major catchment area.

6.5.1.15 The assessor must identify all species credit species that cannot withstand further loss in the major catchment area in the BAR.

Step 5: Prepare species polygon

6.5.1.16 Where either:

(a) a threatened species survey or expert report confirms that a species credit species is present on the development site or biobank site or is likely to use the habitat on a development site or biobank site, or

(b) a species credit species is assumed to be present on the development site

the assessor must prepare species polygons for each of those species credit species.

6.5.1.17 Where a species is assumed to be present on the development site, the assessor must use an expert report to determine the location and area of the species polygon to include the fauna habitat or number of individual flora species assumed to be present on the development site.

6.5.1.18 The boundary of the species polygon must be finalised on completion of the targeted survey or expert report.

6.5.1.19 The species polygon must:

(a) be mapped using a satellite (ADS–40) or the best available ortho-rectified aerial image of the development site or biobank site

(b) use the unit of measurement identified for that species in the Threatened Species Profile Database

(c) include the locations of the species or areas occupied by the species

(d) contain the specific habitat feature or habitat component associated with that species on the development site or biobank site

(e) utilise GPS to confirm the location of the species polygon on the best available ortho-rectified aerial image of the development site or biobank site.

6.5.1.20 A description of the species and the habitat feature or habitat component associated with the species on the site and its abundance must be included in the BAR.

6.6 Undertaking a threatened species survey

6.6.1.1 An assessor must only undertake a threatened species survey during the period of time specified in the Threatened Species Profile Database as being suitable for identifying the species.

6.6.1.2 A threatened species survey should be undertaken and recorded using a method that can be replicated for repeat surveys.

6.6.1.3 A threatened species survey must be undertaken for all species identified in Step 3 in Section 6.5 unless:

(a) an expert report prepared in accordance with Subsection 6.6.2 has been obtained for the species, or

(b) the species is assumed to be present and the area of habitat or number of individuals is in a species polygon determined in accordance with Paragraph 6.5.1.8.

6.6.1.4 The timing, method and effort used for a threatened species survey must be described in the BAR.

6.6.1.5 Threatened species surveys for any species other than amphibians must be undertaken in accordance with the OEH threatened species survey guidelines, or otherwise by OEH.

6.6.1.6 A threatened species survey for amphibians must be undertaken in accordance with the OEH threatened species survey guidelines for amphibians.

6.6.2 Using expert reports instead of undertaking a survey

6.6.2.1 An expert report may be obtained instead of undertaking a threatened species survey at a development site or biobank site.

6.6.2.2 An expert report must only be prepared by a person who is accredited by the Chief Executive of OEH under section 142B(1)(b) of the TSC Act, or a person who, in the opinion of the Chief Executive of OEH possesses specialised knowledge based on training, study or experience to provide an expert opinion in relation to the biodiversity values to which an expert report relates.

6.6.2.3 The expert report must document the information that was considered, and/or rejected as unsuitable for consideration, to reach the determination made in the expert report.

6.6.2.4 An expert report can only be used instead of a survey for species to which species credits apply.

6.6.2.5 An expert report must set out whether:

(a) for development sites – the species is unlikely to be present on the development site – in this case no further assessment of the species is required, or

(b) for all development sites or biobank sites – the species is likely to be present on the site – in this case the expert report must provide an estimate of the number of individuals or area of habitat to be impacted by the development or the management actions (according to the unit of measurement identified for the species in the Threatened Species Profile Database).

6.6.2.6 The Chief Executive of OEH may decide not to accept an expert report instead of undertaking a threatened species survey at a development site or a biobank site, in which case a target species survey will be required for the species.

Stage 2 – Impact assessment (biodiversity values)

7 Introduction to Stage 2

7.1 Documenting Stage 2 outcomes

7.1.1.1 The outcomes of Stage 2, combined with the outcomes of Stage 1, are documented in the BAR (refer to Paragraph 3.1.1.1). The BAR must be prepared by an assessor and must contain the matters identified in Appendix 9.

7.1.1.2 The BAR is to be submitted to OEH as part of an application for a biobanking statement.

Sections within Stage 2

8 Avoid and minimise impacts on biodiversity values

8.1.1.1 This section sets out the actions that the proponent of a development must undertake to demonstrate that reasonable measures are taken to avoid and minimise the direct and indirect impacts of a development proposal on biodiversity values.

8.2 Assessment of impacts

8.2.1.1 The assessor must assess the direct and indirect impacts of a development on biodiversity values in accordance with this section for the purposes of an application for a biobanking statement.

8.2.1.2 In assessing the direct and indirect impacts of a development on biodiversity values, the assessor must use the information and data resulting from the assessment of biodiversity values undertaken in accordance with Chapters 3--6.

8.3 Demonstrating avoidance and minimisation of direct impacts on biodiversity values

8.3.1.1 The proponent and the assessor must consider whether biodiversity impacts of a development can be avoided or minimised.

8.3.1.2 The proponent must incorporate the principles of avoiding and minimising impacts to biodiversity into the entire life cycle of the development consistently with the guidelines in Subsection 8.3.2.

8.3.1.3 The proponent must seek to avoid the direct impacts of the development on all biodiversity values at the development site including impacts on:

(a) endangered ecological communities (EECs) and critically endangered ecological communities (CEECs), and

(b) PCTs that contain threatened species habitat, and

(c) areas that contain habitat for vulnerable, endangered or critically endangered threatened species or populations, as determined in accordance with Step 5 in Section 6.5, and

(d) critical habitat, and

(e) the riparian areas of 4th order or higher streams and rivers, important wetlands and estuaries, and

(f) state significant biodiversity links.

8.3.1.4 If a proponent determines that a development cannot proceed without impacting on biodiversity values despite seeking to avoid impacts in accordance with Paragraph 8.3.1.3, the proponent must identify reasonable measures and strategies to minimise the impact of development on biodiversity values.

8.3.1.5 A proponent may only use offsets to compensate for impacts on biodiversity values where those impacts have already been avoided and minimised as far as practicable in accordance with Paragraphs 8.3.1.3 and 8.3.1.4.

8.3.1.6 Measures that minimise the impact on biodiversity may be required for a particular threatened species, or apply to a particular phase of the project life cycle. These measures must be set out in the BAR.

8.3.1.7 In determining the reasonableness of measures aimed at minimising impacts on biodiversity, a proponent can take into account:

(a) industry best practices and standards that avoid and minimise impacts

(b) the proportion of the total cost of the development that is dedicated to biodiversity protection

(c) the risk of failure of the measure.

8.3.1.8 The BAR must:

(a) demonstrate how the proponent has incorporated the principles of avoiding and minimising impacts to biodiversity into the life cycle of the development consistently with the guidelines at Subsection 8.3.2

(b) describe and document the reasonable measures and strategies that the proponent has taken or proposes to take to avoid and minimise the direct and cumulative adverse impacts of the development on biodiversity values at the site selection, or route selection for linear projects, and planning phases of the development consistently with the guidelines at Subsection 8.3.2. This includes:

(i) describing the methods used to select a development site. If no method was used to select a site, the reasons for this must also be provided in the BAR

(ii) explaining how the siting and layout of the development was selected to avoid and minimise the adverse impacts on biodiversity values of the development

(iii) explaining how the siting of the project minimises habitat loss and clearing. If there are areas on the development site that contain less vegetation or have lower biodiversity impact potential, an explanation must be provided as to why it is not reasonable for the development to be sited on those areas

(iv) identifying constraints on the development site that the assessor considered in determining the siting and layout of the development footprint, e.g. bushfire protection requirements including clearing for asset protection zones, flood planning levels, servicing constraints

(v) for linear projects: describing the process to select a preferred option; outlining how biodiversity values were weighed in decision making; identifying how impacts on biodiversity values have been minimised through project design, including how the location of temporary construction infrastructure and permanent maintenance infrastructure minimises impacts on biodiversity values. Design and servicing constraints should also be identified

(c) describe and document the reasonable measures and strategies that the proponent has taken or proposes to take to avoid and minimise the direct and cumulative adverse impacts of the development on biodiversity values during the construction phase and at the operation phase of the development consistently with the guidelines at Subsection 8.3.2

(d) document the reasons why it is not practicable to undertake measures that would avoid and minimise the impacts on biodiversity values of the development site.

8.3.2 Guidelines for the avoidance and minimisation of impacts to biodiversity values during the project life cycle

Site selection and planning phase

Site selection

8.3.2.2 Selecting a suitable development site for a development or a route for linear projects, should be informed by knowledge of biodiversity values. An initial desktop assessment of biodiversity values would assist in identifying areas of native vegetation cover, EECs or CEECs, and potential habitat for threatened species.

8.3.2.3 Stage 1 of the BBAM will provide the preliminary information necessary to inform project planning. Early consideration of biodiversity values is recommended in site selection, or route selection for linear projects, and the planning phase.

8.3.2.4 The site/route selection process should include consideration and analysis of the biodiversity constraints of the proposed development site and consider the suitability of the development based on the types of biodiversity values present on the development site.

8.3.2.5 When considering and analysing the biodiversity constraints for the purpose of selecting a development site, the following matters should be addressed:

(a) whether there are alternative sites within the property on which the proposed development is located where siting the proposed development would avoid and minimise impacts on biodiversity values

(b) how the development site can be selected to avoid and minimise impacts on biodiversity values as far as practicable

(c) whether an alternative development site to the proposed development site, which would avoid adversely impacting on biodiversity values, might be feasible.

8.3.2.6 For linear projects, the route selection process must include consideration and an analysis of the biodiversity constraints of the various route options. In selecting a preferred option, loss of biodiversity values must be weighed up and justified against social and economic costs and benefits.

Planning

8.3.2.7 Once a suitable development site has been selected, further analysis of the biodiversity constraints of the proposed development site can then be used to inform concept planning, project siting and design. This includes the proposed location of temporary construction infrastructure such as roads, camps, stockpile sites and parking bays.

8.3.2.8 The development should be located in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower site value) or which avoid an EEC or CEEC. The following matters should be considered for this purpose:

(a) siting of the project – the development should be located in areas where the native vegetation or threatened species habitat is in the poorest condition (i.e. areas that have a lower site value score) or which avoid an EEC or CEEC

(b) minimise the amount of clearing or habitat loss – the development (and associated construction infrastructure) should be located in areas that do not have native vegetation, or in areas that require the least amount of vegetation to be cleared (i.e. the development footprint is minimised), and/or in areas where other impacts to biodiversity will be the lowest

(c) loss of connectivity – some developments can impact on the connectivity and movement of species through areas of adjacent habitat. Minimisation measures may include providing structures that allow movement of species across barriers or hostile gaps

(d) other site constraints – any other constraints that the assessor has considered in determining the siting and layout of the development, e.g. bushfire protection requirements including clearing for asset protection zones, flood planning levels, servicing constraints.

Construction phase

8.3.2.9 The construction phase of the development can have direct impacts on biodiversity values that are additional to the impacts which occur during the site selection and planning phase. These impacts must be avoided and minimised during the construction phase of the project where reasonable.

8.3.2.10 The following matters should be considered in order to avoid and minimise impacts on biodiversity values during the construction phase:

(a) method of clearing – using a method of clearing during the construction phase that avoids damage to retained native vegetation and reduces soil disturbance. For example, removal of native vegetation by chain-saw, rather than heavy machinery, is preferable in situations where partial clearing is proposed

(b) clearing operations – minimising direct harm to native fauna during actual construction operations through onsite measures such as undertaking pre-clearing surveys, daily fauna surveys and the presence of a trained ecologist during clearing events

(c) timing of construction – identifying reasonable measures that minimise the impacts on biodiversity. For example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting, can minimise the impacts of construction activities on biodiversity

(d) other measures that minimise inadvertent impacts of the development on the biodiversity values – measures such as installing temporary fencing to protect significant environmental features such as riparian zones, promoting the hygiene of construction vehicles to minimise spread of weeds or pathogens, appropriately training and inducting project staff and contractors so that they can implement all measures that minimise inadvertent adverse impacts of the development on biodiversity values.

Operational phase

8.3.2.11 The proponent should consider implementing reasonable measures to avoid and minimise any impacts that may occur during the operational phase of the development that are additional to the impacts which occurred during the site selection, planning and construction phases.

8.3.2.12 The following matters should be considered in order to avoid and minimise direct impacts on biodiversity values at the operational phase:

(a) seasonal impacts – whether there are likely to be any impacts that occur during specific seasons. Minimisation measures may include amending operational times to minimise impacts on biodiversity during periods when seasonal events such as breeding or species migration occur

(b) artificial habitats – using 'artificial habitats' for fauna where they may be effective in minimising impacts on such fauna. These include nest boxes, glider-crossings or habitat bridges.

8.3.3 Confirming the proposed boundary of the development footprint

8.3.3.1 Once all impacts to biodiversity have been avoided and minimised using all reasonable measures, a proposed development footprint can be confirmed.

8.4 Demonstrating minimisation of indirect impacts on biodiversity values using reasonable onsite measures

8.4.1.1 The BAR must:

(a) include an assessment of the adverse indirect impacts of the development on biodiversity values

(b) identify and assess any relevant negative indirect impacts that the development is likely to have on biodiversity values that may occur during the construction phase and those that occur once the development is operational

(c) incorporate any reasonable onsite measures that minimise the indirect impacts of the development.

8.4.1.2 When assessing indirect impacts, the assessor must consider all adverse impacts that can reasonably be predicted to result from the development. The assessor must consider indirect impacts on biodiversity where they are sufficiently related to the development to be considered a consequence of the development.

8.4.1.3 Well designed and reasonable onsite measures taken at the development site can be effective in minimising the indirect impacts of the development on biodiversity values on land that adjoins the development site and in the surrounding area.

8.4.1.4 The types of indirect impacts on biodiversity that may arise from the development, for which consideration of onsite measures is required to minimise those impacts, include but are not limited to:

(a) sedimentation and run-off – sediment barriers or sedimentation ponds to minimise impacts of the development on biodiversity values on land that is adjoining the development site, and waterways downstream of the development site

(b) noise, dust or light spill – adopting onsite measures that can minimise the impacts on biodiversity values from noise, dust or light spill during the construction phase. For example, only undertake construction during daylight hours to avoid impacts from light spill where this may be detrimental to species habitat on adjoining lands

(c) inadvertent impacts on adjacent habitat or vegetation – considering measures such as retaining vegetation on the development site as a buffer to protect significant environmental features (e.g. riparian zones, likely or known threatened species habitat)

(d) feral pest, weed and/or pathogen encroachment into vegetation on land adjoining the development site – one example is using protocols for hygiene that minimise the likelihood of construction vehicles spreading weeds or pathogens from the development site into native vegetation on land adjoining the development site

(e) impacts that are infrequent, cumulative or difficult to measure – where there are likely to be indirect impacts on biodiversity that are infrequent, cumulative or difficult to measure over time, consideration should be given to how an operational monitoring program can be used to assess the timing and/or extent of these impacts. A proposal for an operational monitoring program should be set out in the BAR. Development of a monitoring program may involve determining the base-line information that will be necessary to measure the impact over time. It should also consider how the results of the monitoring program could be used to inform ongoing operations in order to reduce the extent of indirect impacts

(f) impacts during the operational phase – measures to avoid or minimise the indirect impacts on threatened species and threatened species habitat on land adjoining the development site, migratory species or flight pathways as a result of the operation of the development. Such measures may include those adopted to avoid and minimise:

(i) trampling of threatened flora species

(ii) rubbish dumping

(iii) noise

(iv) light spill

(v) weed encroachment

(vi) nutrient run-off

(vii) increased risk of fire, and

(viii) pest animals.

8.4.1.5 All onsite measures that are proposed to avoid and minimise the indirect impacts of the development must be documented in the BAR.

9 Thresholds for the assessment and offsetting of unavoidable impacts of development

9.1.1.1 The assessment of landscape features, native vegetation, and threatened species on a development site requires the assessor to identify the following impact thresholds:

(a) impacts on red flag areas that must be avoided unless a red flag variation is approved, and

(b) impacts for which the assessor is required to determine an offset, and

(c) impacts that do not require further assessment by the assessor.

9.1.1.2 Table 4 provides a summary of the thresholds for impacts of the proposed development on landscape features, native vegetation, and threatened species.

9.1.1.3 Each of these categories is further described in Sections 9.2 to 9.4 below.

Table 4: Summary of impact thresholds for landscape features, native vegetation, and threatened species and populations

Impact thresholds identified by the assessor	A Landscape features	B Native vegetation	C Species & populations
I. Impacts that must be avoided (unless a red flag variation is approved) (and for which the assessor is required to determine an offset where the variation is approved) (Refer to Section 9.2)	Impacts on native vegetation in the riparian buffer zone bordering rivers and streams 4th order or greater Impacts in state significant or regionally significant biodiversity links Impacts on native vegetation in the buffer area of important wetlands Impacts in the buffer zone along estuaries	Any impact on a CEEC/EEC with a site value score of >34, or which is not in low condition Any impact on a PCT that is >70% cleared in the major catchment area with a site value score of >34, and which is not in low condition	Any impact on a threatened species or population that cannot withstand further loss in the major catchment area Any impact on a threatened species or population that has not previously been recorded in the IBRA subregion according to records in the NSW Wildlife Atlas Impacts on critical habitat that is listed on the Register of Critical Habitat in NSW
II. Impacts for which the assessor is required to determine an offset (Refer to Section 9.3)	Not applicable to the BBAM	Any impact on a CEEC/EEC with a site value score of ≤34, or which is in low condition Any impact on a PCT that is >70% cleared in the major catchment area with a site value score of ≤34, or which is in low condition Impacts on PCTs associated with threatened species habitat Impacts on other PCTs not associated with threatened species habitat	Impacts on threatened species, populations and threatened species habitat other than species or populations that cannot withstand further loss in the major catchment area

Table 4 continued.

Impact thresholds identified by the assessor	A Landscape features	B Native vegetation	C Species & populations
III. Impacts that do not require further assessment by the assessor (Refer to Section 9.4)	Areas of land without native vegetation	Areas of land without native vegetation	Not applicable since all areas of land must be assessed for threatened species, even if they do not contain native vegetation

9.2 Development that improves or maintains biodiversity

9.2.1.1 Under the TSC Act, a biobanking statement can only be issued for a proposed development where the Chief Executive of OEH makes a determination on the basis of an assessment of the development in accordance with the BBAM, that the development will improve or maintain biodiversity values. The BBAM establishes the circumstances where the development is to be regarded as improving or maintaining biodiversity values. This includes circumstances where the impacts of clearing on biodiversity values at the development site are offset against the beneficial impacts of management actions which create biodiversity credits at the biobank site.

9.2.1.2 A development is to be regarded as improving or maintaining biodiversity values if:

(a) the development does not directly, adversely impact on biodiversity values in a red flag area on the development site

or

(b) the development does directly adversely impact on biodiversity values in a red flag area but the Chief Executive of OEH makes a determination as set out in Subsection 9.2.3

and

(c) the direct impacts of the development on biodiversity values on the development site are offset by the retirement of biodiversity credits determined in accordance with the offset rules in Section 10.6

and

(d) the Chief Executive of OEH determines that any indirect impacts of the development on biodiversity values on-site and off-site are mitigated through reasonable onsite measures.

9.2.1.3 The Chief Executive of OEH must publish on the register of biobanking statements the reasons for determining that a development may be regarded as improving or maintaining biodiversity values according to Subsection 9.2.3.

9.2.2 Definition of a red flag area

An area of land is regarded as a red flag area if it contains one of more of the following:

Landscape features

9.2.2.2 Native vegetation within:

(a) 20 m either side of a 4th or 5th order stream

(b) 50 m either side of a 6th order stream or higher

(c) 50 m of an estuarine area

(d) 50 m of an important wetland

(e) a state significant biodiversity link

(f) a regionally significant biodiversity link.

Native vegetation

9.2.2.3 Native vegetation of a plant community type that:

(a) has greater than 70% cleared as listed in the VIS Classification Database (that is, has less than 30% of its estimated distribution prior to 1750 remaining in the catchment area) or is associated with a critically endangered ecological community, or endangered ecological community, and

(b) is not in low condition, and

(c) has a site value score >34.

Threatened species and populations

9.2.2.4 A threatened species, or any part of its habitat, where:

(a) the threatened species is identified in the Threatened Species Profile Database as a species that cannot withstand further loss in the major catchment area, or

(b) it is a threatened species that has not previously been recorded in the IBRA subregion according to records in the NSW Wildlife Atlas

9.2.2.5 Critical habitat that is listed on the register of critical habitat under section 55 of the TSC Act.

9.2.3 Determining that impacts on a red flag area may be offset

9.2.3.1 Where the development site comprises or includes a red flag area, or any part of a red flag area, and the development will have an adverse impact on that area, the development is not to be regarded as improving or maintaining biodiversity values unless the Chief Executive of OEH makes all of the relevant determinations set out in Subsections 9.2.4.1(b), 9.2.5, 9.2.6 and 9.2.7.

Highly cleared vegetation types

9.2.3.2 A highly cleared vegetation type is a PCT whose distribution in the major catchment area is 10% or less than its estimated distribution in the major catchment area prior to 1750 (that is, 90% or more cleared in the major catchment area as defined by the VIS Classification Database).

9.2.3.3 Where the red flag area contains a highly cleared vegetation type as defined in Paragraph 9.2.3.2 that is not in low condition and is equal to, or greater than, 4 ha within a patch size, the Chief Executive of OEH cannot make a determination that the development will improve or maintain biodiversity values.

9.2.4 Options to avoid and minimise impacts on a red flag area must be considered

9.2.4.1 The Chief Executive of OEH must determine that he or she is satisfied that all reasonable measures have been considered to:

(a) avoid and minimise the adverse impacts of development on the red flag area(s) consistent with the guidelines set out in Subsection 8.3.2, or

(b) improve the viability of the biodiversity values of the red flag area. This includes consideration of whether appropriate conservation management arrangements can be established over the red flag area given its current ownership, status under a regional plan, zoning and the likely costs of future management.

9.2.5 Additional assessment criteria for impacts on landscape features

9.2.5.1 Where the red flag area is native vegetation referred in Paragraph 9.2.2.2 and the proposed development will have an adverse impact on that native vegetation, the Chief Executive of OEH must determine that:

(a) the viability of the biodiversity values in that red flag area are low or not viable, and

(b) the contribution of that red flag area to regional biodiversity values is low.

9.2.5.2 In making an assessment that the viability of the biodiversity values in the red flag area are low or not viable, and that the contribution of the red flag area to regional biodiversity values is low, the Chief Executive of OEH must consider the factors set out in:

(a) Paragraph 9.2.5.3 for impacts on native vegetation in the riparian buffer of a 4th order stream or greater, and

(b) Paragraph 9.2.5.4 for impacts on native vegetation in the riparian buffer of an estuarine area or an important wetland, and

(c) Paragraph 9.2.5.5 for impacts on native vegetation in a state significant biodiversity link or a regionally significant biodiversity link.

In this subsection, ***riparian buffer*** means:

(i) 20 m either side of a 4th or 5th order stream

(ii) 40 metres either side of a 6th order stream or higher

(iii) 50 metres of an estuarine area or an important wetland

Additional criteria for impacts on the riparian buffer of a 4th order stream or higher

9.2.5.3 The assessor must include the following additional assessment criteria in the BAR for impacts that reduce the width of that riparian buffer:

(a) name and stream order of the riparian buffer being impacted

(b) extent of impact of development on the buffer area, including the total area of the riparian buffer that is impacted by the development, the extent to which the width of native vegetation in the riparian buffer will be reduced and over what length, and the size of gaps in native vegetation that would be created or expanded within the riparian buffer

(c) PCT and the condition of the vegetation in the riparian buffer adversely impacted by the development

(d) any indirect impacts on wetlands or watercourses downstream of the development site

(e) measures proposed to minimise the impact on the biodiversity values of the riparian buffer or downstream area from the direct or indirect impacts of the development.

In this subsection, ***riparian buffer*** means:

(i) 20 m either side of a 4th or 5th order stream

(ii) 40 metres either side of a 6th order stream or higher

Additional criteria for impacts on the riparian buffer of estuarine areas or important wetlands

9.2.5.4 The assessor must include the following additional assessment criteria in the BAR for impacts on the riparian buffer of an estuarine area or an important wetland:

(a) category of wetland that is being impacted by the development, or the name of the estuarine area

(b) whether the estuary or important wetland itself, and/or its riparian buffer area, is being impacted

(c) extent of impact to the riparian buffer area of the estuary or important wetland including the total area of the riparian buffer that is impacted by the development, the extent to which the width of native vegetation in the riparian buffer will be reduced and over what length, and the size of gaps in native vegetation that would be created or expanded within the riparian buffer

(d) the PCT and condition of the vegetation in the riparian buffer area adversely impacted on by the development

(e) any indirect impacts on the riparian buffer area of the estuary or important wetland, or on other wetlands or watercourses downstream of the proposed development

(f) measures proposed to minimise the impact on the biodiversity values of the buffer area of the estuary or important wetland.

Additional criteria for impacts on a state significant biodiversity link or a regionally significant biodiversity link

9.2.5.5 The assessor must include the following additional assessment criteria in the BAR for impacts on state significant biodiversity links or regionally significant biodiversity links:

(a) category of the biodiversity link being impacted

(b) a description of the total area of the biodiversity link that is impacted by the development; the extent to which the width of the link will be reduced; over what length will the width of the link be reduced; the size of gaps being created or expanded

(c) the PCT(s) and the condition of the vegetation in the biodiversity link that is adversely impacted on by the development

(d) whether the proposed development will create a hostile barrier, such as a dual carriageway, wider highway, or similar hostile barrier within the state significant biodiversity link, or regionally significant biodiversity link

(e) identify any threatened species whose movement and/or dispersal pathways are likely to be affected by the impact, including the extent to which populations may become fragmented or isolated

(f) likely effects of the impact on the movement and dispersal pathways, including impacts on the processes important to the species' life cycle (such as in the case of a plant – pollination, seed set, seed dispersal, germination), genetic diversity and long-term evolutionary development

(g) onsite measures proposed to minimise the likely impacts on species movement.

9.2.6 Additional assessment criteria for PCTs and ecological communities

9.2.6.1 Where the red flag area contains native vegetation referred to in Paragraph 9.2.2.3 and the proposed development will have an adverse impact on that native vegetation, the Chief Executive of OEH must be satisfied that:

(a) the viability of that red flag area is low or not viable in accordance with Paragraph 9.2.6.3, and

(b) the contribution to regional biodiversity values of that red flag area is low in accordance with Paragraph 9.2.6.4.

Viability must be low or not viable

9.2.6.2 Where the red flag area contains native vegetation referred to in Paragraph 9.2.2.3 and the proposed development will have an adverse impact on that native vegetation, the Chief Executive of OEH must determine that the viability of biodiversity values in that red flag area is low or not viable. The viability of biodiversity values in an area depend on:

(a) the condition of the vegetation

(b) the size of the area of biodiversity values and its isolation

(c) current or proposed tenure and zoning under any relevant planning instrument

(d) current and proposed surrounding land use, and

(e) whether mechanisms and funds are available to manage low viability sites such that their viability is improved over time.

9.2.6.3 In making an assessment that the viability of biodiversity values in a red flag area is low or not viable, the Chief Executive of OEH must be satisfied that at least one of the following factors applies:

(a) The current or future land uses of land surrounding the red flag area (other than the land use proposed in the biobanking statement application) reduce its viability or make it unviable. Relatively small areas of native vegetation surrounded or largely surrounded by intense land uses, such as urban development, can be unviable or have low viability because of disturbances from urbanisation, including edge effects.

(b) The size and connectedness of native vegetation in the red flag area to other native vegetation is insufficient to maintain its viability. Relatively small areas of isolated native vegetation can be unviable or have low viability. In considering the size and connectedness, the assessor may consider whether there is less than 30% native vegetation cover within a 0.55 km and 1.75 km radius of the red flag area, or the area to perimeter ratio of the patch size that contains the red flag area.

(c) The condition of native vegetation in the red flag area is substantially degraded resulting in loss of, or reduced, viability. Native vegetation in degraded condition can be unviable or have low viability. *Degraded condition* means vegetation in the vegetation zone where at least half of the site attributes are less than 50% of benchmark as listed in Table 2 of the BBAM without the vegetation being in low condition, or having a site value score of ≤34.

Note: Vegetation that is substantially outside benchmark due to a recent disturbance such as a fire, flood or prolonged drought is not considered degraded for the purposes of the BBAM.

Contribution of the red flag area to regional biodiversity values is low

9.2.6.4 In making an assessment as to whether the contribution of the red flag area to regional biodiversity values is low for the purposes of Paragraph 9.2.6.1, the Chief Executive of OEH must consider the following factors for each PCT that is in that red flag area:

(a) relative abundance – whether the PCT, or the EEC or CEEC in the red flag area is relatively abundant in the region

Note: *Relatively abundant in the region* may vary from one or more thousands of hectares in coastal regions, to tens of thousands of hectares or greater for some inland regions.

(b) percent remaining is high – that the percent remaining of the PCT, or the EEC or CEEC, in the red flag area is relatively high for the region

Note: *Relatively high* means relatively high in the region compared with the percent cleared of the vegetation type for the major catchment area where the red flag area is located.

(c) percent native vegetation (by area) remaining is high – that the percent remaining of all native vegetation cover in the region is relatively high

Note: *Relatively high* means relatively high in the region compared with the percent native vegetation cover for the major catchment area where the red flag area is located.

(d) condition of the PCT – whether the PCT, or the EEC/CEEC that comprises the red flag area is generally in moderate to good condition in the region.

9.2.6.5 *Region* for the purposes of Paragraph 9.2.6.1, means the IBRA subregion in which the red flag area is located, and any of the adjoining IBRA subregions.

9.2.7 Additional assessment criteria for threatened species and populations

9.2.7.1 Where the red flag area contains a threatened species and its habitat referred to in Paragraph 9.2.2.4, and the proposed development will have an adverse

impact on the threatened species and its habitat, the Chief Executive of OEH must determine that:

(a) the viability of the red flag area is low or not viable in accordance with Paragraph 9.2.7.2, and

(b) the contribution to regional biodiversity values of the species and its habitat in the red flag area is low in accordance with Paragraph 9.2.7.3.

Viability must be low or not viable

9.2.7.2 In making an assessment that the viability of biodiversity values in a red flag area is low or not viable, the Chief Executive of OEH must be satisfied that at least one of the following factors applies:

(a) The current or future land uses of land surrounding the red flag area (other than the land use proposed in the biobanking statement application) reduce its viability or make it unviable. Relatively small areas of native vegetation surrounded or largely surrounded by intense land uses, such as urban development, can be unviable or have low viability because of disturbances from urbanisation, including edge effects.

(b) The size and connectedness of native vegetation in the red flag area to other native vegetation is insufficient to maintain its viability. Relatively small areas of threatened species habitat isolated from areas of native vegetation can be unviable or have low viability.

(c) The condition of threatened species habitat in the red flag area is substantially degraded resulting in loss of, or reduced, viability.

Note: Vegetation that is substantially outside benchmark due to a recent disturbance such as a fire, flood or prolonged drought is not considered degraded for the purposes of the BBAM.

Contribution of the red flag area to regional biodiversity values is low

9.2.7.3 In making an assessment that the contribution of that red flag area to regional biodiversity values for the species is low, the Chief Executive of OEH must be satisfied that:

(a) relative abundance of the individual threatened species, threatened population or threatened species habitat on the site, whether habitat and/or the number of the threatened species in the region, would allow the species to bear temporary loss at the development site while gains are being achieved at potential biobank site(s) within the same region, or

(b) the relative importance of the relationship of the local population to other population/populations of the species in the region is low. This must include consideration of the interaction and importance of the local population to other population/populations for factors such as breeding, dispersal and genetic viability/diversity, and whether the local population is at the limit of the species' range.

9.2.7.4 For the purposes of assessing the contribution of that red flag area to regional biodiversity values, the assessor must define the region as the IBRA subregion in which the red flag area is located.

9.2.7.5 An assessor must use records from the NSW Wildlife Atlas or other documented, quantifiable sources to estimate what percentage of the species' population and habitat is likely to be lost in the long term within the IBRA subregion due to the direct and indirect impacts of the development.

Impacts on critical habitat

9.2.7.6 Where the red flag area contains critical habitat and the proposed development will have an adverse impact on that critical habitat, the Chief Executive of OEH must determine that:

(a) the viability of the biodiversity values in that red flag area are low or not viable, and

(b) the contribution of that red flag area to regional biodiversity values is low.

9.3 Impacts for which the assessor is required to determine an offset requirement

9.3.1 Impacts on native vegetation

9.3.1.1 The assessor is required to determine an offset for all impacts of development on PCTs.

9.3.1.2 The offset requirement for impacts on native vegetation is determined in accordance with Chapter 10.

9.3.2 Impacts on species and populations

9.3.2.1 The assessor is required to determine an offset for the impacts of development on threatened species, populations and threatened species habitat.

9.3.2.2 The offset requirement for impacts on threatened species, populations and threatened species habitat is determined in accordance with Chapter 10.

9.4 Impacts that do not require further assessment by the assessor

9.4.1.1 An assessor is not required to assess areas of land on the development site without native vegetation under Chapter 4 or Chapter 5.

Note: Areas of land that do not contain native vegetation must still be assessed for threatened species, in accordance with Chapter 6.

10 Determining the offset requirement for a biobanking statement

10.1.1.1 Once the impacts on biodiversity have been avoided and minimised to the fullest extent practicable, the boundaries of the development site will be confirmed and calculation of an offset requirement can commence.

10.1.1.2 An assessor may use Chapter 10 of the BBAM to determine a proposed offset requirement for impacts on red flag areas; however, a biobanking statement cannot be issued unless the Chief Executive of OEH makes a determination that the development will improve or maintain biodiversity values in accordance with Section 9.2.

10.2 Calculating the credit requirement

10.2.1 Ecosystem credits and species credits

10.2.1.1 Ecosystem credits and species credits will be used to measure the loss of biodiversity values that remains following all reasonable measures to avoid and minimise the impacts of the development in accordance with Chapter 8. Ecosystem credits measure the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Species credits measure the biodiversity value of threatened species individuals or habitat (using the appropriate unit of measurement). Ecosystem credits and species credits are together referred to as 'biodiversity credits'.

10.2.1.2 Biodiversity credits are used to measure the remaining impact on biodiversity values to determine the offset requirement. The offset requirement is documented in the BAR as outlined in Appendix 9.

10.2.1.3 The offset requirement for the development can be met by creating biodiversity credits on a biobank site in accordance with Chapters 11 and 12.

10.3 Calculating the future site value score for vegetation zones on the development site

10.3.1.1 Taking into account the impact of the development, the assessor must determine future site attribute scores for each site attribute within each vegetation zone on the development site in accordance with Table 2.

10.3.1.2 The assessor must then use those future site attribute scores to calculate the future site value score for each vegetation zone on the development site in accordance with Equation 2 as set out in Appendix 1, except to the extent provided otherwise below:

(a) If the lower benchmark value for any future site attribute is zero, and the measure of that attribute on the site is zero, then the site attribute score of that attribute against the benchmark is 3.

(b) If the *only* benchmark value for any future site attribute is zero, then the attribute is not included in Equation 2 and *c* (that is, the maximum total where the relevant attributes are in benchmark condition) is scaled accordingly.

(c) The multipliers for 'native over-storey cover × proportion of over-storey species occurring as regeneration' and 'number of trees with hollows × total length of fallen logs' may be omitted from Equation 2 (and *c* is recalculated accordingly) for determining site value in a vegetation zone if the PCT is from one of the following vegetation formations:

(i) Grasslands

(ii) Heathlands

(iii) Alpine Complex

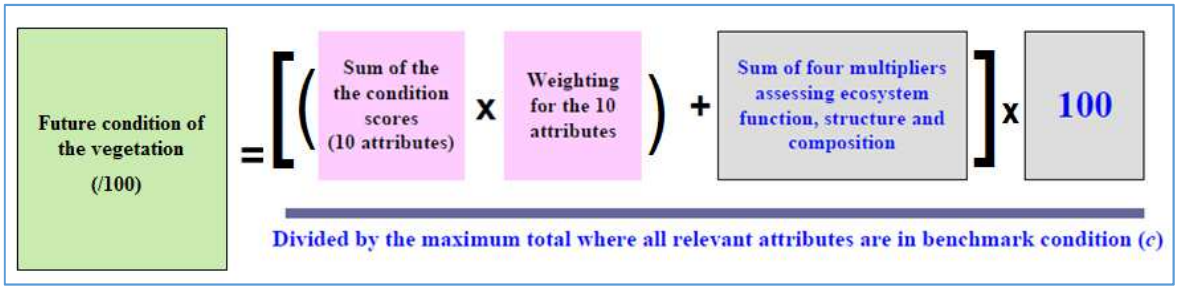
(iv) Freshwater Wetlands

(v) Saline Wetlands

(vi) Arid Shrublands.

10.3.1.3 The assessor may calculate a different future site value score for separate parts of a vegetation zone to allow for any variation in the impact of development across the vegetation zone. This includes where the impact of development will result in partial clearing of the native vegetation and includes areas such as asset protection zones and easements. The assessor must map these areas of the vegetation zone as a management zone and include this in the BAR

Summary of Equation 2: Determine the future site value score of a vegetation zone

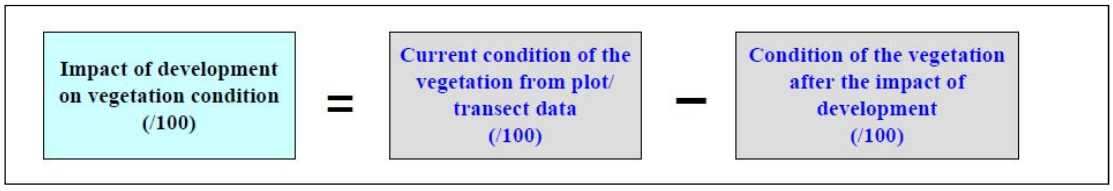


10.4 Calculating the change in the site value score for vegetation zones on the development site

10.4.1.1 The assessor must calculate the change in site value score for the vegetation zone or for a management zone using Equation 3 in Appendix 1.

10.4.1.2 The change in site value is the difference between the current site value score determined in Equation 1 and the future site value score determined in Equation 2.

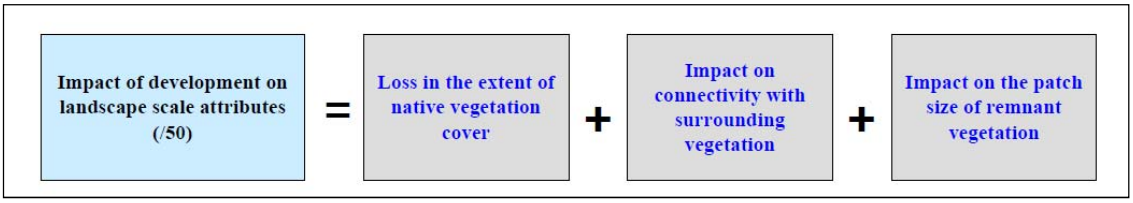
Summary of Equation 3: Calculate the change in site value score at the development site



10.4.2 Assessing the direct impact of the development on landscape values

10.4.2.1 The assessor must calculate the change in landscape value score for the development site using Equation 4 in Appendix 1.

Summary of Equation 4: Calculate the change (loss) in landscape value with development



10.4.3 Calculating the ecosystem credits that measure the direct impact on vegetation that is a CEEC/EEC or contains threatened species habitat

10.4.3.1 The direct impact of a development on vegetation in each vegetation zone, including any part of the vegetation zone identified as a management zone that:

(a) the assessor has identified as a CEEC/EEC under Chapter 5, or

(b) contains habitat for a threatened species that is predicted to use the site under Section 6.3

(c) contains any other plant community type

must be measured using ecosystem credits.

10.4.3.2 The assessor must calculate those ecosystem credits in accordance with Equation 5 in Appendix 1.

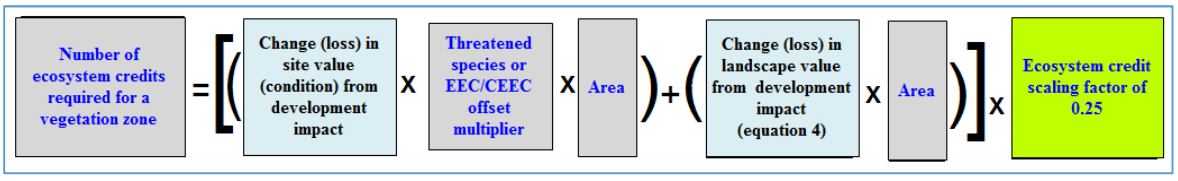
10.4.3.3 The assessor must record these ecosystem credits in the BAR.

10.4.3.4 For PCTs that, in the opinion of the assessor, are a threatened ecological community, the *Threatened Species Offset Multiplier* which must be used in Equation 5 is 3.

10.4.3.5 Where the total number of credits calculated for a vegetation zone by the assessor is not a whole number, the assessor is to round it to the nearest whole number using conventional rounding rules, except if the number being rounded is less than one, in which case the number of credits is rounded to one.

10.4.3.6 The assessor must use the Credit Calculator to obtain a biodiversity credit report setting out the number and type of ecosystem credits which measure the direct impact of the development on the biodiversity values of the development site.

Summary of Equation 5: Calculate the number of ecosystem credits required for the impact on vegetation that is an EEC or contains threatened species habitat



10.4.4 Calculating the species credits that measure the direct impact of a development on threatened species

10.4.4.1 The direct impact of the development on the species credit species determined to be present on the development site under Chapter 6 must be measured using species credits.

10.4.4.2 The assessor must calculate those species credits using Equation 6 in Appendix 1 using the area of habitat or number of individuals identified in the species polygon prepared in Step 5 of Section 6.5.

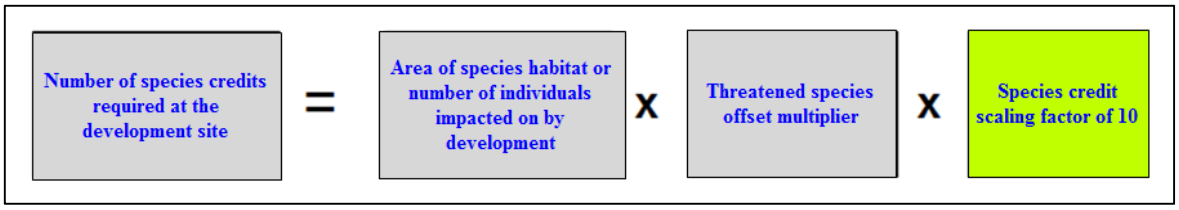
10.4.4.3 Where the total number of species credits calculated by the assessor is not a whole number, the assessor is to round it to the nearest whole number using conventional rounding rules, except if the number being rounded is less than one, in which case the number of credits is rounded to one.

10.4.4.4 The assessor must record these species credits in the BAR.

10.4.4.5 A proponent does not require an offset where no threatened species or habitat components that require species credits have been identified after completing Step 3 in Section 6.5.

10.4.4.6 The assessor must use the Credit Calculator to obtain a biodiversity credit report setting out the number and type of species credits which measure the impact of the development on species credit species.

Summary of Equation 6: Calculate the number of species credits required for the loss of individual threatened species at a development site



10.4.5 Credit profile for ecosystem credits and species credits

10.4.5.1 The credit profile of an ecosystem credit consists of the following two attributes:

(a) PCT

(b) IBRA subregion.

10.4.5.2 The credit profile of a species credit consists only of the threatened species which is being impacted upon at the development site.

10.4.5.3 The credit profile for ecosystem credits is established according to Table 5. The credit profile is part of the biodiversity credit report (biodiversity credits) produced from the Credit Calculator which sets out the number and type of ecosystem credits required to offset the impacts of development in accordance with Subsection 10.4.3.

10.4.5.4 The credit profile for ecosystem credits is created for each vegetation zone at the development site.

Table 5: Attributes of the credit profile for ecosystem credits

Credit profile attribute	Credit profile for ecosystem credits at a development site
Attribute 1: PCTs	PCTs that meet the following criteria will appear on the credit profile for ecosystem credits at a development site: a) the PCT for which the ecosystem credit is required for the impacts of development b) any PCT of the same vegetation class as identified in a) that has: ○ a percent cleared value of the PCT in the major catchment area equal to or greater than the percent cleared of the PCT specified in a) or ○ a percent cleared value up to 10% lower than the PCT specified in a), if the percent cleared of the PCT specified in a) is less than or equal to 70% cleared. Note: To illustrate condition b), a PCT proposed to be cleared that is 60% cleared in the major catchment area, may be offset by a PCT that is no less than 50% cleared in the major catchment area where it is of the same vegetation class.
Attribute 2: IBRA subregions	IBRA subregions that meet the following criteria will appear on the credit profile for ecosystem credits at a development site: a) the IBRA subregion in which the development occurs b) the adjoining IBRA subregions within the same IBRA region as identified in a) c) any other IBRA subregions that immediately adjoin the IBRA subregion identified in a) d) any other IBRA subregions that have the same geographic distribution of the threatened species assessed for the ecosystem credits in accordance with Section 6.2.

10.5 Calculating credits for environmental contributions

10.5.1.1 If an environmental contribution is required in respect of a development, the assessor may reduce the number of biodiversity credits required to offset the development (including to nil) to take account of that environmental contribution.

10.5.1.2 In issuing a biobanking statement, the Chief Executive of OEH may take into account an environmental contribution for the conservation or enhancement of the natural environment. The biobanking statement issued for a development for which an environmental contribution is required will set out the biodiversity credits required to be retired without the contribution, and the reduced number of biodiversity credits required to be retired if the environmental contribution is made.

10.5.1.3 In applying for a biobanking statement, the proponent must provide information about the environmental contribution, including:

(a) the type of environmental contribution, and

(b) how the contribution will be used or applied for the purpose of conservation or enhancement of the natural environment.

10.5.1.4 The assessor must calculate the number of credits by which an environmental contribution may reduce the number of biodiversity credits required for a development in accordance with the following four steps.

Step 1: Identify parts of the contribution that are relevant

10.5.1.5 A contribution required under the EP&A Act may be used for or applied to many different purposes. The assessor must first identify the parts of an environmental contribution that are used for or applied to the conservation or enhancement of the natural environment to reduce the number of credits required at a development site.

Step 2: Undertake a biodiversity assessment of the land to which the environmental contribution applies

10.5.1.6 The assessor must assess the biodiversity values of land proposed to be managed for the conservation or enhancement of the natural environment for improved biodiversity values in accordance with Chapters 4, 5 and 6.

Step 3: Calculate the total number of credits that can be created for the environmental contribution

10.5.1.7 The assessor must assess the gain in biodiversity values and calculate the number of credits that can be created on the land as if it were a biobank site, in accordance with Chapter 12.

10.5.1.8 The assessor must then consider the mechanism to be used to secure the land to be managed for the conservation or enhancement of the natural environment and determine the management actions that will apply to the land.

10.5.1.9 Where any management actions set out in Section 12.9 are not undertaken on the land, or the land is subject to an existing conservation obligation, the assessor must reduce the number of credits that can be created for the environmental contribution in accordance with the proportion shown for that management action according to Tables 11 and 12.

Step 4: Subtract the total number of credits that can be created for the environmental contribution from the number of biodiversity credits required for the development

10.5.1.10 The assessor must calculate the revised number of credits required to offset the development (if any) by subtracting the number of credits that are created for the environmental contribution in Step 3 from the required ecosystem credits and species credits for the development.

10.5.1.11 The assessor can only subtract credits from the number required for the development where the biodiversity credits created for the environmental contribution match the credit profile of the required ecosystem credits or species credits in accordance with the offset rules set out in Section 10.6.

10.5.1.12 A revised biobanking statement must be obtained if there is a change to the components of the environmental contribution used to reduce the number of biodiversity credits after the biobanking statement has been issued.

10.6 Offset rules for biodiversity values

10.6.1.1 This section sets out the rules which govern how impacts on the biodiversity values at a development site are offset by the improvements in biodiversity values at a biobank site.

10.6.1.2 Under the offsetting rules established in the BBAM, the credit profiles for biodiversity credits created at a biobank site are matched with the credit profiles for the type of biodiversity credits required to offset the impacts on biodiversity values at a development site.

10.6.1.3 The purpose of these offset rules is to ensure that losses of biodiversity values are offset by improvements on land with the same or similar biodiversity values.

10.6.2 Ecosystem credit offset requirement

10.6.2.1 For the purposes of this subsection and Subsection 10.6.3, *required ecosystem credit* means an ecosystem credit calculated for a development in accordance with Subsection 10.4.3.

10.6.2.2 An ecosystem credit created at a biobank site can only be used to offset the required ecosystem credit in accordance with this chapter.

10.6.3 Using an ecosystem credit created at a biobank site to offset a required ecosystem credit

10.6.3.1 An ecosystem credit created from a biobank site in accordance with Section 12.5 is a matching ecosystem credit if:

(a) the PCT identified in the credit profile for the ecosystem credit created from a biobank site is the same as any of the PCTs identified in attribute 1 of the required ecosystem credit, and

(b) the IBRA subregion identified in the credit profile for the ecosystem credit created from a biobank site is the same as an IBRA subregion identified in attribute 2 of the required ecosystem credit.

10.6.3.2 A matching ecosystem credit may be used to offset a required ecosystem credit.

10.6.4 Defining a suitable offset for individual threatened species

10.6.4.1 The credit profile of a species credit relates only to the threatened species or population which is impacted at a development site or is being managed at a biobank site.

10.6.5 Using a species credit created from a biobank site to offset a required species credit

10.6.5.1 In Subsection 10.6.5, *required species credit* means a species credit calculated for a development in accordance with Chapter 6.

10.6.5.2 A required species credit must be offset with a species credit created for the same species.

10.7 Deferred credit retirement arrangements

10.7.1.1 When issuing a biobanking statement, the Chief Executive of OEH may approve a deferred retirement arrangement if satisfied that restorative actions will be taken to partially or fully restore or improve the biodiversity values affected by the development.

10.7.1.2 A deferred retirement arrangement allows the retirement of some or all of the credits required for the development to be deferred pending completion of the restorative actions within a specified time frame. The deferred credits are to be transferred to the Minister and will be held by the Minister pending completion of the relevant restorative actions at the development site.

10.7.1.3 The types of restorative actions that may be the subject of a deferred retirement arrangement include, but are not restricted to, the management actions listed in Section 12.9.

10.7.1.4 When the restorative actions are completed, the former holder (or person who acquired the former holder's rights to apply for the credits) may apply to the Chief Executive of OEH for the return of the credits.

10.7.1.5 When determining the deferred retirement arrangements, the Chief Executive of OEH will consider the terms of any lease and/or development consent to assess what restorative actions are required to be carried out on the development site. The Chief Executive of OEH will then make an assessment as to whether the terms are suitable to be included in a deferred retirement arrangement. This assessment may also consider any rehabilitation or site restoration plan, such as a Mine Operations Plan, that has been prepared by the applicant and includes the future land-use objectives for the site.

10.7.1.6 The Chief Executive of OEH will determine the application in accordance with the requirements of this BBAM:

(a) The number and class of biodiversity credits that may be returned is determined in accordance with Chapter 12 of this methodology as if the restorative actions at the development site were management actions at a biobank site, taking into account the future land-use objectives stated in the restoration or rehabilitation plan.

(b) The current site value score in Equation 1 is taken to be the value immediately prior to commencing restorative works. The gain in site value score (as determined by Equation 7) is assessed against the benchmark for the PCT that is the target of the proposed ecological rehabilitation works and set out in the rehabilitation or restoration plan.

(c) The landscape value assessment may include newly planted, or regenerating native vegetation where the primary land-use objective following the rehabilitation is management for nature conservation.

(d) Where the restoration or rehabilitation actions outlined in the restoration or rehabilitation plan do not include or meet the management actions listed in Section 12.9, the future site value must be reduced below that set out in Table 6.

(e) The Chief Executive of OEH must be satisfied that the restorative actions outlined in the plan have been completed to a satisfactory standard.

10.7.1.7 If the restorative actions are not completed within the time frame specified in the deferred retirement arrangement, the credits may be retired.

10.7.1.8 The maximum number and class of credits that can be returned is the number and class of credits that are held by the Minister under the deferred retirement arrangement.

10.7.1.9 Any differences between the number and class of credits returned by the Minister and the number and class of credits required for a biobanking statement requires retirement of the relevant number and class of credits such that the difference is zero.

Stage 3 – Improving biodiversity values

11 Introduction to Stage 3

11.1 Documenting Stage 3 outcomes

11.1.1.1 For the purposes of an application for a biobanking agreement, the improvement in biodiversity values on a biobank site determined through Stage 3 is combined with the outcomes of Stage 1 and documented in the BAR. The BAR must be prepared by an assessor and it must contain the matters identified in Appendix 9.

Sections within Stage 3

12 Calculating gain in biodiversity values at a biobank site

12.1 Assessing biodiversity values at the biobank site

12.1.1.1 The assessor must undertake an assessment of the biodiversity values of the proposed biobank site by assessing the:

(a) landscape value of the biobank site in accordance with Chapter 4, and

(b) biodiversity values of native vegetation on the biobank site in accordance with Chapter 5, and

(c) biodiversity values of threatened species at the biobank site in accordance with Chapter 6.

12.1.1.2 The information and data resulting from this assessment of biodiversity values of the biobank site must be used to determine the number and type of biodiversity credits that can be created at the biobank site in accordance with this chapter.

12.2 Calculating the change (gain) in site value score at a biobank site

12.2.1.1 The assessor must determine future site attribute scores for each site attribute within each vegetation zone on the biobank site, by increasing the site attribute score determined for the site attribute in Equation 2 by the predicted gain for that site attribute from the management actions proposed to be carried out on the biobank site, as detailed in Table 6 and set out in Section 12.9.

Table 6: Predicted gain in the site attribute score for each site attribute with management at a biobank site

Site attribute		Gain in current site attribute score			
		0	1	2	3
a)	Native plant species richness	+0.5	+0.5	+1	No change
b)	Native over-storey cover	+1	+1	+1	No change
c)	Native mid-storey cover	+1	+1	+1	No change
d)	Native ground cover (grasses)	+1	+1	+1	No change
e)	Native ground cover (shrubs)	+1	+1	+1	No change
f)	Native ground cover (other)	+1	+1	+1	No change
g)	Exotic plant cover	0.5	0.5	+1	No change
h)	Number of trees with hollows	0	+0.5	+1	No change
i)	Proportion of over-storey species occurring as regeneration	+0.5	+1	+1	No change
j)	Total length of fallen logs	0	+0.5	+1	No change

12.2.1.2 The assessor must identify any land on the biobank site that is subject to a legal impediment, such as a covenant or an easement on the land title that restricts full implementation of the management actions set out in Section 12.9 on that part of the biobank site. The assessor must not increase the current site attribute score to the predicted site attribute score for any part of the vegetation zone that is subject to such a restriction and the assessor must identify any such areas in the management plan for the biobank site.

12.2.1.3 The assessor may increase the predicted site attribute scores for each site attribute where additional management undertaken on the biobank site is predicted to improve the site attribute score by more than the increase in the attribute score given in Table 6. Any increase in the attribute score must be in accordance with the guidelines in Appendix 7.

12.2.1.4 The assessor must then use the future site attribute scores to calculate the future site value score for each vegetation zone on the biobank site in accordance with Equation 2 as set out in Appendix 1, except to the extent provided otherwise below:

(a) If the lower benchmark value for any future site attribute is zero, and the measure of that attribute on the site is zero, then the site attribute score of that attribute against the benchmark is 3.

(b) If the *only* benchmark value for any future site attribute is zero, then the attribute is not included in Equation 2 and *c* (that is, the maximum total where the relevant attributes are in benchmark condition) is scaled accordingly.

(c) The multipliers for 'native over-storey cover × proportion of over-storey species occurring as regeneration' and 'number of trees with hollows × total length of fallen logs' may be omitted from Equation 2 (and *c* is recalculated accordingly) for determining site value at a site if the PCT is from one of the following vegetation formations:

(i) Grasslands

(ii) Heathlands

(iii) Alpine Complex

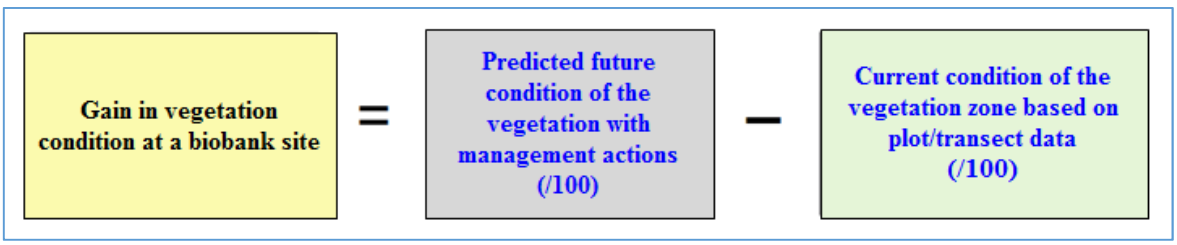
(iv) Freshwater Wetlands

(v) Saline Wetlands

(vi) Arid Shrublands.

12.2.1.5 The change in site value score for a biobank site must be calculated using Equation 7 in Appendix 1.

Summary of Equation 7: Calculate the change (gain) in site value score at the biobank site



12.3 Calculating the averted loss in site value at a biobank site

12.3.1.1 The assessor may consider the averted loss in site value at the biobank site through assessing the risk of decline should the biobank site not be secured under a conservation measure.

12.3.1.2 In assessing the risk that the site value score will decline in a vegetation zone over the next 20 years, the assessor must consider the land-use zone and/or the permitted clearing entitlements that apply to the land. The 20-year period is defined as commencing at the time the conservation agreement is entered into.

12.3.1.3 Native vegetation that has a high risk of decline in site value score is on:

(a) lands that were or are zoned for residential (but not rural residential), business or industrial uses in a Local Environmental Plan (LEP) prior to the development of a Standard Instrument LEP (in accordance with the Standard Instrument (LEP) Order 2006), or

(b) land that is zoned RU1 (Primary production).

12.3.1.4 Native vegetation on all other land is considered to have a low risk of decline in the site value score of the vegetation zone over a 20-year period.

12.3.1.5 Where a vegetation zone is on land identified as having a high risk of decline the assessor may reduce the current site attribute score to the likely future attribute score for the six site attributes listed Table 7.

Table 7: Likely future site attribute scores within 20 years on high risk land without management

Site attribute	Likely future attribute score where the current attribute score is 1	Likely future attribute score where the current attribute score is 2	Likely future attribute score where the current attribute score is 3
Native ground cover (grasses)	1	1.5	2
Native ground cover (shrubs)	1	1.5	2
Native ground cover (other)	1	1.5	2
Exotic plant cover	1	1.5	2
Proportion of over-storey species occurring as regeneration	1	1.5	2
Total length of fallen logs	1	1.5	2

12.3.1.6 The assessor must then calculate the likely site value score within 20 years for each vegetation zone on high risk land in accordance with Equation 2 as set out in Appendix 1, except to the extent provided otherwise below:

(a) If the lower benchmark value for any future site attribute is zero, and the measure of that attribute on the site is zero, then the site attribute score of that attribute against the benchmark is 3.

(b) If the *only* benchmark value for any future site attribute is zero, then the attribute is not included in Equation 2 and *c* (that is, the maximum total where the relevant attributes are in benchmark condition) is scaled accordingly.

(c) The multipliers for 'native over-storey cover × proportion of over-storey species occurring as regeneration' and 'number of trees with hollows × total length of fallen logs' may be omitted from Equation 2 (and *c* is recalculated accordingly) for determining site value at a site if the PCT is from one of the following vegetation formations:

(i) Grasslands

(ii) Heathlands

(iii) Alpine Complex

(iv) Freshwater Wetlands

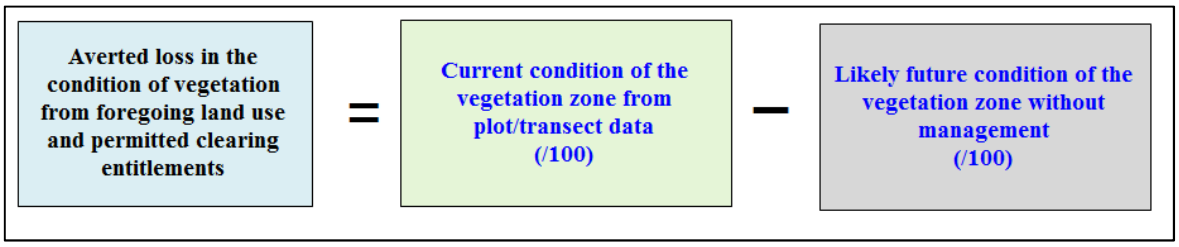
(v) Saline Wetlands

(vi) Arid Shrublands.

12.3.1.7 The score for the averted loss in site value at a biobank site on high risk land must be calculated in accordance with Equation 8 in Appendix 1.

12.3.1.8 The score for the averted loss in site value at a biobank site on low risk land is 50% of the averted loss in site value if the biobank site was on high risk land as calculated in accordance with Equation 8 in Appendix 1.

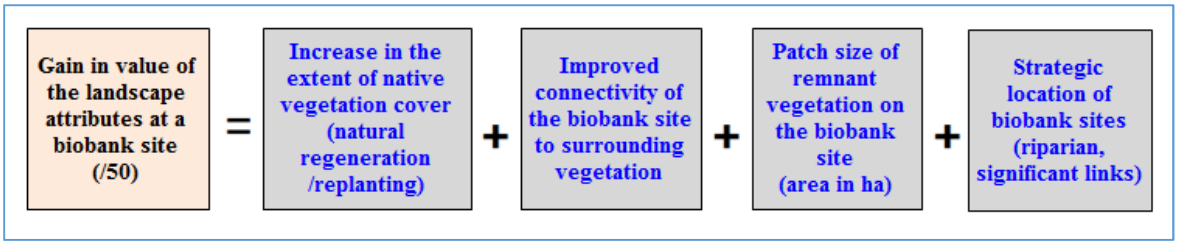
Summary of Equation 8: Calculate the averted loss in site value score at the biobank site



12.4 Calculating the change in landscape value at the biobank site

12.4.1.1 The change in landscape value score at a biobank site must be calculated using Equation 9 in Appendix 1.

Summary of Equation 9: Calculate the change (gain) in landscape value with offset



12.4.1.2 The maximum scores which can be given to each landscape attribute are shown in Table 8.

Table 8: Maximum scores of landscape attributes with weightings at a biobank site

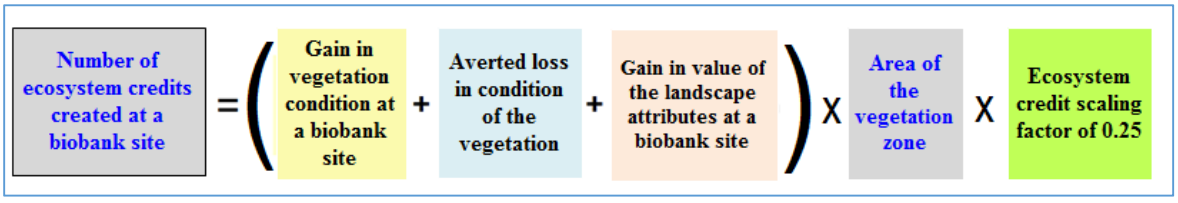
Landscape attribute	Weighting	Maximum score with relative weighting
Percent native vegetation cover within an outer assessment circle (minimum of 1000 ha)	0.625	10
Percent native vegetation cover within an inner assessment circle (minimum of 100 ha)	1	10
Connectivity value	0.75	9
Total patch size	1	12
Strategic location of a biobank site	1	9
Total for landscape value at a biobank **site**		**50**

12.5 Calculating the number of ecosystem credits created at a biobank site

12.5.1.1 Ecosystem credits are created for the improvement in biodiversity values at a biobank site by undertaking the management actions set out in Section 12.9.

12.5.1.2 The assessor must calculate the number of ecosystem credits created for each vegetation zone on the biobank site in accordance with Equation 10 in Appendix 1. The number of credits must be rounded to the nearest whole number using conventional rounding rules, except if the number being rounded is less than one, in which case the number of credits is rounded to one.

Summary of Equation 10: Calculate the number of ecosystem credits at a biobank site

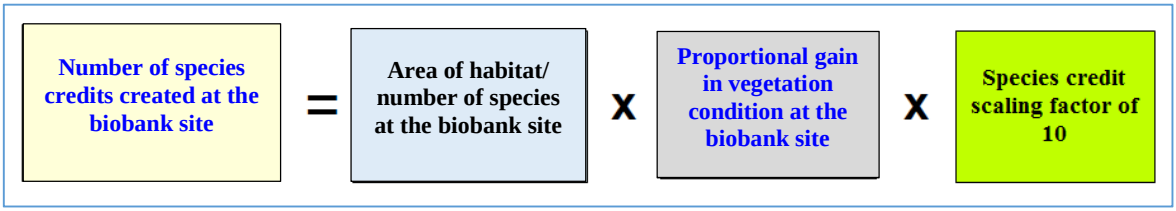


12.6 Calculating the number of species credits created at a biobank site

12.6.1.1 The assessor must calculate the number of species credits created at a biobank site for each species credit species determined to be present on the biobank site under Chapter 6 using Equation 11 in Appendix 1.

12.6.1.2 The number of credits must be rounded to the nearest whole number using conventional rounding rules, except if the number being rounded is less than one, in which case the number of credits is rounded to one.

Summary of Equation 11: Species credits – number of credits created at the biobank site



12.7 Ecosystem credits created at a biobank site

12.7.1.1 The credit profile for ecosystem credits created at a biobank site is established according to Table 9. The credit profile is part of the biodiversity credit report (biodiversity credits) produced from the Credit Calculator which sets out the number and type of ecosystem credits created at the biobank site in accordance with Section 10.4.3.

12.7.1.2 Under the offsetting rules established in Section 10.6, the credit profile is used to match biodiversity credits created at a biobank site with those that are required to offset the impacts on biodiversity values at a development site.

Table 9: Attributes of the credit profile for ecosystem credits created at a biobank site

Credit profile attribute	Credit profile for ecosystem credits created at a biobank site
Attribute 1: PCTs	The PCT for which the ecosystem credit is created in a vegetation zone at the biobank site is the PCT that will appear on the credit profile
Attribute 2: IBRA subregions	The IBRA subregion that contains the land in which the biobank site is located is the IBRA subregion that will appear on the credit profile

12.8 Species credits created at a biobank site

12.8.1.1 The credit profile of a species credit created at a biobank site is the species which is being managed at the biobank site.

12.8.1.2 The credit profile is part of the biodiversity credit report (biodiversity credits) produced from the Credit Calculator which sets out the number and type of species credits created at the biobank site in accordance with Section 10.4.3.

12.9 Management actions that improve biodiversity values

12.9.1.1 In this section *management plan* means the management plan required under Paragraph 12.9.1.8.

12.9.1.2 Biodiversity credits may only be created from management actions that are or are proposed to be carried out at a biobank site in accordance with Section 12.10.

12.9.1.3 The management actions that can create biodiversity credits are:

(a) management of grazing for conservation

(b) weed control

(c) application of ecological fire management

(d) management of human disturbance

(e) retention of regrowth and remnant native vegetation

(f) replanting or supplementary planting where natural regeneration will not be sufficient

(g) retention of dead timber

(h) erosion control

(i) retention of rocks.

12.9.1.4 All the above management actions must be implemented on the biobank site to achieve the predicted gain in site value, as determined by using Table 6 and Equation 7.

12.9.1.5 Additional management actions will be required to create species credits at a biobank site for a species, if the actions are identified in the Threatened Species Profile Database for that species.

12.9.1.6 An assessor must use the Threatened Species Profile Database to determine whether additional management actions are required to create species credits at a biobank site for a species credit species.

12.9.1.7 The additional management actions that may be required to create species credits include:

(a) control of feral and/or overabundant native herbivores

(b) vertebrate pest management of pigs

(c) vertebrate pest management of foxes and/or miscellaneous species

(d) nutrient control

(e) control of exotic fish species

(f) maintenance or reintroduction of natural flow regimes.

12.9.1.8 The assessor must describe the implementation of the management actions in a management plan based on the assessment of the biodiversity values of the biobank site undertaken in Chapters 4, 5 and 6, and the calculation of gain in biodiversity values in Sections 12.2 and 12.4. The management plan must:

(a) describe the implementation of any additional management actions required by the Threatened Species Profile Database, and

(b) set out the area to which each management action applies and the time frame for implementation of each management action

(c) identify which management actions apply and the timeframe for implementation of each management action on any area of the biobank site that is subject to a legal impediment, such as a covenant or an easement on the land title, that restricts full implementation of the management.

12.10 Existing obligations and management actions

12.10.1.1 Ecosystem and species credits may only be created by management actions proposed to be carried out on a biobank site where the management actions are additional to any biodiversity conservation measure or action that is an existing conservation obligation.

12.10.1.2 For the purpose of Paragraph 12.10.1.1, *existing conservation obligation* means any measure or action required to be carried out under:

(a) a restriction on use or public positive covenant under Part 4A of the *Crown Lands Act 1989*

(b) a conservation agreement entered into under the *National Parks and Wildlife Act 1974* (NPW Act)

(c) a trust agreement entered into under the *Nature Conservation Trust Act 2001* (NCT Act)

(d) any agreement entered into with a public authority under which the owner of the land received funding for biodiversity conservation purposes (other than biobanking agreements)

(e) in the case of publically owned land, any legislative requirements to manage the land for biodiversity conservation purposes.

12.10.1.3 This rule does not apply to:

(a) a restriction on use or public positive covenant under Part 4A of the Crown Lands Act that is imposed in connection with an application to purchase land that is duly made by a leaseholder in respect of that land before 10 March 2009

(b) a conservation agreement entered into under the NPW Act as a result of a proposal made by the landholder to the Minister administering that Act before 10 March 2009, or

(c) a trust agreement entered into under the NCT Act as a result of a proposal made by the landholder to the Nature Conservation Trust before 10 March 2009.

12.10.1.4 Existing conservation obligation does not apply to management actions that are undertaken voluntarily and which are not secured by any legal obligation.

12.10.1.5 Where a biobank site is proposed on land on which there is an existing conservation obligation the number of biodiversity credits calculated in accordance with Paragraph 12.2.1.4 and Section 12.5 must be discounted in accordance with the following steps.

Step 1: Calculate credits for the proposed biobank site

12.10.1.6 Calculate the number of ecosystem credits and species credits that are created for the biobank site in accordance with Equation 10 for ecosystem credits and Equation 11 for species credits.

Step 2: Identify the management actions required for the existing conservation obligations

12.10.1.7 The management actions referred to in Section 12.9 that are required for the existing conservation obligation and the timeframe for which they are required must be identified.

Step 3: Determine the management action discount percentage required for the existing conservation obligations

12.10.1.8 The number of credits as determined in Step 1 for the biobank site is scaled back according to the management actions that the landholder is already obliged to perform under the existing obligation and the percentage discount for each management action according to Table 10 for ecosystem credits and Table 11 for species credits.

12.10.1.9 Where an existing conservation obligation only partially aligns with a management action (e.g. 'exclusion of domestic stock' rather than 'management of grazing for biodiversity enhancement'), the credit allocation is discounted by 5% rather than by 7.5%.

Table 10: Percentage discount for ecosystem credits

Conservation measure or action	Percentage discount in ecosystem credit allocation where the existing conservation obligation is in-perpetuity
Strategic stock grazing for conservation (or domestic stock grazing exclusion)	7.5% (5% if obligation is only for domestic stock grazing exclusion)
Weed control	7.5%
Application of ecological fire management (or Do not burn)	7.5% (5% if obligation is only fire exclusion)
Manage human disturbance	7.5%
Retain regrowth and remnant native vegetation	5%
Replant/supplementary planting	7.5%
Retention of all dead timber (standing and fallen)	7.5% (0% if obligation only excludes commercial use as this is required under the *Native Vegetation Act 2003*)
Nutrient control	5%
Erosion control	7.5%
Retention of rocks	5%
Control feral and/or overabundant native herbivores	7.5%
Control feral pigs	7.5%
Exclude miscellaneous feral species	7.5%
Control exotic pest fish species (within dams)	7.5%
Maintain or re-introduce natural flow regimes	7.5%
Fox control	7.5%

Table 11: Percentage discount for species credits

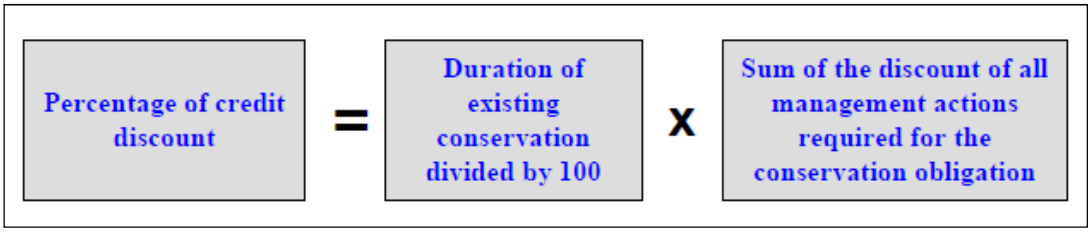
Conservation measure or action	Percentage discount in species credit allocation where the existing conservation obligation is in-perpetuity
Control feral herbivores (and/or overabundant natives)	7.5%
Control feral pigs	7.5%
Exclude miscellaneous feral species	7.5%
Control exotic pest fish species (within dams)	5%
Maintain or re-introduce natural flow regimes	5%
Nutrient control	5%
Exclude commercial apiaries	5%
Fox control	7.5%
Any other management action for species credits	7.5% (for each additional action)

Step 4: Identify the duration of the existing conservation obligation/s and finalise the credit discount percentage

12.10.1.10 The timeframe for the management action/s under the existing conservation obligation, identified in Step 2, must be identified. The final discount percentage must be determined in accordance with Equation 12.

12.10.1.11 The numbers of ecosystem credits and of species credits as determined in Step 1 are then scaled back according to the final discount percentage.

Summary of Equation 12: Calculate the final credit discount percentage for existing conservation obligations



12.10.1.12 Existing conservation obligations and the process for discounting conservation actions must be outlined in the BAR as part of the application for a biobanking agreement.

Definitions

References to legislation in the BBAM are references to legislation as in force from time to time.

References to environmental planning instruments in the BBAM are references to the environmental planning instruments as in force from time to time.

References to databases in the BBAM are references to databases as in force from time to time.

References to sections are references to sections of this BBAM unless otherwise indicated.

The following terms are defined for the purposes of the BBAM:

Assessment circles: two circles (the inner and outer assessment circle) in which the percent native vegetation cover in the landscape is assessed, taking into account both cover and condition of vegetation.

Assessor: the person referred to in Subsection 2.2.1 and who has been engaged by the proponent.

Avoid: measures taken by a proponent such as careful site selection or actions taken through the design, planning, construction and operational phases of the development to completely avoid impacts on biodiversity values, or certain areas of biodiversity. Refer to the BBAM for operational guidance.

BBAM: the BioBanking Assessment Methodology 2014.

Benchmarks: the quantitative measures of the range of variability in vegetation condition in vegetation with relatively little evidence of modification by humans since European (post 1750) settlement. Benchmarks are defined for specified variables for each PCT. Vegetation with relatively little evidence of modification generally has minimal timber harvesting (few stumps, coppicing, cut logs), minimal firewood collection, minimal exotic weed cover, minimal grazing and trampling by introduced or overabundant native herbivores, minimal soil disturbance, minimal canopy dieback, no evidence of recent fire or flood, is not subject to high frequency burning, and has evidence of recruitment of native species.

Biobank site: land designated by a biobanking agreement to be a biobank site.

Biobanking agreement: has the same meaning as in the TSC Act.

Biobanking statement: has the same meaning as in the TSC Act.

Biodiversity Assessment Report (BAR): the report that must be prepared in accordance with the BBAM.

Biodiversity credit report: the report produced by the Credit Calculator that sets out the number and type of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or sets out the number and type of biodiversity credits that are created at a biobank site.

Biodiversity credits: ecosystem credits or species credits.

Biodiversity offsets: are management actions that are undertaken to achieve a gain in biodiversity values on areas of land in order to compensate for losses to biodiversity values from the impacts of development. See also *Offset requirement*, and *Biobank site*.

Biodiversity values: has the same meaning as at section 4A of the TSC Act but excludes marine mammals, wandering sea birds and biodiversity that is endemic to Lord Howe Island.

Biometric vegetation type (BVT): provides the occurrence of the PCT within a specific catchment management area. A BVT may be assigned catchment specific attributes such as benchmark data, percent cleared in the catchment area value and associations with threatened species, populations and communities. A PCT may be distributed across one or more major catchment areas and is assigned a BVT with each major catchment area occurrence. BVTs are managed in the VIS Classification Database.

Broad condition state: are areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the site value score.

Catchment area: the area of operation of a former catchment management authority, as described in Schedule 2 of the *Catchment Management Authorities Act 2003* immediately before its repeal.

Change in site value score for a biobank site: the difference (gain) between the current site value score for a biobank site and the predicted future site value score for a biobank site calculated in accordance with Equation 7.

Change in landscape value score for a biobank site: the difference (gain) between current landscape value score for a biobank site and predicted landscape value score for a biobank site calculated in accordance with Equation 9.

Connectivity: the measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.

Connectivity value: has the meaning given in Subsection 4.2.3.

Credit Calculator: the computer program that provides decision support to assessors and proponents by applying the BBAM, and which calculates the number and type of biodiversity credits required to offset the impacts of a development or created at a biobank site.

Critical habitat: has the same meaning as in the TSC Act.

Critically endangered ecological community (CEEC): an ecological community specified in Part 2 of Schedule 1A of the TSC Act and/or listed under Part 13, Division 1, Subdivision A of the EPBC Act.

Derived vegetation: PCTs that have changed to an alternative stable state as a consequence of land management practices since European settlement. Derived communities can have one or more structural components of the vegetation entirely removed or severely reduced (e.g. over-storey of grassy woodland), or have developed new structural components where they were previously absent (e.g. shrubby mid-storey in an open woodland system).

Development: has the same meaning as development at section 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act), or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.

Development footprint: the area of land that is directly impacted on by a proposed development that is under the EP&A Act, including access roads, and areas used to store construction materials.

Development site: an area of land that is subject to a proposed development that is under the EP&A Act.

Direct impact on biodiversity values: an impact on biodiversity values that is a direct result of vegetation clearance from a development. It is predictable, usually occurs at or near to the development site and can be readily identified during the planning, design, construction, and operational phases of a development.

Ecosystem credits: a measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biobank site.

Endangered ecological community (EEC): an ecological community specified in Part 3 of Schedule 1 of the TSC Act, or listed under the EPBC Act.

Environmental contribution: is a contribution that is required under subdivision 2 (Planning Agreements), subdivision 3 (Local Infrastructure Contributions) or subdivision 4 (Special Infrastructure Contributions) of Division 6 of Part 4 of the EP&A Act and is to be used or applied for the conservation or enhancement of the natural environment. A contribution may be in the form of dedication of land, a levy or other material benefit.

EP&A Act: the NSW *Environmental Planning and Assessment Act 1979*.

EPBC Act: the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Estuarine area: a semi-enclosed body of water having an open or intermittently open connection with the ocean, in which water levels do not vary with the ocean tide (when closed to the sea) or vary in a predictable, periodic way in response to the ocean tide at the entrance (when open to the sea).

Exotic plant cover: exotic plants are vascular plants not native to Australia. Exotic plant cover is measured as total percent foliage cover of all exotics in all strata.

Expert: a person who is accredited by the Chief Executive of OEH under section 142B(1)(b) of the TSC Act, or if arrangements for accreditation under section 142B(1)(b) are not in place, a person who has the relevant experience and/or qualifications to provide expert opinion in relation to the biodiversity values to which an expert report relates.

Gain: the gain in biodiversity values at a biobank site, over time from undertaking management actions at a biobank site. Gain in biodiversity values is the basis for creating biodiversity credits at the biobank site.

Grassland: native vegetation classified in the vegetation formation 'Grasslands' in Keith (2004)[1]. Grasslands are generally dominated by large perennial tussock grasses, lack of woody plants, the presence of broad-leaved herbs in inter-tussock spaces, and their ecological association with fertile, heavy clay soils on flat topography in regions with low to moderate rainfall.

Habitat: an area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic component.

Habitat component: the component of habitat that is used by a threatened species for either breeding, foraging or shelter.

Habitat surrogates: measures of habitat that predict the occurrence of threatened species, populations and communities: IBRA subregion, PCT, percent vegetation cover and vegetation condition.

Herbfield: native vegetation which predominantly does not contain an over-storey or mid-storey and where the ground cover is dominated by non-grass species.

Hollow bearing tree: a living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the minimum entrance width is at least 5 cm across; (c) the hollow appears to have depth (i.e. you cannot see

[1] Keith, D (2004), *Ocean shores to desert dunes: the native vegetation of New South Wales and the ACT*, Department of Environment and Conservation NSW, Hurstville.

solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.

IBRA region: a bioregion identified under the Interim Biogeographic Regionalisation for Australia (IBRA) system[2], which divides Australia into bioregions on the basis of their dominant landscape-scale attributes.

IBRA subregion: a subregion of a bioregion identified under the IBRA system and based on major catchment areas as shown in Appendix 8.

Impact assessment: an assessment of the impact or likely impact of a development on biodiversity values which is prepared in accordance with the BBAM.

Impacts on biodiversity values: loss in biodiversity values from direct or indirect impacts of development in accordance with Chapters 8, 9 and 10.

Important wetland means:

(a) a wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) from time to time; and

(b) For the purposes of all subsections except 4.1.1.11-4.1.1.13 – the actual location on the ground that corresponds to a SEPP 14 Coastal wetland

(c) for the purposes of subsections 4.1.1.11 – 4.1.1.13:

(i) a SEPP 14 Coastal Wetland; and

(ii) the actual location on the ground that corresponds to a SEPP 14 Coastal Wetland.

Indirect impact on biodiversity values: an impact on biodiversity values that occurs when development related activities affect threatened species, threatened species habitat, or ecological communities in a manner other than direct impact. Compared to direct impacts, indirect impacts often:

- occur over a wider area than just the site of the development
- have a lower intensity of impact in the extent to which they occur compared to direct impacts
- occur off site
- have a lower predictability of when the impact occurs
- have unclear boundaries of responsibility.

Individual: in relation to organisms, a single, mature organism that is a threatened species defined in section 4(1) of the TSC Act, or any additional threatened species listed under Part 13 of the EPBC Act.

Initial desktop assessment of biodiversity values: an assessment undertaken as part of concept-planning, and that informs project siting and design. The assessment compiles all existing environmental information about the site, and where necessary, additional information relating to features that are red flag areas.

Landscape attributes: in relation to a development site or a biobank site, native vegetation cover, vegetation connectivity, patch size and the strategic location of a biobank site.

Landscape value: the value given to landscape attributes of a development site or biobank site after an assessment undertaken in accordance with Section 4.2.

[2] Thackway, R and Cresswell ID (1995), *An interim biogeographic regionalisation for Australia: a framework for setting priorities in the National Reserves System Cooperative Program*, Australian Nature Conservation Agency, Canberra.

Life cycle: the series of stages of reproduction, growth, development, aging and death of an organism.

Linear shaped development: development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length.

Local population: the population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.

Local wetland: any *wetland* that is not identified as an important wetland (refer to definition of *important wetland*).

Loss: the loss of biodiversity values from a development site.

Major catchment area: the area of operation of a former catchment management authority, as described in Schedule 2 of the *Catchment Management Authorities Act 2003* immediately before its repeal.

Major Project: State Significant Development or State Significant Infrastructure projects.

Minimise: a process applied throughout the development planning and design life cycle which seeks to reduce the unavoidable impacts of development on biodiversity values.

Mitchell landscape: landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.

More appropriate local data: data that more accurately reflects the local environmental conditions at a development site or a biobank than the data in the databases used in the BBAM. The Chief Executive of OEH may certify that more appropriate local data can be used in an application for a biobanking agreement or a biobanking statement.

Multiple fragmentation impact development: developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including for roads, tracks, gathering systems/flow lines, transmission lines.

Native ground cover: all native vegetation below 1 m in height, including all such species native to NSW (i.e. not confined to species indigenous to the area).

Native ground cover (grasses): native ground cover contains all native vegetation below 1 m in height and includes all species native to NSW (i.e. it is not confined to species indigenous to the area). Native ground cover (grasses) refers specifically to native grasses.

Native ground cover (other): native ground cover contains all native vegetation below 1 m in height and includes all species native to NSW (i.e. it is not confined to species indigenous to the area). Native ground cover (other) refers to non-woody native vegetation (vascular plants only) <1 m that is not grass (e.g. herbs, ferns).

Native ground cover (shrubs): native ground cover contains all native vegetation below 1 m in height and includes all species native to NSW (i.e. it is not confined to species indigenous to the area). Native ground cover (shrubs) refers to native woody vegetation <1 m.

Native mid-storey cover: native mid-storey contains all vegetation between the over-storey stratum and a height of 1 m (typically tall shrubs, under-storey trees and tree regeneration) and including all species native to NSW (i.e. native species not local to the area can contribute to mid-storey structure).

Native over-storey cover: native over-storey is the tallest woody stratum present (including emergent) above 1 m and including all species native to NSW (i.e. native species not local to the area can contribute to over-storey structure). In a woodland

community the over-storey stratum is the tree layer, and in a shrubland community the over-storey stratum is the tallest shrub layer. Some vegetation types (e.g. grasslands) may not have an over-storey stratum.

Native plant species richness: the number of different native vascular plant species that are characteristic of a PCT.

Native vegetation: has the same meaning as in section 6 of the *Native Vegetation Act 2003* (NV Act).

NSW Wildlife Atlas: The Atlas of NSW Wildlife (the Atlas) is the Office of Environment and Heritage's (OEH's) database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails listed under the TSC Act) and some fish.

Number of trees with hollows: a count of the number of living and dead trees that are hollow bearing.

Offset requirement: the number and type of biodiversity credits that are required to offset the remaining impacts of development on biodiversity values after all reasonable measures have been taken to avoid and minimise impacts.

Offset rules: the circumstances in which credits created at a biobank site can be used (retired) for a development to meet the offset requirement.

Onsite measures: reasonable measures and strategies that are taken, or are proposed to be taken at a development site to avoid and minimise the direct and indirect impacts of the development on biodiversity values.

Operational Manual: a guide to using the BBAM. The Operational Manual is being prepared by OEH and will be available on the OEH website (when published).

Patch size: an area of native vegetation that:

a) occurs on the development site or biobank site, and
b) is in moderate to good condition, and
c) includes native vegetation that has a gap of less than 100 m from the next area of moderate to good condition native vegetation (or ≤ 30 m for non-woody ecosystems).

Patch size may extend onto adjoining land that is not part of the development site or biobank site.

PCT classification system: the system of classifying native vegetation approved by the NSW Plant Community Type Control Panel and described in the VIS Classification Database.

Percent cleared value: the percentage of a vegetation type that has been cleared within a major catchment area as a proportion of its pre-1750 extent, as identified in the VIS Classification Database. The percent cleared value is assigned to the BVT equivalent.

Percent foliage cover: the percentage of ground that would be covered by a vertical projection of the foliage and branches and trunk of a plant or plants.

Percent native vegetation cover: the percent of native vegetation cover in the inner and outer assessment circle, or the development footprint buffer area. Cover estimates are based on the cover of native woody and non-woody vegetation relative to the approximate benchmarks for the PCT, taking into account vegetation condition and extent. Native over-storey vegetation is used to determine the percent cover in woody vegetation types, and native ground cover is used to assess cover in non-woody vegetation types.

Plant community type (PCT): a NSW plant community type identified using the PCT classification system.

Plot: an area within a vegetation zone in which site attributes are assessed.

Proponent: an organisation which is an applicant for a development.

Reference sites: the relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.

Regeneration: the proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5 cm within a vegetation zone.

Regionally significant biodiversity link: a biodiversity corridor that is identified in a plan approved by the Chief Executive of OEH.

Required ecosystem credit: has the meaning given by Subsection 10.6.2.

Remaining impact: an impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BBAM, an offset requirement is calculated for the remaining impacts on biodiversity values.

Retirement of credits: the purchase and retirement of biodiversity credits from an already-established biobank site.

Riparian buffer: an area of land determined according to Appendix 2.

Risk of extinction: the likelihood that the local population or CEEC or EEC will become extinct either in the short term or in the long term as a result of direct or indirect impacts on the viability of that population or CEEC or EEC.

SEPP 14 Coastal Wetland means a wetland to which *State Environmental Planning Policy No 14 - Coastal Wetlands* applies.

Site attributes: the matters assessed to determine site value. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.

Site based development: a development other than a linear shaped development, or a multiple fragmentation impact development.

Site value: the condition of native vegetation assessed for each vegetation zone against the benchmark for the PCT.

Site value score: the quantitative measure of vegetation condition calculated in accordance with Equation 1.

Species credit species: threatened species and populations that are assessed according to Section 6.4.

Species credits: 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. Species that require species credits are listed in the Threatened Species Profile Database.

Species that cannot withstand further loss: a species identified in the Threatened Species Profile Database as a species that cannot withstand further loss in the major catchment area in which the species occurs because of one or more of the following:

- the species is naturally very rare, has few populations or a restricted distribution
- the species or population is critically endangered

- the species has threats that are beyond control (of the management actions undertaken on a biobank site)
- the species' or its habitat's needs/response to management are poorly known.

State significant biodiversity link: a biodiversity corridor that is important at a state scale and is identified in a plan approved by the Chief Executive of OEH.

State Significant Development: has the same meaning as in section 89C of the EP&A Act.

State Significant Infrastructure: has the same meaning as in section 115U of the EP&A Act.

Strategic location of a biobank site: a biobank site that includes land that is: part of a state significant biodiversity link and in a plan approved by the Chief Executive OEH; a regionally significant biodiversity link and in a plan approved by the Chief Executive OEH; or in the riparian buffer area of a 4th order stream or higher, an important wetland or an estuarine area.

Stream order: has the same meaning as in Appendix 2.

T_G value: the ability of a species to respond to improvement in site value or other habitat improvement at a biobank site with management actions. T_G is based on an assessment of effectiveness of management actions, life history characteristics, naturally very rare species, and very poorly known species.

Threatened population: has the same meaning as in section 4(1) of the TSC Act.

Threatened species: critically endangered, endangered or vulnerable threatened species or populations as defined in section 4(1) of the TSC Act, or any additional threatened species listed under Part 13 of the EPBC Act as critically endangered, endangered or vulnerable.

Threatened Species Profile Database: is part the BIONET database, is maintained by OEH and can be accessed from the BIONET website at www.bionet.nsw.gov.au/.

Threatened species survey: a targeted survey for threatened species undertaken in accordance with Section 6.6.

Threatened species survey guidelines: survey methods or guidelines provided by OEH or published by OEH at www.environment.nsw.gov.au/threatenedspecies/surveyassessmentgdlns.htm.

Total length of fallen logs: the total length of logs present in a vegetation zone that are at least 10 cm in diameter and at least 0.5 m long.

Transect: a line or narrow belt along which environmental data is collected.

TSC Act: the NSW *Threatened Species Conservation Act 1995*.

Unavoidable impact: an impact on biodiversity values that cannot be avoided and/or minimised.

Vegetation Benchmarks Database: a database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is maintained by OEH and is part of the VIS Classification Database. It is available at www.environment.nsw.gov.au/research/Visclassification.htm.

Vegetation class: a level of classification of vegetation communities defined in Keith (2004)[3]. There are 99 vegetation classes in NSW.

[3] Keith, D 2004, *Ocean shores to desert dunes: the native vegetation of New South Wales and the ACT,* Department of Environment and Conservation NSW, Hurstville.

Vegetation formation: a broad level of vegetation classification as defined in Keith (2004)[3]. There are 12 vegetation formations in NSW.

Vegetation in low condition, or low condition:

a) woody native vegetation with native over-storey percent foliage cover less than 25% of the lower value of the over-storey percent foliage cover benchmark for that vegetation type, and where either:
   - less than 50% of ground cover vegetation is indigenous species, or
   - greater than 90% of ground cover vegetation is cleared

OR

b) native grassland, wetland or herbfield where either:
   - less than 50% of ground cover vegetation is indigenous species, or
   - more than 90% of ground cover vegetation is cleared.

Native vegetation that is not in low condition is in *moderate to good condition*.

Vegetation in moderate to good condition: native vegetation that is not vegetation in *low condition*.

Vegetation zone: a relatively homogenous area of native vegetation on a development or biobank site that is the same PCT and broad condition state.

VIS Classification Database (NSW Vegetation Information System Classification Database): the master vegetation community-level classification for use in vegetation mapping programs and regulatory biodiversity impact assessment frameworks in NSW. The VIS Classification Database is maintained by OEH and available at www.environment.nsw.gov.au/research/Visclassification.htm.

Viability: the capacity of a species to successfully complete each stage of its life cycle under normal conditions so as to retain long-term population densities.

Wetland: an area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water.

Woody native vegetation: native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs.

Appendix 1: Mathematical equations used in the BBAM

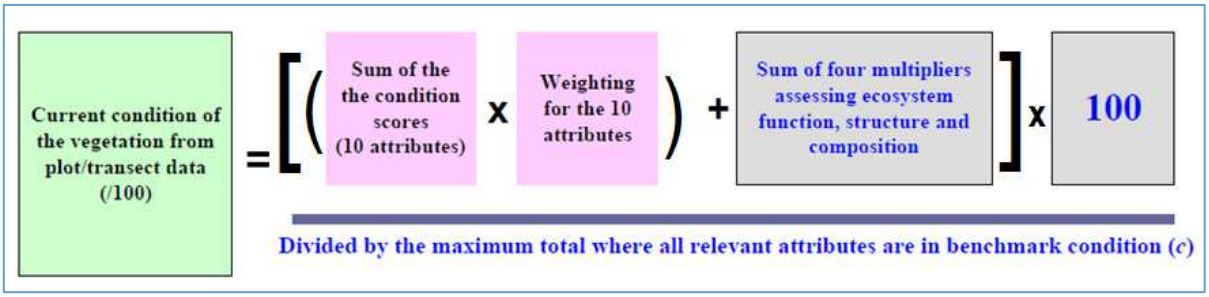
The mathematical equations set out in this appendix correspond with the summarised versions set out in the relevant sections of the BBAM. A decision support system (the Credit Calculator) allows accredited assessors to efficiently undertake the calculations, based on the site survey data collected during Stage 1 – Biodiversity assessment. The calculations used in the Credit Calculator are based on the mathematical equations as set out below.

Equation 1: Determine the current site value score for a vegetation zone

$$SV_c = \frac{\left(\sum_{v=a}^{j}(a_v w_v) + 5\left(\left(a_a a_g\right) + \left(a_b a_i\right) + \left(a_h a_j\right) + \left(a_c a_k\right)\right)\right) \times 100}{c}$$

where SV_C is the current site value score of the vegetation zone
a_v is the attribute score for the *v*th *site attribute* (a–j) as defined in Table 2
a_k is equal to $(a_d + a_e + a_f)/3$, the average score for attributes d, e and f
w_v is the weighting for the *v*th *site attribute* (a–j) as defined in Table 2
c is the maximum score that can be obtained given the attributes a–j that occur in the PCT when in benchmark condition (the maximum score varies depending on which attributes occur in the vegetation zone under assessment).

Summary of Equation 1: Determine the current site value score for a vegetation zone



Element	Explanation of elements in Equation 1
SV_c	This represents the current condition of the vegetation based on a score out of 100 (biometric score). The biometric score is based on transect and plot data that is collected on site for each vegetation zone. The biometric score considers ecosystem structure, composition and function.
$\sum_{v=a}^{j}(a_v w_v)$	a_v is the site attribute score for each of the 10 site attributes. The site attribute score is based on the condition of the attribute against the benchmark (0, 1, 2 or 3), w_v is the weighting given to that site attribute (shown in Table 2) based on its ecological importance. Each site attribute score is multiplied by its weighting and summed together. This part of the site value calculation considers ecosystem structure, composition and function.

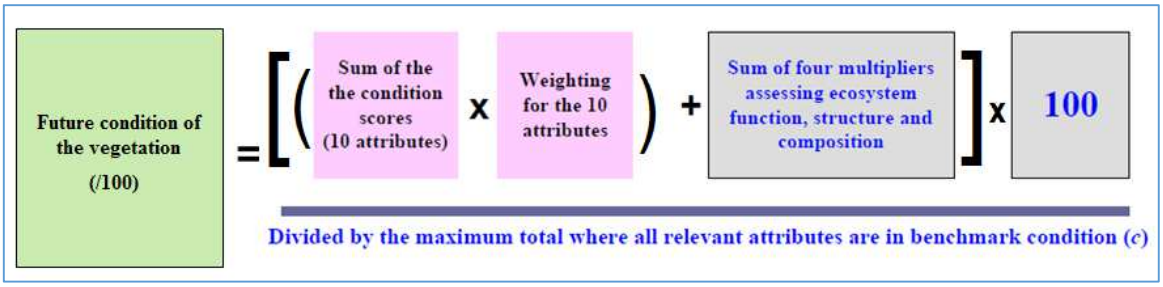
Element	Explanation of elements in Equation 1
$(a_a a_g)$	a_a is the attribute score for *Native plant species richness.* It is multiplied by the attribute score for *Exotic plant cover* (represented by a_g). The total is then multiplied by 5. This part of the calculation considers ecosystem composition and function.
$(a_b a_i)$	a_b is the attribute score for *Native over-storey cover.* It is multiplied by the attribute score for *Proportion of over-storey cover species occurring as regeneration* (represented by a_i). The total is then multiplied by 5. This part of the calculation considers ecosystem composition and function.
$(a_h a_j)$	a_h is the attribute score for *Number of trees with hollows.* It is multiplied by the attribute score for *Total length of fallen logs* (represented by a_j). The total is then multiplied by 5. This part of the calculation considers ecosystem composition and function.
$(a_c a_k)$	a_c is the attribute score for *Native mid-storey cover.* It is multiplied by the average of the attribute scores for *Native ground cover grasses, Native ground cover shrubs* and *Native ground cover other* (collectively represented by a_k). The total is then multiplied by 5. This part of the calculation considers ecosystem composition.
x 100	The totals for each of the elements are summed together and multiplied by 100. This final total for the calculation above the line is the numerator.
c	c is the maximum score that can be achieved for a particular vegetation zone (i.e. where all site attributes are in benchmark condition). The maximum score for c can vary according to whether a particular attribute occurs in a PCT. The maximum score for c is called the denominator. The total for the numerator is divided by the total for the denominator. This is the current site value score for that vegetation zone.

Equation 2: Determine the future site value score for a vegetation zone

$$SV_c = \frac{\left(\sum_{v=a}^{j}(a_v w_v) + 5\left((a_a a_g) + (a_b a_i) + (a_h a_j) + (a_c a_k)\right)\right) \times 100}{c}$$

where SV_C is the future site value score of the vegetation zone
a_v is the attribute score for the *v*th *site attribute* (a–j) as defined in Table 2, determined in accordance with Section 5.3 (for vegetation zones on the development site) or Section 12.2 (for vegetation zones on the biobank site)
a_k is equal to $(a_d + a_e + a_f)/3$, the average score for attributes d, e and f
w_v is the weighting for the *v*th *site attribute* (a–j) as defined in Table 2
c is the maximum score that can be obtained given the attributes a–j that occur in the vegetation zone when in benchmark condition (the maximum score varies depending on which attributes occur in the vegetation zone under assessment).

Summary of Equation 2: Determine the future site value score for a vegetation zone



Element	Explanation of elements in Equation 2
SV_c	This represents the future condition of the vegetation based on a score out of 100 (biometric score). At a development site, the future condition of the vegetation accounts for the impact of development on the vegetation. At a biobank site, the future condition score with management is based on the predicted improvement in biodiversity values from the management actions, taking into account the current condition of the vegetation. At a biobank site, the future condition score without management is based on the predicted decline in biodiversity values taking into account land use and permitted clearing entitlements that apply to the land.
$\sum_{v=a}^{j}(a_v w_v)$	a_v is site attribute score for each of the 10 site attributes. The site attribute score is based on the future condition of the attribute against the benchmark (0, 1, 2 or 3), w_v is the weighting given to that site attribute (shown in Table 2) based on its ecological importance. Each site attribute score is multiplied by its weighting and summed together. This part of the site value calculation considers ecosystem structure, composition and function.
$(a_a a_g)$	a_a is the attribute score for future *native plant species richness.* It is multiplied by the attribute score for *Exotic plant cover* (represented by a_g). The total is then multiplied by 5. This part of the calculation considers ecosystem composition and function.
$(a_b a_i)$	a_b is the attribute score for future *native over-storey cover.* It is multiplied by the attribute score for *Proportion of over-storey cover species occurring as regeneration* (represented by a_i). The total is then multiplied by 5. This part of the calculation considers ecosystem composition and function.
$(a_h a_j)$	a_h is the attribute score for future *number of tress with hollows.* It is multiplied by the attribute score for *Total length of fallen logs* (represented by a_j). The total is then multiplied by 5. This part of the calculation considers ecosystem composition and function.
$(a_c a_k)$	a_c is the attribute score for future *native mid-storey cover.* It is multiplied by the average of the attribute scores for *Native ground cover grasses, native ground cover shrubs* and *native ground cover other* (collectively represented by a_k). The total is then multiplied by 5. This part of the calculation considers ecosystem composition.
x 100	The totals for each of the elements are summed together and multiplied by 100. This final total for the calculation above the line is the numerator.

Element	Explanation of elements in Equation 2
$\frac{}{C}$	C is the maximum score that can be achieved for a particular vegetation zone (i.e. where all site attributes are in benchmark). The maximum score for C can vary according to whether a particular attribute occurs in a PCT. The maximum score for C is called the denominator. The total for the numerator is divided by the total for the denominator. This is the future site value score for that vegetation zone.

Equation 3: Calculate change in site value score at the development site

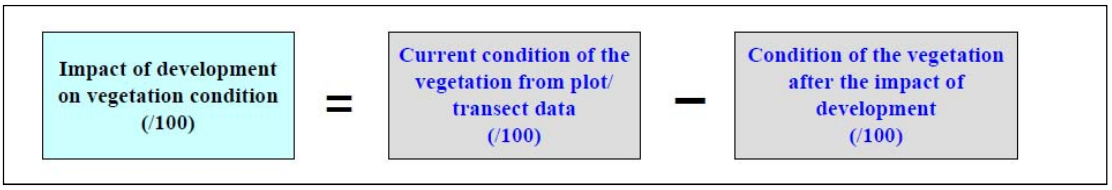
$$\Delta S_{Loss} = S_{current} - S_{future}$$

where ΔS_{Loss} is the change (loss) in the site value score of a vegetation zone at the development site

$S_{current}$ is the current site value score, as determined in accordance with Section 5.3.

S_{future} is the future (after clearing or development) site value score, as determined in accordance with Section 10.3.

Summary of Equation 3: Calculate change in site value score at the development site



Element	Explanation of elements in Equation 3
$S_{current}$	$S_{current}$ is the site value score for the vegetation zone in its current state. It represents the condition of the vegetation in the zone compared to the vegetation in benchmark condition. It is calculated in accordance with Section 5.3 and using Equation 1.
S_{future}	S_{future} is the site value score for the vegetation zone after the impact of the clearing or development is taken into account. It is calculated in accordance with Section 10.3 and using Equation 2. Where native vegetation is to be totally cleared, S_{future} may be zero. The S_{future} score can also take into account partial clearing for purposes such as creating an asset protection zone.
ΔS_{Loss}	ΔS_{Loss} represents the quantified impact of the development on the vegetation condition. It is based on the loss in site value by calculating the difference in the condition of the vegetation in its current state, compared to its future condition state after the impacts of development are taken into account.

Equation 4: Determine the change (loss) in landscape value score for the development site

$$LV_{development\ site} = \left(\sum_{v=a}^{c}(s_v w_v) + d + e\right)_{\text{Current}} - \left(\sum_{v=a}^{c}(s_v w_v)\right)_{\text{With development}}$$

where: s_v is the score for the vth variable (a–c) as defined below

w_v is the weighting for the vth variable. Each variable has a weighting of 1

a = score for percent extent native vegetation cover within an outer assessment circle of the site or the buffer area surrounding the development footprint (minimum area >1000 ha) calculated in accordance with Appendix 4 or Appendix 5

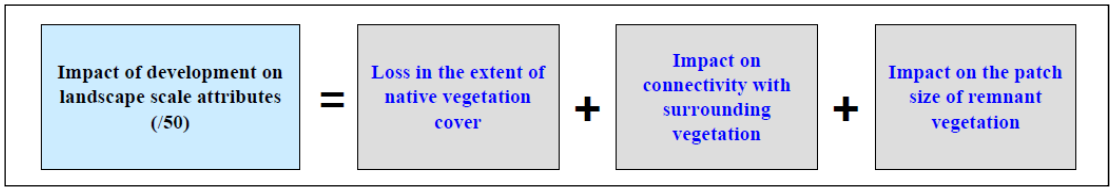
b = score for percent native vegetation cover within an inner assessment circle for the site (minimum of 100 ha) calculated in accordance with Appendix 4 (for linear shaped or multiple fragmentation development, this will be zero)

c = area to perimeter ratio of all patch size areas within the buffer area surrounding the development footprint for a development assessed in accordance with Appendix 5

d = connectivity value score for the development determined in accordance with Appendix 4 or Appendix 5

e = total patch size score determined in accordance with Appendix 4 or Appendix 5.

Summary of Equation 4: Determine the change (loss) in landscape value score for the development site



Element	Explanation of elements in Equation 4
$\left(\sum_{v=a}^{c}(s_v w_v) + d + e\right)_{\text{Current}}$	In this part of the calculation, the scores for each of the four landscape attributes are simply summed together ***S_v*** represents the current extent of native vegetation cover in the landscape surrounding the development. This is determined in accordance with Appendix 4 (for site based development) or Appendix 5 (for linear shaped development or multiple fragmentation impact development). ***W_v*** represents the weighting for each of the landscape value attributes. For development sites, each of the landscape value attributes has a weighting of 1. ***d*** represents the impact of the development on connectivity (the connectivity value score). This score is determined in accordance with Appendix 4 (for site based development) or Appendix 5 (for

Element	Explanation of elements in Equation 4
	linear shaped development or multiple fragmentation impact development). ***e*** represents the value of the size of the remnant vegetation which the development is part of (the patch size score) This score was determined in accordance with Appendix 4 (for site based development) or Appendix 5 (for linear shaped development or multiple fragmentation impact development).
$\left(\sum_{v=a}^{c}(s_v w_v)\right)_{With\ developmen\ t}$	***S_v*** represents the future extent of native vegetation cover in the landscape after the impacts of the development are taken into account (the percent native cover score). This is determined in accordance with Chapter 4, including Appendix 5 (for site based development) or Appendix 6 (for linear shaped development or multiple fragmentation impact development). ***W_v*** represents the weighting for each of the landscape value attributes. For development sites, each of the landscape value attributes has a weighting of 1.
$LV_{development\ site}$	$LV_{development\ site}$ then represents the impact of the development on the surrounding landscape (the loss in landscape value) from development or clearing. This value is then used to calculate the number of ecosystem credits for the development site.

Equation 5: Determine the number of ecosystem credits required for the impact on vegetation that is an EEC or contains threatened species habitat

Ecosystem credits required at a development site or biobank site

$$= \sum_{i=1}^{n}\left[\left\{\left(\Delta S_{Loss} \times \frac{1}{T_{G\ spp1}} \times A\right) + \left(LV_{loss} \times A\right)\right\}\right] \times 0.25$$

where

i is the i th vegetation zone impacted by development at the development site

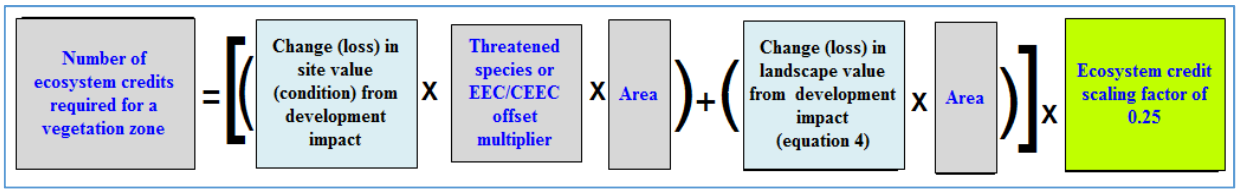
ΔS_{Loss} is the change (loss) in the site value score of a vegetation zone at the development site as determined by Equation 3

LV_{loss} is the total landscape value change (loss) score for the development site as determined by Equation 4

$1/T_{G\ spp1}$ is the species offset multiplier. The T_G value is based on the ability of a species to respond to improvement in site value with management actions at a biobank site. A T_G value is identified for each species in the Threatened Species Profile Database and has values between 0.1 and 1. Species 1 ($_{spp1}$) is the species with the highest offset multiplier that is predicted to use habitat in the vegetation zone. For PCTs that are an EEC or a CEEC, the threatened species offset multiplier is 3.

A is the area in hectares of the vegetation zone

Summary of Equation 5: Determine the number of ecosystem credits required for the impact on vegetation that is an EEC or contains threatened species habitat



Element	Explanation of elements in the Equation 5
$\sum_{i=1}^{n}$	This means that the equation is to apply to each vegetation zone.
$(\Delta S_{Loss} \times \frac{1}{T_{G\ spp1}} \times A)$	The loss in site value score is the difference in the condition of the vegetation in its current state, compared to its future condition after the impacts of development on biodiversity values is taken into account. The threatened species offset multiplier is only applied at the development site. It reflects the ability of a species to respond to improvements in vegetation condition from management actions undertaken at a biobank site. Species 1 ($_{spp1}$) is the species which is most vulnerable to the loss of habitat. Therefore it is the species that requires the highest number of credits. For PCTs that are an EEC or a CEEC, the threatened species offset multiplier is 3.
$(LV_{loss} \times A)$	The loss in landscape value is the change (loss) after the impacts of development on connectivity, loss in the extent of native vegetation cover and patch size of remnant vegetation have been assessed.
A	This is the area of the vegetation zone.
0.25	This is a scaling factor that is applied equally to the calculation of ecosystem credits at a development site and at a biobank site.

Equation 6: Determine the number of species credits required for the loss of individual threatened species

Number of species credits required for a threatened species at the development site or biobank site

$$= H_{loss} \times \frac{1}{T_{G\ spp1}} \times 10$$

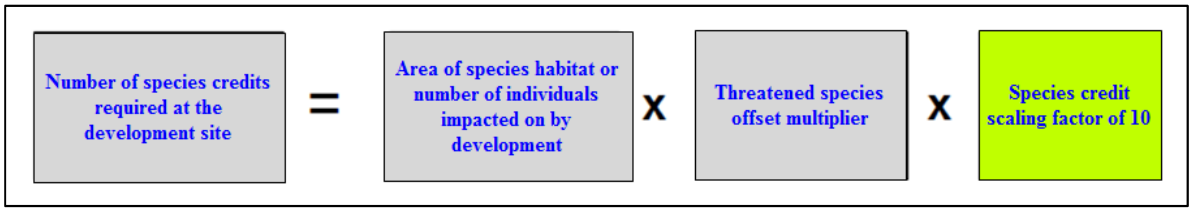
Where the Threatened Species Profile Database indicates that the unit of measurement of impact for a species is the area of habitat (mostly fauna), then:

- H_{loss} is the area of habitat determined using the species polygon for the development site, prepared in accordance with Section 6.5
- T_G is the value identified for each species in the Threatened Species Profile Database.

Where the Threatened Species Profile Database indicates that the unit of measurement of impact for a species is the number of individuals (mostly flora), then:

- H_{loss} is the number of individuals determined using the species polygon for the development site, prepared in accordance with Section 6.5
- $T_{G\ spp1}$ is the value identified for the species in the Threatened Species Profile Database.

Summary of Equation 6: Determine the number of species credits required for the loss for individual threatened species



Element	Explanation of elements in the Equation 6
H_{loss}	This is the area of habitat for the species or the number of individual flora species impacted on by the development.
$\frac{1}{T_{G\ spp1}}$	The threatened species offset multiplier is only applied at the development site. It reflects the ability of a species to respond to improvements in vegetation condition from management actions undertaken at a biobank site. Species 1 ($_{spp1}$) is the species which is being impacted on by the development.
10	This is a general scaling factor that is applied equally to species credits at a development site and at a biobank site.

Equation 7: Calculate the change (gain) in site value score at the biobank site

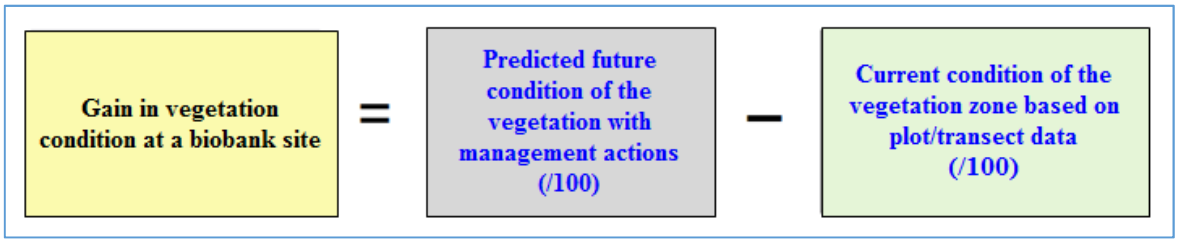
$$\Delta S_{Gain} = S_{future} - S_{current}$$

where ΔS_{Gain} is the change (gain) in the site value score of a vegetation zone at the biobank site

S_{future} is the future site value score (with management actions as described below), as determined in accordance with Section 12.2

$S_{current}$ is the current site value score, as determined in accordance with Section 5.3.

Summary of Equation 7: Calculate the change (gain) in site value score at the biobank site



Element	Explanation of elements in Equation 7
ΔS_{Gain}	ΔS_{Gain} represents the quantified improvement in the condition of the vegetation that is predicted to occur from the management actions undertaken at the biobank site. The ΔS_{Gain} is the basis for creating ecosystem credits at a biobank site.
S_{future}	S_{future} is the site value score for the vegetation zone taking into account the improvement in each condition attribute with management and protection. It is calculated using Equation 2.
$S_{current}$	$S_{current}$ is the site value score for the vegetation zone in its current state. It is calculated using Equation 1.

Equation 8: Calculate the averted loss in site value score at the biobank site

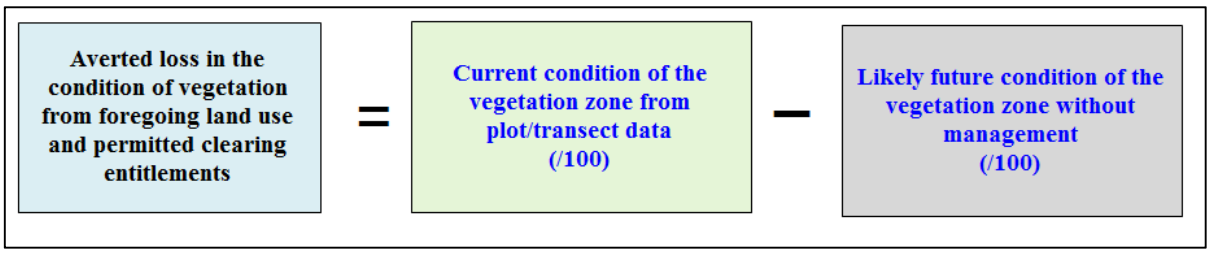
$$\Delta S_{AL} = S_{current} - S_{future\ loss}$$

where ΔS_{AL} is the averted loss in the site value score of a vegetation zone at the biobank site from foregoing existing land-use entitlements

$S_{current}$ is the current site value score, as determined in accordance with Section 5.3.

$S_{future\ loss}$ is the predicted future site value score of the vegetation zone after considering the risk of decline based on land use and permitted clearing entitlements, as determined in accordance with Section 12.3.

Summary of Equation 8: Calculate the averted loss in site value score at the biobank site



Element	Explanation of elements in Equation 8
ΔS_{AL}	ΔS_{AL} represents the quantified decline in vegetation condition that is likely to occur from undertaking existing land use or permitted clearing entitlements at the biobank site.
$S_{current}$	$S_{current}$ is the site value score for the vegetation zone in its current state. It is calculated using Equation 1.
$S_{future\ loss}$	$S_{future\ loss}$ is the site value score for the vegetation zone after taking into account the likely decline in vegetation condition without management. It is calculated using Equation 2.

Equation 9: Calculate the change (gain) in landscape value with offset

$$LV_{biobank\ site} = \left(\sum_{v=a}^{c} (s_v w_v) + (c_v w_v) + d + e \right)_{With\ \_management} - \left(\sum_{v=a}^{c} (s_v w_v) \right)_{Current}$$

where: s_v is the score for the vth variable (a–b) as defined below

w_v is the weighting for the vth variable as defined in Table 8

a = score for the percent extent of native vegetation cover within an outer assessment circle for the site (minimum of 1000 ha) determined in accordance with Appendix 6 (weighting of 0.625)

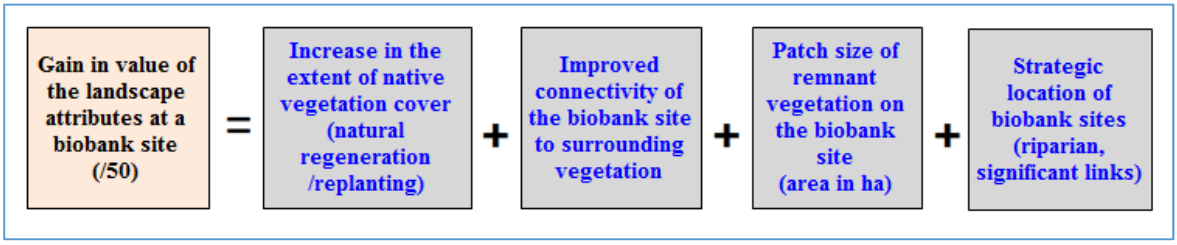
b = score for the percent extent native vegetation cover within an inner assessment circle for the site (minimum of 100 ha) determined in accordance with Appendix 6

c = connectivity value (weighting of 0.75)

d = total patch size

e = score for strategic location of biobank site determined in accordance with Appendix 6.

Summary of Equation 9: Calculate the change (gain) in landscape value with offset



Element	Explanation of elements in Equation 9
$\left(\sum_{v=a}^{d}(s_v w_v)+c+d+e\right)_{\text{With\_management}}$	In this calculation, the scores for each of the five attributes are simply summed together. ***S_v*** represents the future extent of native vegetation cover in the landscape surrounding the biobank site. This accounts for any increase in vegetation from management actions taken at the site. This is determined in accordance with Appendix 6. ***W_v*** represents the weighting for each of the landscape value attributes. For biobank sites, the landscape value attributes have a weighting of 1, except for percent native cover score (outer assessment circle) which has a weighting of 0.625, and connectivity which has a weighting of 0.75. ***c*** represents the improvement in connectivity proposed at the biobank site (the connectivity value score). This score is determined in Appendix 6. ***d*** represents the value of the size of the remnant vegetation which the biobank site is part of (the patch size score). This score is determined in Appendix 6. ***e*** represents the strategic location of the biobank site.
$\left(\sum_{v=a}^{c}(s_v w_v)\right)_{Current}$	***S_v*** represents the current extent of native vegetation cover in the landscape surrounding the biobank site (the percent native cover score). This is determined in accordance with Appendix 6. ***W_v*** represents the weighting for each of the landscape value attributes. For biobank sites, the landscape value attributes have a weighting of 1 except for percent native cover score (outer assessment circle) which has a weighting of 0.625 and connectivity which has a weighting of 0.75. The change in percent native cover scores are multiplied by their weighting and then subtracted from the first part of the calculation. This is to score the gain in increased extent of native vegetation.
$LV_{biobank\ site}$	$LV_{biobank\ site}$ then represents the improvement of the biobank site on the surrounding landscape (the gain in landscape value) from the management actions undertaken on the biobank site. This value is then used in Section 12.5 to calculate the number of ecosystem credits for the site.

Equation 10: Calculate the number of ecosystem credits at a biobank site

$$\text{Number of ecosystem credits created at a biobank site} = \sum_{i=1}^{n} \{(\Delta S_{gain} + \Delta S_{AL} + \Delta LV_{gain}) \times A\} \times 0.25$$

where *i* is the *i* th vegetation zone to be managed at the biobank site

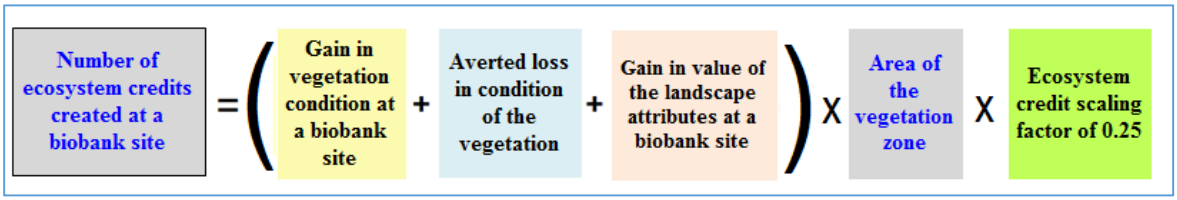
ΔS_{gain} is the change (gain) in the site value score of a vegetation zone at the biobank site, as calculated in Equation 7

ΔS_{AL} is the averted loss in the site value score of a vegetation zone at the biobank site from foregoing existing land-use entitlements, as calculated in Equation 8

ΔLV_{gain} is the landscape value gain score for the biobank site, as determined by Equation 9

A is the area in hectares of the *i* th vegetation zone.

Summary of Equation 10: Calculate the number of ecosystem credits at a biobank site



Element	Explanation of elements in the Equation 10
$= \sum_{i=1}^{n}$	This means that the calculation of ecosystem credits applies to all of the vegetation zones at the biobank site.
$(\Delta S_{gain} + \Delta S_{AL} + \Delta LV_{gain})$	The gain in site value score is the difference in the condition of the vegetation in its current state, compared to its future condition with the benefit of the management actions taken to improve the condition of vegetation at the biobank site according to Equation 7. The averted loss in site value represents the quantified decline in vegetation condition that is likely to occur from undertaking existing land use or permitted clearing entitlements at the biobank site. The gain in landscape value is the improvement in connectivity, increases in extent of native vegetation cover and increases in the patch size of remnant vegetation at a biobank site according to Equation 9.
A	This is the area of the vegetation zone at the biobank site.
0.25	This is a scaling factor that is applied equally to the calculation of ecosystem credits at a development site and at a biobank site.

Equation 11: Species credits – number of credits created at the biobank site

Number of species credits created for a species at a biobank site	$= H_{current} \times 0.71 \times 10$

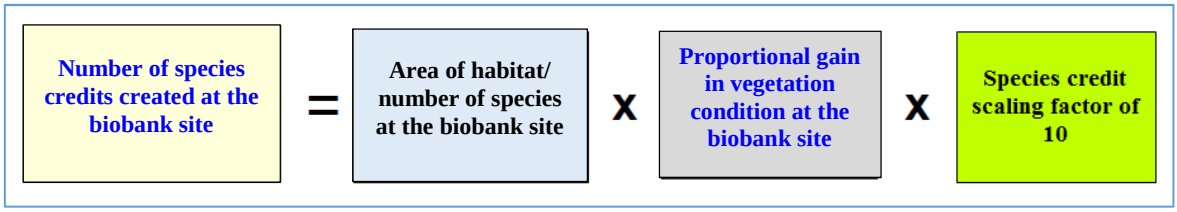
Where the Threatened Species Profile Database indicates that the unit of measurement of impact for a species is the area of habitat (mostly fauna), then:

- $H_{current}$ is the current area of habitat determined using the species polygon for the biobank site, prepared in accordance with Section 6.5.

Where the Threatened Species Profile Database indicates that the unit of measurement of impact for a species is the number of individuals (mostly flora), then:

- $H_{current}$ is the current number of individuals of the species determined using the species polygon, prepared in accordance with Section 6.5.

Summary of Equation 11: Species credits – number of credits created at the biobank site



Element	Explanation of elements in the Equation 11
$H_{current}$	This is the area of habitat for the species, or the number of individual flora species, present on a biobank site.
0.71	0.71 is the proportional improvement in vegetation condition at the biobank site. The improved condition is used as a surrogate for improved habitat for threatened species. 0.71 is the proportional gain in site value for vegetation on a biobank site that is in moderate condition. In moderate condition vegetation, the site value score increases from 58.3 to 100, or an increase of 41.7. This corresponds to a 71% increase in site value (i.e. 41.7/58.3 × 100).
10	This is a general scaling factor that is applied equally to species credits at a development site and at a biobank site.

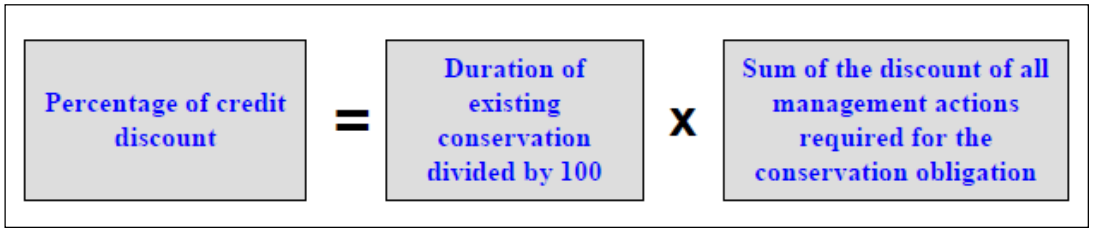
Equation 12: Calculate the final credit discount percentage for existing conservation obligations

The final credit discount percentage = $\{(a/100) \times b\%\}$

Where a is the duration for which the existing conservation obligation applies

b is the sum of the percentage discount for each management action under the existing conservation obligation according to Table 10 for ecosystem credits and Table 11 for species credits.

Summary of Equation 12: Calculate the final credit discount percentage for existing conservation obligations



Appendix 2: Ordering of waterways and riparian buffer distances

The Strahler stream ordering system is a classification system that gives a waterway an 'order' according to the number of tributaries associated with it (Strahler 1952[4]).

Figure 1 illustrates the Strahler stream ordering process. Numbering begins at the top of a catchment with headwater ('new') flow paths being assigned the number one.

Where two flow paths of order one join, the section downstream of the junction is referred to as a second order stream. Where two second order streams join, the waterway downstream of the junction is referred to as a third order stream, and so on. Where a lower order stream (e.g. first order) joins a higher order stream (e.g. third order), the area downstream of the junction will retain the higher number (i.e. it will remain a third order stream).

The stream ordering system is designed to produce results that are consistent between catchments, but also recognises regional differences.

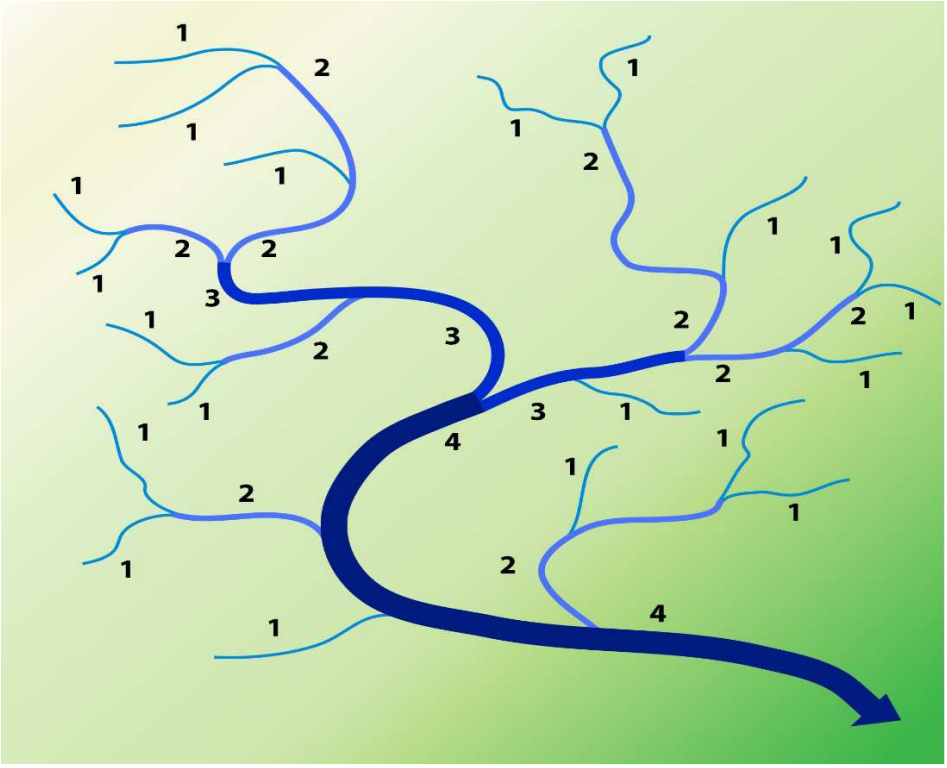


Figure 1: Strahler stream ordering system

Riparian buffer distances must be measured on both sides of the stream from the top of bank, if this is defined, otherwise from the edge of the stream and only from the centre of the stream if the edge is not defined.

Where a stream has more than one bank on either side, the bank closest to the main channel must be used, to protect vegetation on and within the stream banks.

[4] Strahler, AN (1952), 'Hypsometric (area-altitude) analysis of erosional topology', *Geological Society of America Bulletin* **63** (11): 1117–1142.

The riparian buffer distances for various water bodies are set out in Table 12. Riparian buffer distances do not include the width of the water body.

Table 12: Riparian buffer distances

Water body type	Riparian corridor width (each side of waterway)
Unmapped & 1st order streams	10
2nd order stream	20
3rd order stream	30
4th & 5th order streams & above	40
6th order stream & above	50
Local wetland	20
Important wetland	50
Estuarine area	50

The DIWA wetlands are available from www.environment.gov.au/metadataexplorer/download_test_form.jsp?dataTitle=Directory%20of%20Important%20Wetlands%20in%20Australia%20(DIWA)%20Spatial%20Database&dataPoCemail=water.metadata@environment.gov.au&dataFormat=Shapefile

SEPP 14 Coastal wetland data is available from www.planning.nsw.gov.au/spatial-data-download

Appendix 3: Guidelines for the collection of benchmark data from local reference sites or published sources

Benchmark data from local reference sites may be used where that data more accurately reflects the local environmental conditions and condition attributes for a PCT. Where local benchmark data is developed, it must be derived from measurements taken on reference sites that measure the same PCT in a relatively unmodified condition or from published sources. The Chief Executive of OEH of OEH must approve the use of benchmark data from local reference sites or published sources in accordance with Subsection 2.2.2.

Locating reference sites

Reference sites are sites with relatively little evidence of modification by humans since European (post-1750) settlement, as indicated by minimal timber harvesting (few stumps, coppicing, cut logs), minimal firewood collection, minimal exotic weed cover, minimal grazing and trampling by introduced or overabundant native herbivores, minimal soil disturbance, dieback not in excess of normal senescence, no evidence of very recent major perturbation such as fire or flood, not subject to high frequency burning, and evidence of recruitment of native plant species.

It may be difficult to find totally unmodified sites, particularly in highly cleared regions. Vegetation in relatively unmodified condition can be found in some travelling stock routes and reserves, national parks and nature reserves, state forests (especially flora reserves), cemeteries, roadsides and commons. Reference sites can occur in small remnants, such as narrow roadsides and cemeteries.

Number of reference plots

To obtain a reasonable composite picture that encompasses the variation in condition variables, a minimum of three reference plots/transects for each variable should be measured for each PCT (or vegetation class), with more plots/transects being desirable.

Published sources

Benchmarks may also be obtained from published sources.

Appendix 4: Assessing landscape value for site-based developments

1. Assessing percent current extent of native vegetation cover

To assess the percent current extent of native vegetation cover for site based developments, the assessor must do each of the following steps.

Step 1 Identify an inner and an outer assessment circle

The inner assessment circle : outer assessment circle ratio must be 1:10. The assessor must choose the inner and outer assessment circle for a proposed development from the combinations in Table 13.

Table 13: Allowable combinations of inner and outer assessment circles

Inner assessment circle (ha)	Outer assessment circle (ha)
100	1,000
200	2,000
300	3,000
400	4,000
500	5,000
1,000	10,000
1,500	15,000

The inner and outer assessment circles must be centred on the area of native vegetation that is most impacted by the development.

Step 2 Calculate the percent native vegetation cover in the inner and outer assessment circles

Estimate the native vegetation cover taking into account the extent and condition of over-storey cover compared to benchmark condition currently in:

a) the inner assessment circle, and

b) the outer assessment circle

in increments of 5% using a Geographic Information System (GIS). The assessor must convert these calculations into a percent current extent native vegetation cover in the inner and outer assessment circles.

Step 3 Determine the scores for the percent current extent of native vegetation cover in the inner and outer assessment circles

Use the percent current extent of native vegetation cover and Table 14 to determine the scores for the percent current extent of native vegetation cover in the inner and outer assessment circles.

The assessor will later use these figures for Equation 4 set out in Appendix 1.

2. Assessing percent future extent of native vegetation cover

To assess the percent future extent of native vegetation cover for site based developments, the assessor must do each of the following steps.

Step 1 Calculate the percent future extent of native vegetation cover in the inner and outer assessment circles

Taking into account the impact of the development and using the same assessment circles as identified in Step 1 of this appendix, estimate the area of future native vegetation cover, taking into account the extent and condition of over-storey cover compared to benchmark condition in:

a) the inner assessment circle, and
b) the outer assessment circle

in increments of 5% using a GIS. Convert these calculations into a percent future extent of native vegetation cover in the inner and outer assessment circles.

Step 2 Determine the scores for the percent future extent of native vegetation cover in the inner and outer assessment circles

Use the percent future extent of native vegetation cover and Table 14 to determine the scores for the percent future extent of native vegetation cover in the inner and outer assessment circles.

The assessor will later use these figures for Equation 4 set out in Appendix 1.

Table 14: Determining percent native vegetation cover in the landscape

Percent native vegetation cover in the landscape – inner and outer assessment circle (%)	Score for percent native vegetation cover in the landscape – inner assessment circle	Score for percent native vegetation cover in the landscape – outer assessment circle
0	0	0
≤5	0.75	1.25
6–10	1.5	2.5
11–15	2.25	3.75
16–20	3	5
21–25	3.75	6.25
26–30	4.5	7.5
31–35	5.1	8.45
36–40	5.7	9.4
41–45	6.3	10.35
46–50	6.9	11.3
51–55	7.3	11.95
56–60	7.7	12.6
61–65	8.1	13.25
66–70	8.5	13.9

Table 14 continued.

Percent native vegetation cover in the landscape – inner and outer assessment circle (%)	Score for percent native vegetation cover in the landscape – inner assessment circle	Score for percent native vegetation cover in the landscape – outer assessment circle
71–75	8.75	14.25
76–80	9	14.6
81–85	9.25	14.95
86–90	9.5	15.3
91–95	9.75	15.65
96–100	10	16

3. Assessing the connectivity value

The assessor must assess the connectivity value for a development that is a site based development using the following steps.

Step 1: Identify the connecting links

For the purposes of this appendix, native vegetation on the development site is part of a connecting link when it is linked to adjoining vegetation and the native vegetation on the development site:

- is in moderate to good condition, and
- has a patch size >1 ha, and
- is separated by a distance of <100 m (or <30 m for non-woody ecosystems), and
- is not separated by a large water body, dual carriageway, wider highway or similar hostile link.

A site may have none, one, or more than one connecting link.

Taking into account any mitigation or minimisation measures, the assessor must identify the connecting links that the development will impact on.

Where the development impacts on more than one connecting link, the assessor must determine the connectivity value score for each connecting link.

Step 2: Determine whether the development impacts on a state or regional biodiversity link

State or regional biodiversity links are defined in the column titled *Defining criteria* in Table 15 below.

A development impacts on a state or regional biodiversity link where any part of the biodiversity link is on the development site and contains native vegetation.

If the development impacts on a state or regional biodiversity link, then:

a) the final connectivity value score for the development is the corresponding score set out in Table 15 for the relevant link. Where there is more than one state or regional biodiversity link, the higher score is the final connectivity value score

b) the assessor will later use the connectivity value score in Equation 4 to determine the landscape value score for the development

c) no further assessment of connectivity value is required for the development.

Table 15: Connectivity value classes for site based development

Connectivity value class	Defining criteria	Score
State significant biodiversity link	An area identified as being part of a state significant biodiversity link in a plan approved by the Chief Executive, OEH OR A riparian buffer 50 m either side of a 6th order stream or greater OR A riparian buffer 50 m around an important wetland or an estuarine area	12
Regionally significant biodiversity link	An area identified as being part of a regionally significant biodiversity link and in a plan approved by the Chief Executive, OEH OR A riparian buffer 20 m either side of a 4th or 5th order stream	9
Nil	None of the above – proceed to Step 3	

Note: Refer to the Definitions section for definitions of *stream order* and *important wetland*.

If the development does not impact on a state or regional biodiversity link, a site based assessment of connectivity is required using Steps 3–9 below.

Step 3: Determine the current linkage width class at a site

Determine the current linkage width class of each connecting link identified in Step 1 in this section by measuring the width of each connecting link at the narrowest area of the connecting link and looking up the corresponding linkage width class in Table 16. This area may be located on or off the site.

Table 16: Linkage width classes for site based developments

Linkage width (metres)	0 – 5	>5 – 30	>30 – 100	>100 – 500	>500
Linkage width class	Very narrow	Narrow	Moderate	Wide	Very wide

Step 4: Determine the future linkage width class at a site

Taking into account the impacts of the development on the connecting link, estimate the future linkage width of each connecting link identified in Step 1 of this section and determine the corresponding linkage width class for each of those links using Table 16.

Step 5: Determine the number of linkage width classes that are crossed – lost

Determine the number of linkage width classes that are lost or gained for each connecting link identified in Step 1 in this section as follows:

0 = no change or change is within the class, i.e. does not cross a threshold between the classes

1 = crosses one linkage width threshold, i.e. changes from one linkage width class to the next one across one threshold

2 = crosses two linkage width thresholds, i.e. changes from one linkage width class to another class across two thresholds

3 = crosses three linkage width thresholds, i.e. changes from one linkage width class to another linkage width class across three thresholds

4 = crosses four linkage width thresholds, i.e. changes from one linkage width class to another linkage width class across four thresholds.

The number of linkage width classes that are crossed as a result of the development is used in Step 9 to determine the connectivity value score for the connecting link.

Step 6: Determine the current linkage condition class

For each connecting link identified in Step 1 in this section, determine whether any part of the connecting link within the outer assessment circle (referred to in Step 1 of Section 1 of this Appendix) contains a PCT identified by the assessor under Subsection 5.2.1 that is a woody PCT.

Where it contains such a woody PCT:

a) estimate the current average condition of the over-storey vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 17, and

b) estimate the current average condition of either the mid-storey or ground cover vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 17. The assessor must use whichever of those strata is the most appropriate for assessing connectivity for those woody PCTs, and

c) determine the corresponding current linkage condition class for the estimates for each link using Table 17.

Where it does not contain such a woody PCT:

a) estimate the average current condition of the ground cover (including exotic vegetation) for each link within that outer assessment circle using the categories set out in Table 18, and

b) determine the corresponding current linkage condition class for that estimate for each link using Table 18.

Where a connecting link contains both woody and non-woody vegetation, the assessor must choose the current linkage condition class that is most relevant to the development site.

Table 17: Linkage condition classes (woody vegetation)

		Over-storey condition				
		No native over-storey or exotic vegetation with similar structure to the proposal	**% foliage cover <25% of lower benchmark or exotic vegetation with similar structure to the proposal**	**% foliage cover ≥25% of lower benchmark to lower benchmark**	**% foliage cover within benchmark**	
Mid-storey or ground cover condition	No mid-storey or ground cover or exotic vegetation with similar structure to the proposal	**0**	**0.5**	**1**	**1.5**	**Linkage condition class**
	% foliage cover of mid-storey or ground cover <50% lower end benchmark or exotic vegetation with similar structure to the proposal	**0.5**	**1**	**1.5**	**2**	
	% foliage cover of mid-storey or ground cover ≥50% of lower benchmark	**1**	**1.5**	**2**	**2.5**	
	% foliage cover of mid-storey or ground cover within benchmark	**1.5**	**2**	**2.5**	**3**	
		Linkage condition class				

Table 18: Linkage condition classes (non-woody vegetation)

Linkage condition class	Vegetation condition
0	Meets none of the definitions set out below
1	% foliage cover <50% of lower benchmark in native grassland, herbfield or wetland (herbaceous vegetation), or exotic vegetation with similar structure to the proposal
2	% foliage cover ≥50% of lower benchmark to lower benchmark in native grassland, herbfield or wetland (herbaceous vegetation)
3	% foliage cover is within benchmark in native grassland, herbfield or wetland (herbaceous vegetation)

Step 7: Determine the future linkage condition class

For each connecting link identified in Step 1 in this section, determine whether any part of the connecting link within the outer assessment circle (referred to in Section 1 in this appendix) contains a PCT identified by the assessor under Subsection 5.2.1 that is a woody PCT.

Where it contains such a woody PCT:

a) take into account the impacts of the development to estimate the future average condition of the over-storey vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 17, and

b) take into account the impacts of the development to estimate the future average condition of either the mid-storey or ground cover vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 17. The assessor must use whichever of those strata is the most appropriate for assessing connectivity for those woody PCTs, and

c) determine the corresponding future linkage condition class for those estimates for each connecting link using Table 17.

Where it does not contain such a woody PCT:

a) take into account the impacts of the development to estimate the average future condition of the ground cover (including exotic vegetation) for each link within that outer assessment circle using the categories set out in Table 18, and

b) determine the corresponding future linkage condition class for that estimate for each connecting link using Table 18.

Where a connecting link contains both woody and non-woody vegetation, the assessor must choose the future linkage condition class that is most relevant to assessing the impact on connectivity at the development site.

Step 8: Determine the number of linkage condition classes that are crossed – lost

Determine the number of linkage condition class thresholds that are crossed for each connecting link identified in Step 1 of this section as follows:

0 = no change or change is within the same linkage condition class

1 = crosses one linkage condition threshold, i.e. changes from one linkage condition class to the next one across one threshold

2 = crosses two linkage condition thresholds, i.e. changes from one linkage condition class to another class across two thresholds

3 = crosses three linkage condition thresholds, i.e. changes from one linkage condition class to another class across three thresholds.

The number of linkage condition thresholds can include half points where the connectivity condition class crosses to another threshold for only one stratum, as can be seen in Table 18.

Step 9: Determine the connectivity value score

Determine the corresponding final connectivity value score in Table 19 for each connecting link using:

a) the number of linkage condition width class thresholds crossed for that connecting link (as determined in Step 5 of this section), and

b) number of linkage condition class thresholds crossed for that connecting link (as determined in Step 8 of this section).

Where the assessor identifies more than one connecting link in Step 1 of this section, the final connectivity value score for the development is the highest connectivity value score determined under this section.

The assessor will later use these figures for Equation 4 set out in Appendix 1.

Table 19: Scores for loss of linkage condition/width, based on number of thresholds crossed

		Number of linkage width class thresholds crossed			
		0	**1**	**2**	**3 or 4**
Number of linkage condition class thresholds crossed	**0**	0	2	4	6
	0.5	1	3	5	7
	1	2	4	6	8
	1.5	3	5	7	9
	2	4	6	8	10
	2.5	5	7	9	11
	3	6	8	10	12

4. Assessing the patch size

The assessor must:

a) determine the percent native vegetation cleared in the Mitchell landscape in which most of the development occurs, using the categories in Table 20

b) determine the patch size class using the categories in Table 20, and

c) using those calculations, determine the corresponding patch size score using Table 20.

The assessor will later use this score for Equation 4 in Appendix 1.

Table 20: Criteria for assessing patch size

Patch size class	Percent native vegetation cleared in the Mitchell landscape in which most of the development occurs				Patch size score
	<30%	30–70%	>70–90%	>90%	
Extra large	>1000 ha	>200 ha	>100 ha	>50 ha	12
Very large	>500 – 1000 ha	>100 – 200 ha	>50 – 100 ha	>20 – 50 ha	9
Large	>200 – 500 ha	>50 – 100 ha	>20 – 50 ha	>10 – 20 ha	6
Medium	>100 – 200 ha	>20 – 50 ha	>10 – 20 ha	>1 – 10 ha	3
Small	≤100 ha	≤20 ha	≤10 ha	≤1 ha	1
nil	0	0	0	0	0

Appendix 5: Assessing landscape value for linear shaped developments, or multiple fragmentation impacts

1. Assessing percent current extent of native vegetation cover

To determine the percent current extent of native vegetation cover for linear shaped development, or development that has multiple fragmentation impacts, the assessor must do each of the following steps.

Step 1 Identify the buffer area surrounding the development footprint

Using a GIS, establish a 550 m buffer along each side of the centre line of the linear shaped development footprint, or 550 m from the boundary of the development footprint. The buffer should extend 550 m beyond the centre line of a linear shaped development, or 550 m from the outer edge of development that has multiple fragmentation impacts.

Step 2 Calculate the area of the buffer

Calculate the land area within the buffer.

Step 3 Calculate the percent current extent of native vegetation cover

Using a GIS, calculate the area of native vegetation cover that is on land within the buffer, taking into account the extent and condition of over-storey cover compared to benchmark condition.

Convert these calculations into a percent current extent of native vegetation cover.

Step 4 Determine the scores for the percent current extent of native vegetation cover

Use the percent current extent of native vegetation cover and Table 21 to determine the score for the percent current extent of native vegetation cover.

The assessor will later use these figures for Equation 4 in Appendix 1.

2. Assessing percent future extent of native vegetation cover

To determine the percent future extent of native vegetation cover for linear shaped development, the assessor must do each of the following steps.

Step 1 Calculate the percent future extent of native vegetation cover

Taking into account the impact of the development, use a GIS to estimate the area of future native vegetation cover in the development footprint buffer, taking into account the extent and condition of over-storey cover compared to benchmark condition.

Using that calculation and the area of the development footprint buffer calculated under Step 2 of this appendix, calculate the percent future extent of native vegetation cover.

Step 2 Determine the score for the percent future extent of native vegetation cover

Use the percent future extent of nature vegetation cover and Table 21 to determine the corresponding score for the percent future extent of native vegetation cover.

The assessor will later use these figures to determine the change in landscape value score for the project using Equation 4 set out in Appendix 1.

Table 21: Determining percent native vegetation cover in the landscape (550 m buffer from the centre point of the development)

Percent native vegetation cover in the landscape – linear development buffer area (%)	Score for percent native vegetation cover in the landscape – linear development buffer area
0	0
≤5	1.25
6–10	1.25
11–15	2.5
16–20	3.75
21–25	5
26–30	6.25
31–35	7.5
36–40	8.5
41–45	9.5
46–50	10.5
51–55	11
56–60	11.5
61–65	12
66–70	12.5
71–75	13
76–80	13.4
81–85	13.8
86–90	14.2
91–95	14.6
96–100	15

Example

Area of development footprint buffer (ha) (Section 1, Step 2)	Area of native vegetation cover (pre development) (ha) (Section 1, Step 3)	Percent of native vegetation cover (pre development) (Section 1, Step 3)	Percent of native vegetation cover (post development) (Section 2, Step 1)	Score for percent native vegetation cover in the development footprint buffer area
1200	800	66% cover (score 12.5)	50% cover (score 10.5)	2.0

3. Assessing the connectivity value

The assessor must assess the connectivity value score for a development that is a linear shaped development or a multiple fragmentation development using the following steps.

Step 1: Identify the connecting links

A connecting link is when native vegetation on the site adjoins native vegetation surrounding the site and the native vegetation:

- is in moderate to good condition, and
- has an patch size >1 ha, and
- is separated by a distance of <100 m (or <30 m for non-woody ecosystems), and
- is not separated by a large water body, dual carriageway, wider highway or similar hostile link.

A site may have none, one, or more than one connecting link.

Taking into account any mitigation or minimisation measures, the assessor must determine whether the development will impact on any connecting link that falls within the categories of connecting links listed and defined in Table 22.

Step 2: Determine the connectivity value score

If the assessor determines that the development will impact on such a connecting link, the connectivity value score is the highest corresponding score listed in Table 22 for any such connecting links.

If the assessor determines that the development will not impact on such a connecting link, the connectivity value score is zero.

Table 22: Connectivity value scores for linear shaped developments or development that has multiple fragmentation impacts

Categories of connecting links	Definitions of connecting link	Score
State significant biodiversity link	An area identified by the assessor as being part of a state significant biodiversity link and in a plan approved by the Chief Executive, OEH OR A riparian buffer 50 m either side of a 6th order stream or higher OR A riparian buffer 50 m around an important wetland or an estuarine area	12.5
Regionally significant biodiversity link	An area identified by the assessor as being part of a regionally significant biodiversity link and in a plan approved by the Chief Executive, OEH OR A riparian buffer 20 m either side of a 4th or 5th order stream Or A riparian buffer 30 m around a regionally significant wetland	10

Table 22 continued.

Categories of connecting links	Definitions of connecting link	Score
Very large area biodiversity link	Links areas of native vegetation in moderate to good condition that are >5000 ha in total AND Width of vegetation in moderate to good condition that is connecting the area is >500 m	7.5
Large area biodiversity link	Links areas of native vegetation in moderate to good condition that are ≥1000 ha and ≤5000 ha in total, or areas >5000 ha in total AND Width of vegetation in moderate to good condition that is connecting the area is >100 m and <500 m	5
Local area biodiversity link	Links areas of native vegetation in moderate to good condition that are ≥250 ha and <1000 ha in total, or areas greater than 1000 ha in total AND Width of vegetation in moderate to good condition that is connecting the area is >30 m and <100 m	2.5

Note: Refer to the Definitions section for definitions of *stream order* and *important wetlands*.

4. Assessing the patch size

For a development that is linear shaped or a multiple fragmentation development, the assessor must assess the patch size for each Mitchell landscape in which the development occurs.

The assessor must:

Step 1 – determine the percent native vegetation cleared in each Mitchell landscape in which the development occurs using the categories in Table 23

Step 2 – determine the patch size class using the categories in Table 23

Table 23: Criteria for assessing patch size

Patch size class	Percent native vegetation cleared in each Mitchell landscape in which the development occurs				Patch size (score)
	<30%	30–70%	>70–90%	>90%	
Extra large	>1000 ha	>200 ha	>100 ha	>50 ha	12.5
Very large	>500 – 1000 ha	>100 – 200 ha	>50 – 100 ha	>20 – 50 ha	10
Large	>200 – 500 ha	>50 – 100 ha	>20 – 50 ha	>10 – 20 ha	7.5
Medium	>100 – 200 ha	>20 – 50 ha	>10 – 20 ha	>1 – 10 ha	5
Small	≤100 ha	≤20 ha	≤10 ha	≤1 ha	2.5
nil	0	0	0	0	0

Step 3 – using those calculations, determine the corresponding patch size score for each Mitchell landscape / patch size class, and

Step 4 – determine the final patch size score by averaging those scores.

The assessor will later use this score for Equation 4 in Appendix 1.

5. Assessing the change in area to perimeter ratio

For a development that is a linear shaped development or multiple fragmentation development, the assessor must assess the change in area to perimeter ratio of patch size areas that are impacted on by the development.

The assessor must:

Step 1 – use a GIS to calculate the area (m^2) and perimeter (m) of each separate patch size impacted on by the development within the buffer area surrounding the development footprint. Only the patch size and its perimeter that is within the buffer area surrounding the development footprint is to be calculated

Step 2 – calculate the total area (m^2) and total perimeter length (m) of all patch size areas that are impacted on by the development

Step 3 – determine the current area to perimeter ratio by dividing the total of all patch size areas (m^2) by the total perimeter length (m) of all patch size areas

Step 4 – taking into account the impact of the development, use a GIS to estimate the future area and future perimeter (m) for each patch size that is impacted on by the development and identified in Step 1. The future perimeter must include the perimeter of all new and existing edges created by the impacts of development within or through the patch size identified in Step 1, regardless of the distance to other vegetation in moderation to good condition.

Step 5 – determine the future area to perimeter ratio by dividing the future total of all patch size areas (m^2) by the future total perimeter length (m) of new edge for all patch size areas.

Step 6 – determine the proportional change in area to perimeter ratio by dividing the current area to perimeter ratio (from Step 3) by the future area to perimeter ratio (in Step 5)

Step 7 – determine the score for the change in area to perimeter ratio using the categories in Table 24.

The assessor may use a representative sample of patch size areas within the buffer area surrounding the development footprint to determine the proportional change in area to permitter ratio.

Table 24: Scores for proportional change in area to perimeter ratio

Proportional change in area to perimeter ratio (%)	Score for proportional change in area to perimeter ratio
0	0
≤10	1
>10 – 20	2
>20 – 30	3
>30 – 40	4
>40 – 50	5
>50 – 60	6
>60 – 70	7
>70 – 80	8
>80 – 90	9
>90 – 100	10

Appendix 6: Assessing landscape value for biobank sites

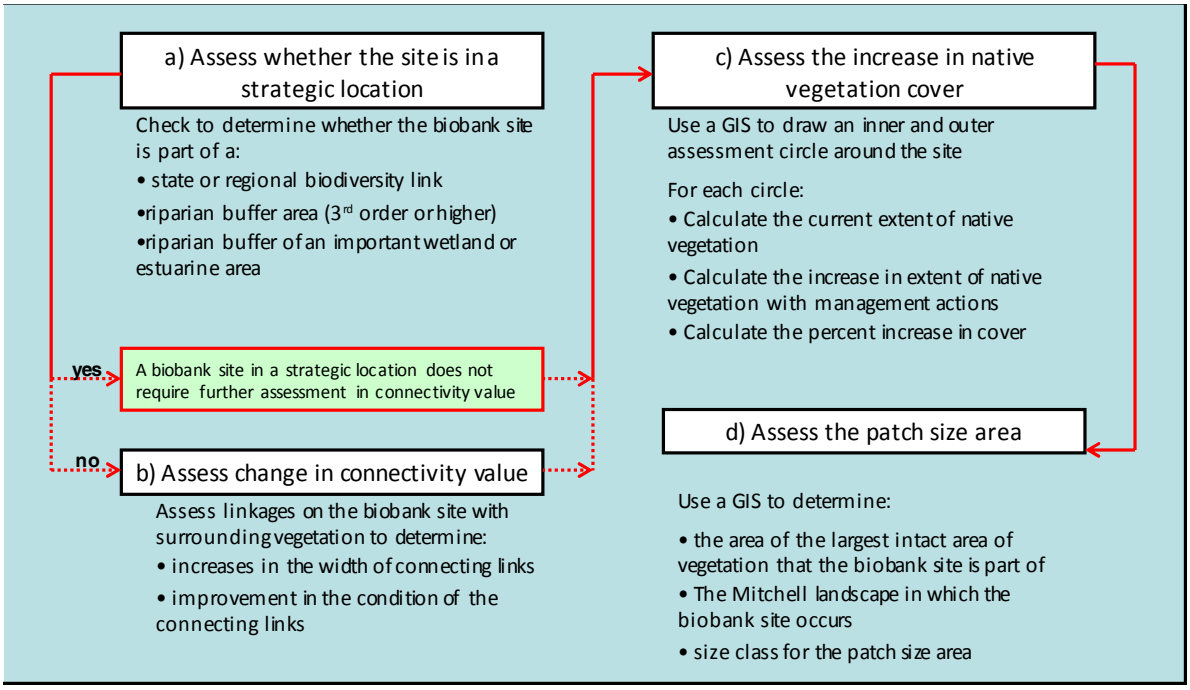


Figure 2: Indicative workflow to assess landscape value at a biobank site

Landscape value components are assessed beyond the boundary of the biobank site and require the use of GIS for optimal accuracy and consistency.

1. Assessing the strategic location of the biobank site

Where a biobank site includes land that meets any of the criteria set out in Table 25, the biobank site is assessed as being within a strategic location. The assessor is not required to assess the connectivity value of a biobank site that is within a strategic location. The score for connectivity value is included in the category of the strategic location of a biobank site. This means that assessing the strategic location of a biobank site is a score out of 18.

The score for the strategic location of a biobank site is to be used in Section 12.4 to determine the overall landscape value score for the proposed offset.

Where a biobank site meets more than one category of the strategic location set out in Table 25, the assessor may choose the highest category.

Table 25: Score for categories of the strategic location of the biobank site

A biobank site is in a strategic location if it includes:	Score
• Riparian buffer area on both sides of a 6th order stream or higher, or • Riparian buffer area of an important wetland, or • Riparian buffer area of an estuarine area	18
• An area identified as being part of a state biodiversity corridor, or • Riparian buffer area on both sides of a 4th or 5th order stream, or • Riparian buffer area on one side of a 6th order stream or higher	15
• An area identified as being part of a regional biodiversity corridor, or • Riparian buffer area on one side of a 4th or 5th order stream	12
• Riparian buffer area on both sides of a 3rd order stream	9
• Riparian buffer area on one side of a 3rd order stream • Riparian buffer of a local wetland	6

Note: Refer to the Definitions section for definitions of stream order and important wetlands.

2 Assessing percent current extent of native vegetation cover

To assess the percent current extent of native vegetation cover for the biobank site, the assessor must do each of the following steps.

Step 1 Identify an inner and an outer assessment circle

The inner assessment circle : outer assessment circle ratio must be 1:10. The assessor must choose the inner and outer assessment circle for a proposed biobank site from the following combinations:

Inner assessment circle (ha)	Outer assessment circle (ha)
100	1,000
200	2,000
300	3,000
400	4,000
500	5,000
1,000	10,000

The inner and outer assessment circles must be centred on the area of the biobank site that will involve the greatest increase in native vegetation cover.

Step 2 Calculate the percent current extent native vegetation cover in the inner and outer assessment circles

Estimate the native vegetation cover taking into account the extent and over-storey cover compared to benchmark condition currently in:

a) the inner assessment circle, and

b) the outer assessment circle

in increments of 5% using a GIS. Convert these calculations into a percent current extent native vegetation cover in the inner and outer assessment circles.

Step 3 Determine the scores for the percent current extent of native vegetation cover in the inner and outer assessment circles

Use the percent current extent of native vegetation cover and Table 26 to determine the corresponding scores for the percent current extent native vegetation cover in the inner and outer assessment circles.

The assessor will later use these figures for Equation 9 set out in Appendix 1.

Table 26: Determining percent native vegetation cover in the landscape

Percent native vegetation cover in the landscape – inner and outer assessment circle (%)	Score for percent native vegetation cover in the landscape – inner assessment circle	Score for percent native vegetation cover in the landscape – outer assessment circle
0	0	0
≤5	0.75	1.25
6–10	1.5	2.5
11–15	2.25	3.75
16–20	3	5
21–25	3.75	6.25
26–30	4.5	7.5
31–35	5.1	8.45
36–40	5.7	9.4
41–45	6.3	10.35
46–50	6.9	11.3
51–55	7.3	11.95
56–60	7.7	12.6
61–65	8.1	13.25
66–70	8.5	13.9
71–75	8.75	14.25
76–80	9	14.6
81–85	9.25	14.95
86–90	9.5	15.3
91–95	9.75	15.65
96–100	10	16

3 Assessing percent future extent of native vegetation cover

To assess the percent future extent of native vegetation cover for the biobank site, the assessor must do each of the following steps.

Step 1 Calculate the percent future extent of native vegetation cover in the inner and outer assessment circles

Taking into account increases in the extent of vegetation cover from management actions to be undertaken on the biobank site and using the same assessment circles as identified in Section 2 of this appendix, estimate the area of future native vegetation cover, taking into account the extent and condition of over-storey cover compared to benchmark condition in:

a) the inner assessment circle, and

b) the outer assessment circle

in increments of 5% using a GIS. Convert these calculations into a percent future extent of native vegetation cover in the inner and outer assessment circles.

Step 2 Determine the scores for the percent future extent of native vegetation cover in the inner and outer assessment circles

Use the percent future extent of native vegetation cover and Table 14 to determine the corresponding scores for the percent future extent of native vegetation cover in the inner and outer assessment circles.

The assessor will later use these figures for Equation 9 set out in Appendix 1.

4 Assessing the connectivity value

The assessor must assess the connectivity value for a biobank site that is not within or part of a strategic location, using the following steps.

Step 1: Identify the connecting links

For the purposes of this appendix, native vegetation on the biobank site is part of a connecting link when it is linked to adjoining vegetation and the vegetation on the biobank site:

- is in moderate to good condition, and
- has a patch size >1 ha, and
- is separated by a distance of <100 m (or <30 m for non-woody ecosystems), and
- is not separated by a large water body, dual carriageway, wider highway or similar hostile link.

A site may have none, one, or more than one connecting link.

The assessor must identify the connecting links that the management actions for the biobank site will impact on.

Where the management actions for the biobank site will impact on more than one connecting link, the assessor must determine the connectivity value score for each connecting link.

Step 2: Determine the current linkage width class at a site

Determine the current linkage width class of each connecting link identified in Step 1 in this section by measuring the width of each connecting link at the narrowest area of the connecting link and looking up the corresponding linkage width class in Table 27. This area may be located on or off the site.

Table 27: Linkage width classes for a biobank site

Linkage width (metres)	0 – 5	>5 – 30	>30 – 100	>100 – 500	>500
Linkage width class	Very narrow	Narrow	Moderate	Wide	Very wide

Step 3: Determine the future linkage width class for the biobank site

Taking into account any increases in the width of the connecting link from the proposed management actions for the biobank site, estimate the future linkage width of each connecting link identified in Step 1 in this section and determine the corresponding linkage width class for each of those links using Table 27.

Step 4: Determine the number of linkage width classes that are crossed – gained

Determine the number of linkage width classes that are gained for each connecting link identified in Step 1 in this section as follows:

0 = no change or change is within the class, i.e. does not cross a threshold between the linkage width classes

1 = crosses one linkage width threshold, i.e. changes from one linkage width class to the next one across one threshold

2 = crosses two linkage width thresholds, i.e. changes from one linkage width class to another linkage width class across two thresholds

3 = crosses three linkage width thresholds, i.e. changes from one linkage width class to another linkage width class across three thresholds

4 = crosses four linkage width thresholds, i.e. changes from one linkage width class to another linkage width class across four thresholds.

The number of linkage width classes that are crossed as a result of management actions at a biobank site is used in Step 8 to determine the connectivity value score.

Step 5: Determine the current linkage condition class

For each connecting link identified in Step 1 in this section, determine whether any part of the connecting link within the outer assessment circle (referred to in Step 1 of Section 1 of this appendix) contains a PCT identified by the assessor under Subsection 5.2.1 that is a woody PCT.

Where it contains such a woody PCT:

a) estimate the current average condition of the over-storey vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 28, and

b) estimate the current average condition of either the mid-storey or ground cover vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 28. The assessor must use whichever of those strata is the most appropriate for assessing connectivity for those woody PCTs, and

c) determine the corresponding current linkage condition class for the estimates for each link using Table 28.

Where it does not contain such a woody PCT:

a) estimate the average current condition of the ground cover (including exotic vegetation) for each link within that outer assessment circle using the categories set out in Table 29, and

b) determine the corresponding current linkage condition class for that estimate for each link using Table 29.

Where a connecting link contains both woody and non-woody vegetation, the assessor must choose the current linkage condition class that is most relevant to the PCTs on the biobank site.

Table 28: Linkage condition classes (woody vegetation)

		Over-storey condition				
		No native over-storey	**% foliage cover <25% of lower benchmark or exotic vegetation with similar structure to the proposal**	**% foliage cover ≥25% of lower benchmark to lower benchmark**	**% foliage cover within benchmark**	
Mid-storey or ground cover condition	No mid-storey or ground cover or exotic vegetation with similar structure to the proposal	**0**	**0.5**	**1**	**1.5**	**Linkage condition class**
	% foliage cover of mid-storey or ground cover <50% lower end benchmark or exotic vegetation with similar structure to the proposal	**0.5**	**1**	**1.5**	**2**	
	% foliage cover of mid-storey or ground cover ≥50% of lower benchmark	**1**	**1.5**	**2**	**2.5**	
	% foliage cover of mid-storey or ground cover within benchmark	**1.5**	**2**	**2.5**	**3**	
		Linkage condition class				

Table 29: Linkage condition classes (non-woody vegetation)

Linkage condition class	Vegetation condition
0	Meets none of the definitions set out below
1	% foliage cover <50% of lower benchmark in native grassland, herbfield or wetland (herbaceous vegetation), or exotic vegetation with similar structure to the proposal
2	% foliage cover ≥50% of lower benchmark to lower benchmark in native grassland, herbfield or wetland (herbaceous vegetation)
3	% foliage cover is within benchmark in native grassland, herbfield or wetland (herbaceous vegetation)

Step 6: Determine the future linkage condition class

For each connecting link identified in Step 1 in this section, determine whether any part of the connecting link within the outer assessment circle (referred to in Section 1 of this appendix) contains a PCT identified by the assessor under Subsection 5.2.1 that is a woody PCT.

Where it contains such a woody PCT:

a) take into account the proposed management actions on the biobank site to estimate the future average condition of the over-storey vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 28, and

b) take into account the proposed management actions on the biobank site to estimate the future average condition of either the mid-storey or ground cover vegetation (including exotic vegetation) for each link, or part thereof, within that outer assessment circle using the categories set out in Table 28. The assessor must use whichever of those strata is the most appropriate for assessing connectivity for those woody PCTs, and

c) determine the corresponding future linkage condition class for those estimates for each connecting link using Table 28.

Where it does not contain such a woody PCT:

a) take into account the proposed management actions on the biobank site to estimate the average future condition of the ground cover (including exotic vegetation) for each link within that outer assessment circle using the categories set out in Table 29; and

b) determine the corresponding future linkage condition class for that estimate for each connecting link using Table 29.

Where a connecting link contains both woody and non-woody vegetation, the assessor must choose the future linkage condition class that is most relevant to the PCTs on the biobank site, taking into account the likely improvements in condition of the vegetation.

Step 7: Determine the number of linkage condition classes that are crossed – gained

Determine the number of linkage condition class thresholds that are crossed for each connecting link identified under Step 1 in this section as follows:

0 = no change or change is within the same linkage condition class

1 = crosses one linkage condition threshold, i.e. changes from one linkage condition class to the next one across one threshold

2 = crosses two linkage condition thresholds, i.e. changes from one linkage condition class to another linkage condition class across two thresholds

3 = crosses three linkage condition thresholds, i.e. changes from one linkage condition class to another linkage condition class across three thresholds.

The number of linkage condition thresholds can include half points where the connectivity condition class crosses to another threshold for only one stratum, as can be seen in Table 28.

Step 8: Determine the connectivity value score

Determine the corresponding final connectivity value score in Table 30 for each connecting link identified under Step 1 in this section using:

c) the number of linkage width class thresholds that are crossed for that connecting link (as determined in Step 4 of this section), and

d) the number of linkage condition class thresholds that are crossed (as determined under Step 7 of this section).

Where the assessor identifies more than one connecting link under Step 1 of this section, the final connectivity value score for the biobank site is the highest connectivity value score determined under this section.

The assessor will later use this score for Equation 9 in Appendix 1.

Table 30: Scores for gain of linkage condition/width, based on number of thresholds crossed

		Number of linkage width class thresholds crossed			
		0	**1**	**2**	**3 or 4**
Number of linkage condition thresholds crossed	**0**	0	2	4	6
	0.5	1	3	5	7
	1	2	4	6	8
	1.5	3	5	7	9
	2	4	6	8	10
	2.5	5	7	9	11
	3	6	8	10	12

5. Assessing the patch size

The assessor must:

a) determine the percent native vegetation cleared in the Mitchell landscape in which most of the biobank site occurs, using the categories in Table 31

b) determine the patch size using the categories in Table 31, and

c) using those calculations, determine the corresponding patch size score using Table 31.

Table 31: Criteria for assessing patch size

Patch size class	Percent native vegetation cleared in the Mitchell landscape in which most of the biobank site occurs				Patch size score
	<30%	30–70%	>70–90%	>90%	
Extra large	>1000 ha	>200 ha	>100 ha	>50 ha	12
Very large	>500 – 1000 ha	>100 – 200 ha	>50 – 100 ha	>20 – 50 ha	9
Large	>200 – 500 ha	>50 – 100 ha	>20 – 50 ha	>10 – 20 ha	6
Medium	>100 – 200 ha	>20 – 50 ha	>10 – 20 ha	>1 – 10 ha	3
Small	≤100 ha	≤20 ha	≤10 ha	≤1 ha	1
nil	0	0	0	0	0

Appendix 7: Guidelines for varying the increase in site value with additional management actions

The gain in the site attribute score may be increased beyond the default scores (set out in Table 32) for a vegetation zone where it is demonstrated that additional and/or more tailored actions are being undertaken within the vegetation zone at a biobank site. Additional gain in site value may also be used where the extent and/or degree to which the management actions are being undertaken is likely to provide a greater increase in site value than that shown in Table 32. Any increase in site value greater than that shown in Table 32 must be documented in the biobanking agreement.

Table 32: Allowable additional increases in predicted improvement in site attribute scores with management actions under certain circumstances

Site attribute	Increase in site attribute score from current condition			
	0	1	2	Standard for assessing the site attribute condition against the benchmark for the PCT
Species richness	Increase by 1 rather than by 0.5	Increase by 1 rather than by 0.5	No additional gain (i.e. increase by 1)	Only plant species characteristic of the target PCT may be counted towards native plant species richness. • To increase the species richness attribute from 0 – 1, the BAR must set out the additional actions to achieve up to <50% of the native plant species richness benchmark for the nominated PCT. • To increase the species richness attribute from 1 – 2, the BAR must set out the additional actions to achieve between 50 and <100% of the native plant species richness benchmark for the nominated PCT.
Over-storey cover	Increase by 1.5 rather than by 1	Increase by 1.5 rather than by 1	No additional gain (i.e. increase by 1)	Only over-storey plant species characteristic of the target PCT may be counted towards percent native over-storey cover. • To increase the over-storey cover attribute score from 0 – 1.5, the BAR must document the additional management actions that will achieve >25 – <50% or <175% of the percent native over-storey cover benchmark for the nominated PCT. • To increase the over-storey cover attribute score from 1 – 2.5, the BAR must document the additional management actions that will achieve >50 – <75% or >100 – <125% of the percent native over-storey cover benchmark for the nominated PCT.
Mid-storey cover	Increase by 1.5 rather than by 1	Increase by 1.5 rather than by 1	No extra increase (i.e. increase by 1)	Only mid-storey plant species characteristic of the target PCT may be counted towards percent native mid-storey cover. • To increase the mid-storey cover attribute score from 0 – 1.5, the BAR must document the additional management actions that will achieve >25 – <50% or <175% of the percent native over-storey cover benchmark for the nominated PCT. • To increase the mid-storey cover attribute score from 1 – 2.5, the BAR must document the additional management actions that will achieve >50 – <75% or >100 – <125% of the percent native over-storey cover benchmark for the nominated PCT.

Site attribute	Increase in site attribute score from current condition			
	0	1	2	Standard for assessing the site attribute condition against the benchmark for the PCT
Native ground cover (grasses)	Increase by 1.5 rather than by 1	Increase by 2 rather than by 1	No additional gain (i.e. increase by 1)	Only native ground cover (grass) plant species characteristic of the target PCT may be counted towards percent native ground cover (grasses). • To increase the native ground cover (grass) attribute score from 0 – 1.5, the BAR must document the additional management actions that will achieve >10 – <25 or <175% of the native ground cover (grass) benchmark for the nominated PCT. • To increase the native ground cover (grass) attribute score from 1 – 3, the BAR must document the additional management actions that will achieve the native ground cover (grass) benchmark for the nominated PCT.
Native ground cover (shrubs)	No additional gain (i.e. increase by 1)	Increase by 1.5 rather than by 1	No additional gain (i.e. increase by 1)	Only native ground cover (shrub) plant species characteristic of the target PCT may be counted towards percent native ground cover (shrub). • To increase the native ground cover (grass) attribute score from 1 – 2.5, the BAR must document the additional management actions that will achieve >50 – <75% or >100 – <125% of the native ground cover (shrub) benchmark for the nominated PCT.
Native ground cover (other)	No additional gain (i.e. increase by 1)	No additional gain (i.e. increase by 1)	No additional gain (i.e. increase by 1)	No change from the default.
Exotic plant cover	No additional gain(i.e. increase by 0.5)	Increase by 1 rather than by 0.5	No additional gain (i.e. increase by 1)	Exotic plant cover is measured as total percent foliage cover of all exotics in all strata. • To increase the exotic plant cover score from 0 – 1 the exotic plant cover will be in a range >33 and <45%. Exotic plant cover must be calculated as a percentage of the total ground and mid-storey cover. • To increase the exotic plant cover score from 1 – 2, the exotic plant cover will be >5 – <33%. Exotic plant cover must be calculated as a percentage of the total ground and mid-storey cover. The BAR must demonstrate the additional actions that will be undertaken to manage the exotic plant cover in the vegetation zones to which this increase applies.
Number of trees with hollows	Attribute score may increase by 0.5	Attribute score may increase by 1	No additional gain (i.e. increase by 1)	• To increase the number of trees with hollows attribute from 0 – 0.5, only stags brought onto the vegetation zone that already contain hollows and are properly secured may be used as habitat augmentation for this attribute. • To increase the number of trees with hollows attribute from 1 – 2, properly constructed and secured nest boxes may be used as habitat augmentation for this attribute. The BAR must include actions to maintain the nest boxes as part of the approved management plan for the vegetation zone.

Site attribute	Increase in site attribute score from current condition			
	0	1	2	Standard for assessing the site attribute condition against the benchmark for the PCT
Over-storey regeneration	Increase by 1 rather than by 0.5	No additional gain (i.e. increase by 1)	No additional gain (i.e. increase by 1)	Over-storey regeneration is when a second generation of over-storey plants naturally regenerates in a vegetation zone as a result of reproduction of established over-storey species. Over-storey regeneration must not include juvenile or young plants which have been planted or seeded. Over-storey regeneration must be present across the vegetation zone. • To increase the over-storey regeneration attribute from 0 – 1, the BAR must demonstrate that >25% – <50% of over-storey species for the nominated PCT are naturally regenerating.
Total length of fallen logs	Increase by 0.5 rather than zero increase	Increase by 1 rather than by 0.5	No additional gain(i.e. increase by 1)	The active placement of logs brought onto the vegetation zone and placed in a configuration that reflects natural systems can be used as habitat augmentation. • To increase the total length of fallen logs from 0 – 1, the length of coarse woody debris that is at least 10 cm in diameter and greater than 0.5 m long will be in a range >25% and <50% of the total length of fallen logs benchmark for the nominated PCT. An assessor may also increase this attribute score from 0 – 1 where the vegetation zone contains some scattered mature or senescent trees.

Appendix 8: Map of IBRA subregions in major catchment areas of NSW

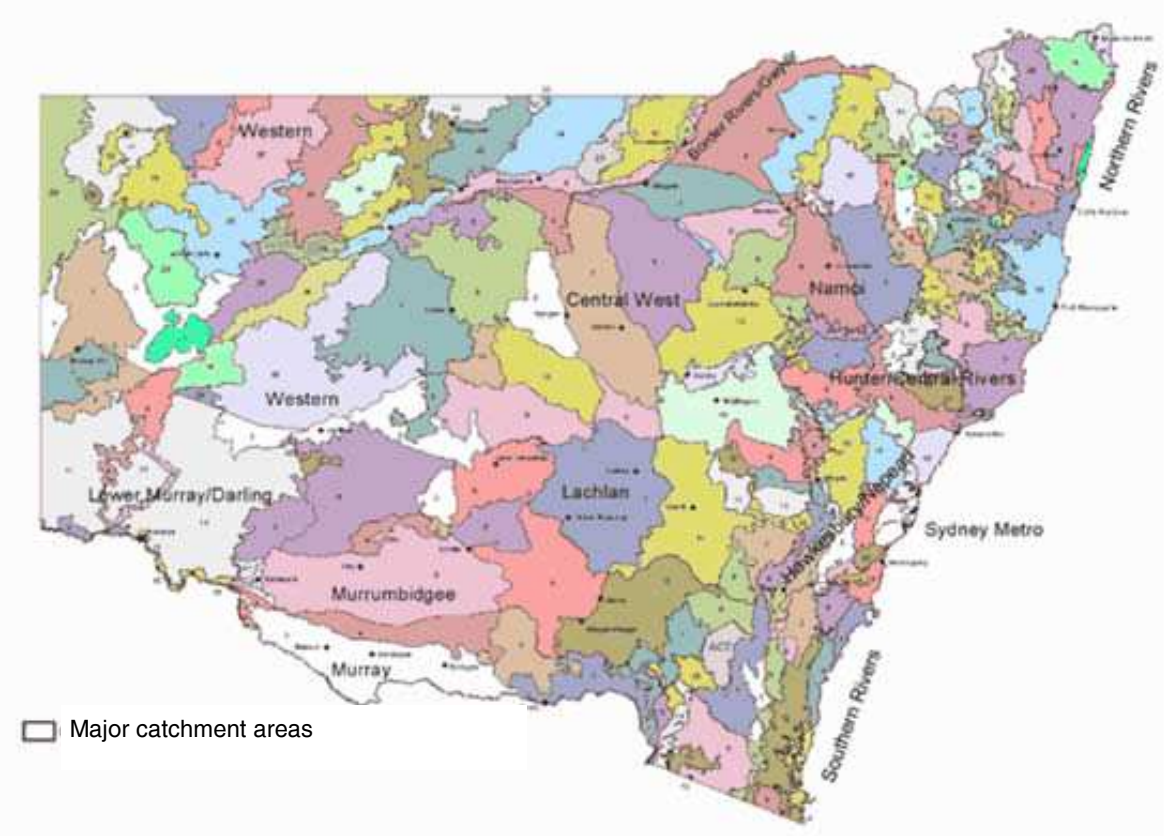


Figure 3: Map of IBRA subregions in major catchment areas of NSW

IBRA subregions of major catchment areas in NSW **Key to map**	
Border Rivers/Gwydir major catchment area	
1	Beardy River Hills
2	Binghi Plateau
3	Bundarra Downs
4	Castlereagh-Barwon
5	Deepwater Downs
6	Eastern Nandewars
7	Glenn Innes–Guyra Basalts

8	Inverell Basalts
9	Kaputar
10	Moredun Volcanics
11	Nandewar, Northern Complex
12	Northeast Forest Lands
13	Northern Basalts
14	Northern Outwash
15	Peel
16	Severn River Volcanics
17	Tenterfield Plateau
18	Tingha Plateau
19	Yarrowyck–Kentucky Downs
Central West major catchment area	
1	Bathurst
2	Bogan–Macquarie
3	Canbelego Downs
4	Capertee
5	Castlereagh–Barwon
6	Hill End
7	Kerrabee
8	Liverpool Range
9	Lower Slopes
10	Nymagee–Rankins Springs
11	Oberon
12	Orange
13	Pilliga

14	Pilliga Outwash
15	Talbragar Valley
16	Upper Slopes
17	Wollemi
Hawkesbury/Nepean major catchment area	
1	Bathurst
2	Bungonia
3	Burragorang
4	Capertee
5	Crookwell
6	Cumberland
7	Kanangra
8	Monaro
9	Moss Vale
10	Oberon
11	Pittwater
12	Sydney Cataract
13	Wollemi
14	Yengo
Hunter/Central Rivers and Sydney Metro major catchment area	
1	Barrington
2	Comboyne Plateau
3	Ellerston
4	Hunter
5	Karuah Manning

6	Kerrabee
7	Liverpool Range
8	Macleay Hastings
9	Mummel Escarpment
10	Pilliga
11	Tomalla
12	Upper Hunter
13	Walcha Plateau
14	Wollemi
15	Wyong
16	Yengo
Lachlan major catchment area	
1	Barnato Downs
2	Crookwell
3	Darling Depression
4	Kanangra
5	Lachlan
6	Lachlan Plains
7	Lower Slopes
8	Murrumbateman
9	Nymagee–Rankins Springs
10	Oberon
11	Orange
12	South Olary Plain, Murray Basin Sands
13	Upper Slopes

Lower Murray/ Darling major catchment area	
1	Barrier Range
2	Barrier Range Outwash, Fans and Plains
3	Darling Depression
4	Great Darling Anabranch
5	Lachlan
6	Menindee
7	Murray Scroll Belt
9	Pooncarie–Darling
10	Robinvale Plains
11	South Olary Plain, Murray Basin Sands
Murray major catchment area	
1	Bondo
2	Lower Slopes
3	Murray Fans
4	Murrumbidgee
5	New South Wales Alps
6	South Olary Plain, Murray Basin Sands
7	Upper Slopes
Murrumbidgee major catchment area	
1	Bondo
2	Darling Depression
3	Kybeyan – Gourock
4	Lachlan
5	Lachlan Plains

6	Lower Slopes
7	Monaro
8	Murrumbateman
9	Murrumbidgee
10	New South Wales Alps
11	South Olary Plain, Murray Basin Sands
12	Upper Slopes
Namoi major catchment area	
1	Castlereagh–Barwon
2	Eastern Nandewars
3	Kaputar
4	Liverpool Plains
5	Liverpool Range
6	Northern Basalts
7	Peel
8	Pilliga
9	Pilliga Outwash
10	Walcha Plateau
Northern Rivers major catchment area	
1	Armidale Plateau
2	Carrai Plateau
3	Cataract
4	Chaelundi
5	Clarence Lowlands
6	Clarence Sandstones

7	Coffs Coast & Escarpment
8	Comboyne Plateau
9	Dalmorton
10	Ebor Basalts
11	Glenn Innes–Guyra Basalts
12	Guy Fawkes
13	Macleay Gorges
14	Macleay Hastings
15	Murwillumbah (Qld – Southeast Hills and Ranges)
16	Nightcap
17	Northeast Forest Lands
18	Richmond – Tweed (Qld – Scenic Rim)
19	Rocky River Gorge
20	Round Mountain
21	Stanthorpe Plateau
22	Upper Manning
23	Walcha Plateau
24	Washpool
25	Wongwibinda Plateau
26	Woodenbong
27	Yuraygir
Southern Rivers major catchment area	
1	Bateman
2	Bungonia
3	Burragorang
4	East Gippsland Lowlands (EGL)

5	Ettrema
6	Illawarra
7	Jervis
8	Kybeyan – Gourock
9	Monaro
10	Moss Vale
11	New South Wales Alps
12	South East Coastal Ranges
13	South East Coastal Plains
Western major catchment area	
1	Barnato Downs
2	Barrier Range
3	Barrier Range Outwash, Fans and Plains
4	Bogan–Macquarie
5	Boorindal Plains
6	Bulloo Dunefields
7	Bulloo Overflow
8	Canbelego Downs
9	Castlereagh–Barwon
10	Central Depression
11	Central Downs – Fringing Tablelands and Downs
12	Core Ranges
13	Core Ranges
14	Culgoa–Bokhara
15	Darling Depression
16	Kerribree Basin

17	Louth Plains
18	Menindee
19	Moonie – Barwon Interfluve, Collarenebri Interfluve
20	Mootwingee Downs
21	Narrandool
22	Nebine Plains, Block Range
23	Nymagee–Rankins Springs
24	Paroo Overflow
25	Paroo Sand Sheets, Cuttaburra–Paroo
26	Paroo–Darling Sands
27	Scopes Range
28	South Olary Plain, Murray Basin Sands
29	Strzelecki Desert, Western Dunefields
30	Urisino Sandplains
31	Warrambool–Moonie
32	Warrego Plains
33	Warrego Sands
34	West Warrego – Tablelands and Downs
35	White Cliffs Plateau
36	Wilcannia Plains

Appendix 9: Reporting requirements for Biobanking applications

There are three stages to the methodology:

Stage 1 – Biodiversity assessment

Stage 2 – Impact assessment

Stage 3 – Improving biodiversity values

The Biodiversity Assessment Report (BAR) which is prepared to document these three stages is submitted as part of an application for a biobanking statement (development), or a biobanking agreement (offset), or both.

The minimum information requirements for the BAR, depending on its specific purpose, are detailed in the following tables:

- **Table 33** – when part of an application for a biobanking statement or agreement
- **Table 34** – when part of an application for a biobanking statement
- **Table 35** – when part of an application for a biobanking agreement.

Table 33: Minimum information requirements for the Biodiversity Assessment Report (Application for a biobanking statement or agreement – Stage 1: Biodiversity assessment)

Report section	Information	Maps & data	BBAM reference

Introduction	Introduction to the biodiversity assessment including:
	• identification of development/biobank site footprint, including:
	  ○ operational footprint
	  ○ construction footprint indicating clearing associated with temporary construction facilities and infrastructure
	• general description of development/biobank site
	• sources of information used in the assessment, including reports and spatial data.
		• Site Map (as described in Section 3.2)
		• Location Map (as described in Section 3.2)
		• Digital shape files for all maps and spatial data
			Chapter 3 and Section 3.2

Landscape features	Identification of landscape features at the development/biobank site, including:
	• IBRA bioregions and subregions, NSW landscape region and area (ha)
	• native vegetation extent in the outer assessment circle or buffer area
	• cleared areas
	• evidence to support differences between mapped vegetation extent and aerial imagery
	• rivers and streams classified according to stream order
	• wetlands within, adjacent to and downstream of the site
	• landscape value score components, including:
	  ○ identification of method applied (i.e. linear or site-based)
	  ○ percent native vegetation cover in the landscape (development site and biobank site)
	  ○ connectivity value (development site and biobank site)
	  ○ patch size (development site and biobank site)
	  ○ area to perimeter ration (development site), and
	  ○ strategic location of a biobank site
	• landscape value score.
		• IBRA bioregions and subregions (as described in Paragraphs 4.1.1.3–4)
		• NSW landscape regions (as described in Paragraphs 4.1.1.5–6)
		• Rivers and streams (as described in Paragraphs 4.1.1.8–10
		• Wetlands (as described in Paragraphs 4.1.1.11–13)
		• Native vegetation extent (as described in Paragraphs 4.1.1.12–15)
		• State, regional and local biodiversity links (as described in Paragraphs 4.1.1.16–17)
		• Regional vegetation used to calculate patch size
			Section 4.1, Appendix 4, Appendix 5 and Appendix 6.

Report section	Information	Maps & data	BBAM reference
Native vegetation	Identify native vegetation extent within the development/biobank site, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery. Describe PCTs within the development/biobank site, including: • vegetation class • vegetation type • area (ha) for each vegetation type • species relied upon for identification of vegetation type and relative abundance • justification of evidence used to identify a PCT (as outlined in Paragraph 5.2.1.8) • EEC status (as outlined in Subsection 5.2.1) • estimate of percent cleared value of PCT. Describe vegetation zones within the development/biobank site, including: • condition class and subcategory (where relevant) • area (ha) for each vegetation zone • survey effort as described in Paragraphs 5.2.1.5–7 (number of plots/transects). Where use of local data is proposed: • identify relevant vegetation type • identify source of information for local benchmark data • justify use of local data in preference to database values.	• Map of native vegetation extent within the development/biobank site (as described in Section 5.1) • Map of PCTs within the development/biobank site • Map of condition class and subcategory (where relevant) • Map of plot and transect locations relative to PCTs and condition class • Map of EECs • Plot and transect field data (MS Excel format) • Plot and transect field data sheets • Table of current site value scores for each vegetation zone within the development/biobank site • Map of vegetation zones with a current site value score of <17.	Chapter 5

Report section	Information	Maps & data	BBAM reference
Threatened species	Identify ecosystem credit species associated with PCTs on both the development site and biobank site as outlined in Section 6.3, including: • list of species derived • justification for exclusion of any ecosystem credit species predicted above. Identify species credit species on both the development site and the biobank site as outlined in Sections 6.5 and 6.6, including: • list of candidate species • justification for inclusions and exclusions based on habitat features • indication of presence based on targeted survey or expert report • details of targeted survey technique, effort, timing and weather • species polygons • species that cannot withstand a further loss. Where use of local data is proposed: • identify relevant species or population • identify aspect of species/population data • identify source of information for local data • justify use of local data in preference to database values. Where expert reports are used in place of targeted survey: • identify the relevant species or population • justify the use of an expert report • indicate and justify the likelihood of presence of the species or population and information considered in making this assessment • estimate the number of individuals or area of habitat (whichever unit of measurement applies to the species/individual) for the development site or biobank site, including a description of how the estimate was made • identify the expert and provide evidence of their expert credentials.	• Table of vegetation zones and landscape Tg values, particularly indicating where these have changed due to species exclusion • Targeted survey locations • Table detailing the list of species credit species and presence status on site as determined by targeted survey, indicating also where presence was assumed and/or where presence was determined by expert report • Species credit species polygons (as described in Paragraph 6.5.1.19) • Table detailing species and habitat feature/component associated with species and its abundance on site (as described in Paragraph 6.5.1.19) • Species polygons for species that cannot withstand a loss	Chapter 6

Table 34: Minimum information requirements for the BAR (Application for a biobanking statement – Stage 2: Impact assessment (biodiversity values))

Report section	Information	Maps & data	BBAM reference
Avoid and minimise impacts	Demonstration of efforts to avoid and minimise impact on biodiversity values in accordance with Section 8.3. Identification of final project footprint during construction and operation in accordance with Subsection 8.3.3. Assessment of direct and indirect impacts unable to be avoided at the development site in accordance with Sections 8.3 and 8.4. The assessment would include but not be limited to: type, frequency, intensity, duration and consequence of impact. Statement of onsite measures proposed to avoid and minimise direct and indirect impacts of the development.	• Table of measures to be implemented before, during and after construction to avoid and minimise the impacts of the project, including action, outcome, timing and responsibility • Map of final project footprint, including construction and operation • Maps demonstrating indirect impact zones where applicable	Chapter 8
Impact summary	Identification of impacts on red flag areas in accordance with Section 9.2, addressing the red flag variation criteria set out in Section 9.2. Identification of PCTs and species polygons requiring offset in accordance with Section 9.3. Identification of areas not requiring assessment in accordance with Section 9.4.	• Map of areas not requiring assessment • Map of PCTs and species polygons requiring offset • Map of the red flag areas on the development site showing each entity in the red flag area	Chapter 9
Impact summary	Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including: • future site value score for each vegetation zone at the development site	• Table of PCTs requiring offset and the number of ecosystem credits required	Subsections 10.4.3 and 10.4.4

Report section	Information	Maps & data	BBAM reference
	• change in landscape value score • number of required ecosystem credits for the impact of development on each vegetation zone at a development site • number of required species credits for each threatened species that is impacted on by development	• Table of species and populations requiring offset and the number of species credits required • Submitted proposal in the Biobanking Credit Calculator	
Biodiversity Credit report	Credit profiles for ecosystem credits and species credits at the development site.	• Table of credit type and matching credit profile	Subsection 10.4.5

Table 35: Minimum information requirements for the BAR (Application for a biobanking agreement – Stage 3: Improving biodiversity values)

Report section	Information	Maps & data	BBAM reference
Biobank site identification	Biobank site(s) details, including: • location • general description of biobank site • land-use history • lot and DP numbers.	• Location of biobank site • Biobank site boundary map • Cadastral map of biobank site	
Improving biodiversity at the biobank site report	Ecosystem credits and species credits created at a biobank site, including: • future site value score for each vegetation zone at the biobank site • change in landscape value score • averted loss at the biobank site • number of ecosystem credits created for the improvement in biodiversity values for each vegetation zone at a biobank site • number of species credits created for each threatened species that occurs on the biobank site • management actions proposed for the biobank site to improve biodiversity values, including full disclosure of existing obligations and management actions and the credit adjustments relating to these.	• Table of PCTs at the biobank site and the number of ecosystem credits created • Table of species and populations at the biobank site and the number of species credits created • Submitted proposal in the Biobanking Credit Calculator	Chapter 12
Biodiversity credit report	Credit profiles for ecosystem credits and species credits at the biobank site.	• Table of credit type and matching credit profile • Produced by the Credit Calculator	Sections 12.7 and 12.8

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