

SC6.1 Biodiversity

SC6.1.1 Application

1. This planning scheme policy applies to development where an applicable code identifies Planning Scheme Policy SC6.1 Biodiversity as supporting an outcome of the Biodiversity overlay code.

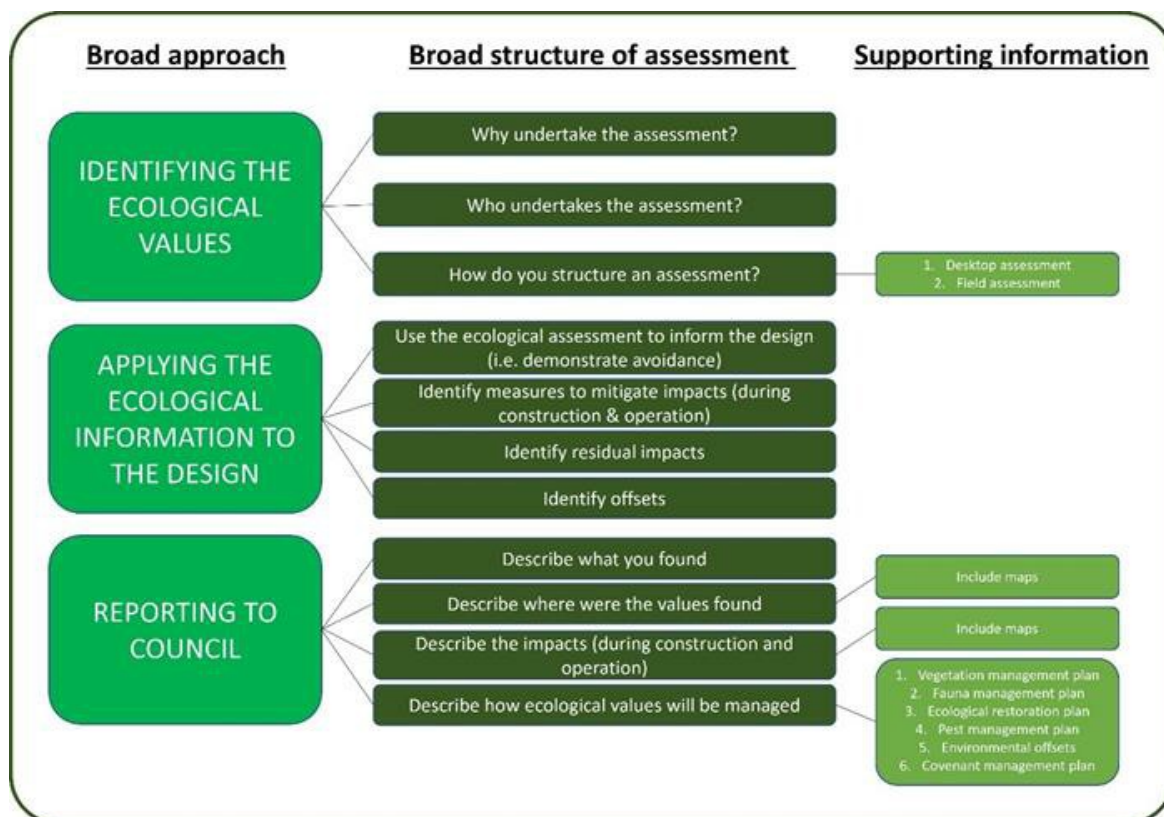
SC6.1.2 Relationship to the planning scheme

1. This planning scheme policy is to be read in conjunction with the assessment benchmarks specified in the planning scheme and applies when development is proposed in an area identified on:
 - a. OM3A Biodiversity - Ecological areas overlay;
 - b. OM3B Biodiversity - Wildlife Habitat overlay;
 - c. OM3C Biodiversity - Waterways and wetland habitat overlay.
2. This policy specifically relates to the assessment of section 8.3 Biodiversity overlay code and ensuring development is consistent with the purpose and performance outcomes of the code.

SC6.1.3 Purpose

1. The purpose of this planning scheme policy is to ensure ecological values are appropriately identified, considered and reported so that they can be protected and managed before, during and after development. The approach will assist in determining whether the outcomes of the Biodiversity overlay code are met.
2. An information request will be requested where the information required by this policy is not supplied when a development application is made.
3. The figure below summarises the broad approach of assessment.

Figure SC6.1.3-1: Broad approach of assessment



SC6.1.4 Qualifications

1. The consultant undertaking the ecological assessment and associated management plans must be a competent person.
2. A person is competent if they have qualifications in:
 - a. environmental science, or
 - b. botany; or
 - c. zoology; or
 - d. ecology; or
 - e. another related discipline.
3. A competent person must also have demonstrated experience in undertaking flora and fauna surveys, assessing regional ecosystems, and undertaking conservation, ecology, and biodiversity assessments. Other persons may be involved with assessment but must be under the supervision of a competent person particularly when conducting field investigations.
4. Persons undertaking field surveys must have appropriate licences, approvals and permits as required. Individuals handling fauna must be compliant with all relevant animal handling requirements and hold the necessary permits for the proposed purpose. The individual handling fauna must hold ethical clearance from an Animal Ethics Committee. The individual undertaking a protected flora survey for the purposes of meeting the requirements of the protected plants legislative framework for clearing protected plants must be a suitably qualified person in accordance with the Flora Survey Guidelines - Protected Plants.
5. The qualifications, experience, licences, approvals and permits of the person undertaking the ecological assessment must be stated within the ecological assessment report.
6. Where proposing to engage a suitably qualified person with qualifications other than those listed, prior approval by Council is required.

SC6.1.5 Technical standards

1. Ecological assessments and management plans are informed by contemporary technical documentation. Guidelines, standards and other references are dynamic and new documentation is frequently published and existing documentation is often revised. Competent persons should be aware of contemporary documentation and refer to the latest versions of documentation when preparing ecological assessments and management plans. **SC6.1 Appendix 2** presents several relevant guidelines, standards and other references.
2. This planning scheme policy makes specific reference to documentation listed in **SC6.1 Appendix 2**. A reference in the policy to a specific resource, guideline, standard or document means the latest version of the resource, guideline, standard or document.
3. It is the responsibility of the developer to consider their obligations under relevant legislation including the:
 - a. *Vegetation Management Act*;
 - b. *Nature Conservation Act*;
 - c. *Environmental Offsets Act*;
 - d. *Fisheries Act*;
 - e. *Water Act*;
 - f. *Environmental Protection Act*; and
 - g. *Environment Protection and Biodiversity Conservation Act (Cth)*.

SC6.1.6 Consultation

1. Council may seek third party advice or comment about an application where:
 - a. development may conflict with a code; or
 - b. technical advice is required to assess the development.
2. Where technical advice is outsourced to an independent consultant an additional fee will apply.

SC6.1.7 Requirements for ecological assessments

SC6.1.7.1 Level of ecological assessment required

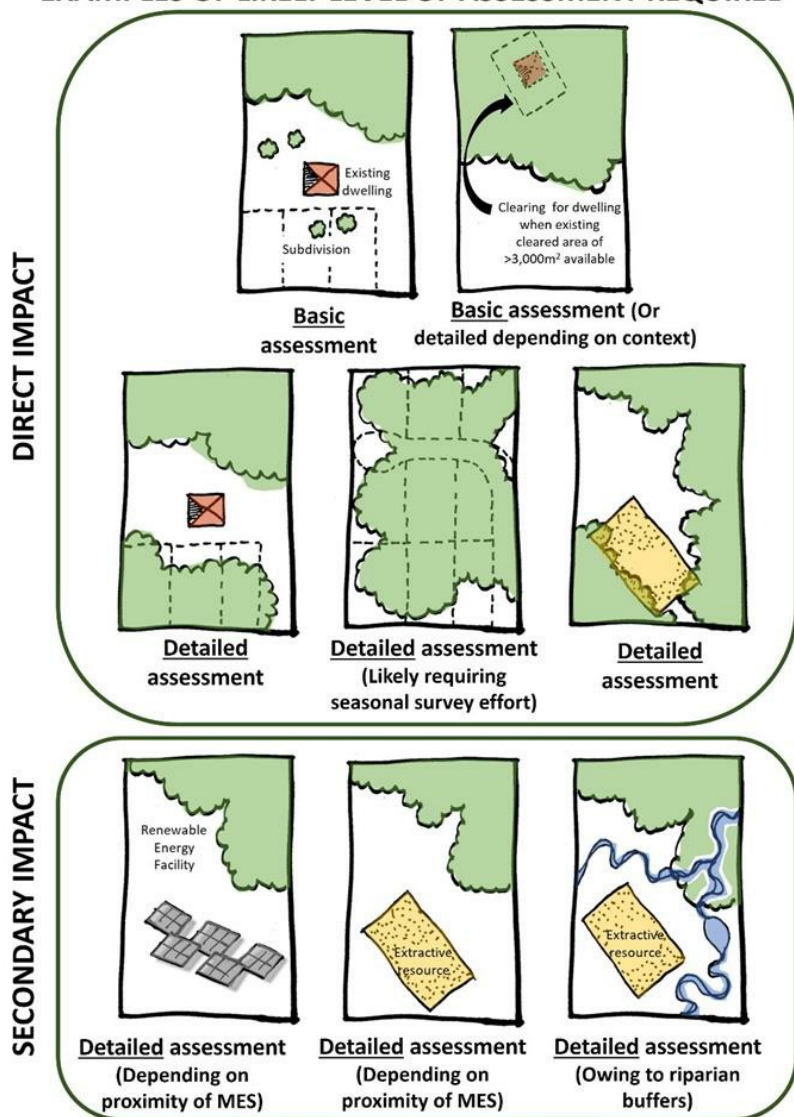
1. Where required, ecological assessments are to be undertaken for the entirety of the lot(s) and adjacent road reserves and creek reserves that are the subject of the development application.
2. A Basic or Detailed Ecological Assessment will be required depending on the complexity of the development site and/or associated adverse effects of the development. **Table SC6.1-1** provides a summary of the circumstances that may determine the level of ecological assessment required.

Table SC6.1-1: Circumstances for basic and detailed ecological assessments

	BASIC	DETAILED
Circumstance	<p>Assessment relates to a small, affected area, which has simple solutions to the adverse effects of the development on environmental values. The report must consider the Biodiversity overlay code and detail how the relevant outcomes are to be met by the development. Examples include:</p> <ul style="list-style-type: none"> • The extent of vegetation clearing is minor, limited to scattered low habitat value trees. • The ecological value of the area to be affected is minor, for example disconnected trees outside of a corridor. • The extent of impact on the ecology both direct and/or secondary is minor. <p>Refer to Figure SC6.1-1 for further examples.</p>	<p>Assessment relates to development which affects a large area and/or has potential to cause significant ecological and residual impacts on environmental values. Solutions to adverse effects on environmental values may be complex and multi-faceted, requiring in-depth analyses of ecological issues across the development site and adjacent areas of influence. Examples include:</p> <ul style="list-style-type: none"> • The extent of vegetation clearing is broad including stands of diverse native vegetation. • The ecological value of the area to be affected is important, for example a broad patch or corridor providing habitat and/or movement opportunities for multiple species. • The extent of impact on the ecology both direct and/or secondary is considerable. <p>Refer to Figure SC6.1-1 for further examples.</p>
General approach to field assessments	<p>Assessment is undertaken over the period of a day or less. Trapping is generally not undertaken, although diurnal searches for fauna are desirable. Vegetation structure is likely to be readily assessed using quaternary sites, although transect information may be useful in some situations. All prevailing environments are assessed and documented.</p>	<p>A Detailed Ecological Assessment is undertaken over a five day/four-night period. Flora and fauna surveys are conducted. Trapping is undertaken. To describe vegetation structure a mix of secondary and quaternary sites are required. In some instances, seasonal survey information may be required (e.g. Summer and Winter surveys). All prevailing environments are assessed and documented. An assessment of adverse effects on wetlands and watercourses is conducted where required, and appropriate mitigation measures outlined.</p>

Figure SC6.1-1: Example likely assessment and type of impact

EXAMPLES OF LIKELY LEVEL OF ASSESSMENT REQUIRED



3. It is strongly recommended that pre-lodgement discussions are held with Council prior to assessment for clarification of specific requirements and outcomes related to a particular project. Any variation to policy requirements should be discussed as early as possible.
4. Council may:
 - a. consent to a lesser or greater level of ecological assessment; or
 - b. require a lesser or greater level of ecological assessment.

SC6.1.7.2 Ecological assessment

SC6.1.7.2.1 Desktop assessment

1. Desktop assessments are an integral component of all ecological assessments. The level of effort applied to desktop assessments should remain relatively constant irrespective of the level of field assessment undertaken (basic or detailed).
2. A desktop assessment must identify:
 - a. information for the entire lot(s) and adjacent road or water parcels:
 - i. contemporary and historical aerial photography;
 - ii. contours/topographic information;
 - iii. geology and soil types including any special features such as rocky outcrops or unusual/unique soil/geology combinations;
 - iv. Matters of State Environmental Significance (MSES) regulated under the State Planning Policy such as protected

- areas, regulated vegetation, essential habitat, regulated vegetation intersecting a waterway, wildlife habitat, koala habitat, waterway providing for passage of fish, threatened species and protected plants flora survey trigger;
- v. Matters of Local Environmental Significance (MLES) as shown on the Biodiversity overlay maps;
- vi. wetlands and waterways visible on aerial photography, but not mapped as Matters of National Environmental Significance (MNES), MSES or MLES;
- vii. salinity and salinity recharge areas;
- viii. previous site-based studies where available;
- b. information for the site and a 5-10km buffer to aid in identifying potential ecological features within the site:
 - i. MNES under the *Environment Protection and Biodiversity Conservation Act (Cth)* such as Threatened Ecological Communities (TEC), threatened species, migratory species, World Heritage Places, National Heritage Places and Wetlands of International Importance;
 - ii. adjacent or nearby conservation areas;
 - iii. ecological corridors or links at the local, regional, state, or national scale;
 - iv. Atlas of Living Australia/Wildnet/Biomaps.
- 3. The desktop assessment must:
 - a. include a likelihood of occurrence assessment for threatened species, migratory species and significant ecological communities;
 - b. determine the most appropriate time of the year to undertake the field survey, i.e. when there is the highest possible chance of detecting possible threatened or migratory species (particularly for detailed ecological assessments).
- 4. Resources included in SC6.1 Appendix 2 should be considered in the desktop assessment.
- 5. It is recommended that local naturalists and other sources of local knowledge who are likely to be able to provide further detailed information about the ecological values of the study area (e.g. members of local environmental or catchment groups) are consulted.

SC6.1.7.2.2 Field assessment

1. The survey area is to include the maximum area likely to be affected by the construction and ongoing operation of the proposed development. The area outside the development area on the site is also to be incorporated into the field survey particularly where secondary adverse effects are anticipated.
2. The level of survey effort required will be determined during early project planning and as part of the desktop assessment. Table SC6.1-2 identifies the method to be adopted for each ecological element during basic and detailed ecological assessments.
3. Other assessments (soil, water, drainage, connectivity, pest animals and weeds) to be undertaken using methods recommended by the ecologist.

Table SC6.1-2: Field survey methods

ELEMENT	METHOD	BASIC	DETAILED
Flora	Prepare a flora list for the site identifying those species that are: <ul style="list-style-type: none"> • native (including if significant under the <i>Nature Conservation Act, Environment Protection and Biodiversity Conservation Act (Cth)</i> or locally significant including range extensions). • exotic (including status under the <i>Biosecurity Act</i> and Councils' Biosecurity Plan). 	✓	✓
	Notable weed occurrences to be mapped and categorised according to the Spatial Pest Attributes Standard Queensland.		✓
	For threatened flora follow the current Flora Survey Guidelines - Protected Plants - Nature Conservation Act 1992. Noting where a property is not mapped in the State's protected plants flora survey trigger map the survey is confined only to the site. The location of threatened flora is to be recorded with a GPS. Where large, difficult to map populations occur, population extents are to be mapped and numbers estimated based on methods outlined in the current Flora Survey Guidelines - Protected Plants - <i>Nature Conservation Act</i> .	✓	✓
Vegetation communities	The Regional Ecosystems of the site should be identified and classified according to vegetation and land zone, the current Regulated Vegetation Management mapping. and extensive fieldwork undertaken. The survey should seek to verify the current Regional Ecosystem mapping. Collect data using quaternary points in accordance with the current version of "Methodology for survey and mapping of regional ecosystems and	✓	✓

	vegetation communities in Queensland”.		
	<p>Where anomalies are identified in regional ecosystem/vegetation mapping a revised map should be prepared along with the rationale for the changes. The current version of “Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland” identifies some of the appropriate approaches for mapping including secondary sites.</p> <p>Vegetation that is not mapped as remnant (category B) or regrowth (category C) must also be mapped. This may include unmapped regrowth or isolated remnant trees.</p>		✓
	Where the desktop assessment identifies the presence of Threatened Ecological Communities under the <i>Environment Protection and Biodiversity Conservation Act (Cth)</i> they are to be assessed in accordance with the current listing advice of each community.	✓	✓
Being present during topsoil stripping where subterranean species of reptiles or amphibians are present;	The presence and extent of locally significant vegetation communities are to be identified and mapped.	✓	✓
Waterways and wetlands	A description of the presence, condition, water quality, type and habitat values of water features including overland flows, floodplains, creeks, wetlands, groundwater dependent ecosystems, and aquatic ecosystems on the site (using photos upstream and downstream, creek profiles, description of vegetation present within the creek and wetlands as well as any state mapping). If wetlands are present, they are identified according to “Part B of the Queensland Wetland Definition and Delineation Guideline” (State of Queensland 2011)	✓	✓
Trees	<p>A tree survey is undertaken for all trees 100mm diameter and greater at breast height (DBH) on the site. The map and table are to outline the following:</p> <ul style="list-style-type: none"> • Tree identification number; • tree species (botanical and common names); • height (in metres); • Diameter at Breast Height (DBH) (in centimetres); • Tree Protection Zone (in accordance with The Australian Standard Protection of Trees on Development Sites AS 4970-2009); • condition/health; • evidence of fauna uses or habitat value including, scratch marks, hollows, nests, arboreal termitarium, dreys and scats; • where in mapped koala habitat, those trees regarded as non-juvenile koala habitat trees including species in the genera of <i>Angophora</i>, <i>Corymbia</i>, <i>Melaleuca</i>, <i>Lophostemon</i> or <i>Eucalyptus</i> genera (i.e. being 4m tall and greater or 10cm diameter and greater at 1.3m above the ground). <p>Trees on adjacent properties and road reserves that are likely to be impacted by the proposed development (e.g. by impacting Tree Protection Zones) must also be assessed.</p> <p>Trees are to be located by high precision (sub-centimetre) GPS or by the project surveyor.</p> <p>Where there are broad areas of trees where survey is impractical (e.g. in a retained ecological corridor) a reduced survey effort may be consented to by Council.</p>	✓	✓
Fauna	<p>All fauna assessments are to include:</p> <ul style="list-style-type: none"> • diurnal assessments; • tracks, scats, and other trace analysis; • some active searches for fauna in natural and artificial places such as stockpiles of vegetation, rocky outcrops, cracks in soil, bridges, 	✓	✓

	<p>concrete piles, tin on ground;</p> <ul style="list-style-type: none"> • opportunistic observations; • habitat assessments. 		
	<p>For detailed fauna surveys, a minimum of five days and four nights survey time is recommended to minimise any sampling duration influences within any given sampling period. At least one sampling site should be established in each habitat type.</p> <p>All surveys must be conducted consistent with the State's Terrestrial Vertebrate Fauna Survey Guidelines for Queensland 2018 and recommended survey guidelines for target wildlife listed under the <i>Environment Protection and Biodiversity Conservation Act (Cth)</i> (refer to the Species Profile and Threats Database for individual species). Targeting koala habitat assessment in known or predicted koala habitat, the Spot Assessment Technique or Koala Rapid Assessment Method are recommended.</p> <p>Specific methods may be required to target particular fauna species identified as potentially occurring within the study area, particularly EVNT-listed and significant species. Some vertebrates, e.g. amphibians, nomadic mammals and birds which have population cycles and movements that are more closely linked to stochastic events, e.g. heavy rainfall than to seasonal changes, will require targeted surveys after such events to enhance detectability.</p> <p>Many or, in some instances, all the specific techniques outlined in SC6.1 Appendix 3 are be utilised during the survey effort.</p> <p>Additional seasonal survey sampling may need to be undertaken for cryptic, migratory and/or seasonal species, which may occur on the site. This is recommended irrespectively where direct or secondary adverse effects are likely to be substantial.</p>		✓
	<p>Known or predicted breeding places are to be identified. For the purposes of this assessment, the definition of "breeding places" follows that provided in section 332 of the <i>Nature Conservation (Wildlife Management) Regulation 2006</i>. For species such as koala and native frogs, that do not use a habitual breeding place, the term 'breeding habitat' is used in lieu of 'breeding place'.</p> <p>Habitat features that are considered significant for assessing the presence of breeding places and/or habitation value for native fauna, include but are not limited to:</p> <ul style="list-style-type: none"> • presence of hollow-bearing trees: these may be used by birds, reptiles or arboreal mammals for the purpose or incubating or rearing offspring; • presence of bowers, nests, dreys, termitaria: birds or mammals commonly use these structures to incubate or rear offspring; • presence of caves, mounds, burrows, ground hollows, crack in soil and/or coarse woody debris: birds, mammals, reptiles or amphibians commonly use these structures to incubate or rear offspring; • presence of permanent water, ephemeral ponding, depressions and/or seasonally inundated areas: waterbodies may be used for breeding by aquatic species or amphibians, or may provide intermittent breeding habitat for opportunistic species; • presence of large trees: large trees can be a dominant feature of native vegetation and are difficult to replace once lost. Their influence for wide-ranging species can extend over a considerable distance from their location. 	✓	✓

SC6.1.7.3 Design and impact assessment

SC6.1.7.3.1 Informing the design

1. The results of the ecological assessment must inform the design of the development following the mitigation hierarchy. Specifically:
 - a. in the first instance the development design must consider how adverse effects can be avoided;
 - b. where impacts cannot be avoided, they should then be minimised;
 - c. the applicant should demonstrate how impacts on MES have been avoided and minimised.
2. Reference to the purpose, performance outcomes and acceptable outcomes of the Biodiversity overlay code will assist in informing the development design.
3. The design must consider potential direct impacts of the proposed development, especially vegetation clearing and adverse effects on significant species. The potential adverse effects should consider the design, construction, and operational phase of the development. Direct impacts can result from:
 - a. buildings and structures, including fences outbuildings and tanks;
 - b. roads;
 - c. clearing and earthworks footprint showing the extent of ground disturbance, clearing including cut and fill, trenching for infrastructure within the Tree Protection Zones of retained trees and significant vegetation;
 - d. asset protection zones;
 - e. infrastructure services (i.e. driveways, electricity, water, bores, dams, sewer or onsite effluent disposal areas, stormwater systems, telecommunications, easements, access, fences and fauna infrastructure);
 - f. exempt clearing areas (as defined under the *Planning Regulation 2017*).
4. Flying fox roosts must be retained in situ.
5. The analysis must also consider secondary adverse effects and maintenance of ecological processes including but not limited to:
 - a. changes to existing hydrological regimes (surface water and groundwater) that may affect groundwater dependant ecosystems;
 - b. changes in light that may affect nocturnal wildlife;
 - c. changes in the noise, odour, vibration and dust environment that may affect wildlife.
6. The assessment of potential adverse effects must consider the biological requirements of the flora and fauna species that are known or are likely to occur on the site. Adverse effects on fauna breeding places must be clearly identified.
7. Enhancement and maintenance of corridors must be addressed. This will include:
 - a. determining the minimum width of corridors. The width of the corridor is to be identified by a competent person who must consider at a minimum:
 - i. the mapped width of corridors in the overlay map;
 - ii. the ecological needs of wildlife known to or that are likely to move through the site. Reference should also be made to the State's Koala-Sensitive Design Guideline;
 - iii. the following design considerations:
 - A. the relative width to length of corridor. In some instances, a reduced width may be acceptable provided it is over a short distance;
 - B. preventing fragmentation and minimising edge effects;
 - C. reconstructing ecological corridors and widening existing ecological connections to support wildlife, including:
 - I. for links between vegetation 'islands' these should be a minimum of 50m wide unless threatened species are confirmed when the minimum should be 100m (see also to the State's koala-sensitive design guidelines);
 - II. for waterway corridors these should accord with riparian buffers (i.e. minimum 10m wide for stream orders 1-2; 25m wide for stream orders 3-4; and 50m wide for stream orders 5 and greater as measured from the defining banks on both sides of the waterway);
 - D. providing dense landscape buffer corridors to either side of the ecological corridor to minimise edge effects;
 - E. avoiding the creation of any additional exempt clearing rights within the corridor area including the establishment of new lot boundaries;
 - F. locating structures and infrastructure (e.g. services, fences, roads, pedestrian access and instream structures) outside the corridor area;
 - G. ensuring that buildings and accesses (pedestrian and vehicle) are setback as far as practicable from matters of environmental significance;
 - b. identifying the retention and enhancement of vegetation that contribute to steppingstone corridors.
 8. Areas of retained MES are to be protected in perpetuity. This may include protection by way of a registrable covenant, in community title under an appropriate management regime or a under voluntary declaration for the purposes of the *Vegetation Management Act 1999*. In some instances, Council may accept a dedication of the land as open space. Circumstances where this might be acceptable include where the land:
 - a. adjoins existing areas managed by Council as open space;
 - b. adjoins another area of conservation estate such as a National Park;
 - c. supports outstanding ecological values.

SC6.1.7.3.2 Identifying mitigation measures

1. After taking steps to avoid and minimise impacts on MES the design must then consider how adverse effects can be mitigated. Examples of mitigation include identification of:

- a. areas that should be buffered;
 - b. areas that should be fenced;
 - c. areas requiring ecological restoration;
 - d. appropriate lighting solutions that prevent or minimise light spill;
 - e. noise, odour, vibration and dust reduction strategies;
 - f. areas where habitats can be reconnected or where wildlife connectivity is to be maintained through the establishment of wildlife movement infrastructure.
2. Mitigation measures must form part of the design.
 3. Some mitigation measures must form part of supporting documentation (e.g. Ecological Restoration Plans).

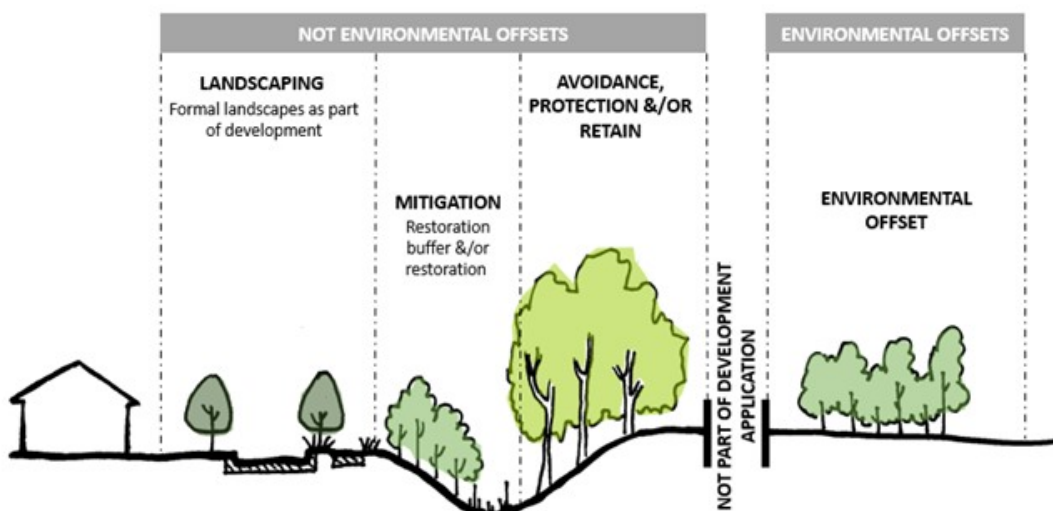
SC6.1.7.3.3 Assessing residual impacts

1. If the proposed development still results in adverse effects on MES following avoidance and mitigation then these adverse effects are considered 'residual impacts'.
2. Residual impacts on MES must be identified and categorised according to
 - a. Matters of National Environmental Significance (MNES);
 - b. Matters of State Environmental Significance (MSES);
 - c. Matters of Local Environmental Significance (MLES).
3. Where the residual impact is the unavoidable loss of MLES native vegetation (with the exception of flying fox roosts) then this is regarded as a 'significant residual impact' for the purpose of this policy.

SC6.1.7.3.4 Environmental offsets

1. Environmental offsets are designed to counterbalance unavoidable residual impacts on MES. An offset may be proposed where a development proposal causes significant residual impacts on MES. Offsets should be guided by and have a conservation outcome as defined by the *Environmental Offsets Act*.
2. Environmental offsets covered by this planning scheme policy only apply in instances where there is a significant residual impact on MLES. Where residual impacts occur on MNES or MSES they may require offsetting under other legislative frameworks.
3. Where a development is likely to require an environmental offset, it is strongly recommended that a pre-lodgement meeting is undertaken with Council prior to finalising the development application.
4. An environmental offset can be established on a development site, but it must be separate to other planting, restoration or protection measures established as part of the development. Figure SC6.1-2 below identifies what is not considered an environmental offset.

Figure SC6.1-2: Differences between landscaping restoration buffers and environmental offsets



5. Offsets should aim to result in long-term strategic conservation outcomes with net environmental benefits, including an increase in biodiversity and ecosystem values, ecological connectivity, improved sediment and erosion control, catchment functioning, and hydrological processes across the Lockyer Valley.
6. The developer may either deliver the offset themselves (proponent driven offset) or pay a financial contribution to the Lockyer Valley Regional Council (financial settlement offset) or a combination of both approaches. Council is to be consulted prior to settling on a delivery mechanism to discuss the most appropriate approach. (Note funds received by the Lockyer Valley Regional Council will be accumulated and spent strategically through possible purchase and protection of environmentally sensitive land, or offset restoration works and ongoing maintenance on existing Council land.)
7. Offsets must:
 - a. not replace or undermine existing environmental standards or regulatory requirements, or be used to allow development in areas otherwise prohibited through other legislation or policy;
 - b. result in a net environmental benefit to the Lockyer Valley Region.
8. Developer driven offsets:
 - a. have an impact ratio of 3:1 based on area of native vegetation impacted within and/or supporting MLES;
 - b. result in the enhancement of the environmental values of the offset receiving site to a greater extent than the loss of the environmental values from the impact site;
 - c. offset the impact of the development for the duration of the period that that impact occurs;
 - d. result in improved ecological connectivity (e.g. within a mapped ecological corridor);
 - e. must enhance biodiversity at a range of scales;
 - f. minimise the time lag between the impacts and the delivery of the offset;
 - g. consider the risks of delivering offsets through revegetation;
 - h. ensure the long-term viability and functionality of biodiversity;
 - i. protect the offset receiving site in perpetuity;
 - j. are provided on the same site as that on which the significant residual impact is occurring, or on a suitable offset receiving site. In the first instance, providing an environmental offset on the same site is preferred. If this is not achievable, the following hierarchy of preference is to be utilised to determine a suitable offset receiving site:
 - i. Within the boundaries of the local government area; AND
 - ii. on land which has the same or very similar pre-cleared regional ecosystem, underlying geology, soils, aspect, and drainage to re-establish the offset vegetation, as close as practical to the impact site and contiguous with areas of MES;
 - k. environmental offset receiving sites must become secure land managed for conservation purposes. It must be secured in perpetuity using a legally binding mechanism (e.g. environmental offset protection area, covenant, voluntary declaration etc);
 - l. environmental offset receiving sites (as defined by metes and bounds, not necessarily cadastral boundaries) must not be used for any other purpose other than for the environmental offset.
9. For financial settlement offsets the financial settlement for impacts to MLES values can be calculated using the Queensland Environmental Offsets Policy online offset calculator. For the 'Matter Group' choose 'Local Government Matter MLES 3'.
10. Documentation requirements for offsets, including management plans, are presented in section SC6.1.8.5 Environmental offsets.

SC6.1.7.4 Ecological assessment reporting

1. The purpose of an ecological assessment report is to:
 - a. describe the proposed development in the context of environmental adverse effects including impacts that are temporary, permanent, direct, and secondary;
 - b. present the outcomes of desktop and field surveys that have been undertaken within 24 months of the report being submitted to Council;
 - c. use maps and descriptions to show areas of combined ecological values as well as opportunities and constraints across the site;
 - d. demonstrate how the identification and location of ecological values has informed the development design process and has resulted in the best outcome for the ecological values on the site, including how the mitigation hierarchy (i.e. Avoid - Minimise - Mitigate - Offset) has been applied;
 - e. identify any residual impacts from the proposed development;
 - f. address any requirements of the relevant planning scheme.
2. The Basic and Detailed Ecological Assessment will be required to establish and describe the following as a minimum (Table SC6.1-3):

Table SC6.1-3: Contents of an ecological assessment report

SECTION	DETAIL	BASIC	DETAILED
1.0 Introduction			
1.1 Background	A brief background summary explaining the scope of the report	✓	✓

1.2 Site Description	Detailed description of the natural and physical environment of the site such as locality, landform, contours, geology, hydrology (surface and ground waters), air quality, noise, site contamination (where relevant to the impacts from the development), etc as well as how the site fits in a regional context. Current aerial photography at a scale to enable interpretation	✓	✓
1.3 Proposed Development	Full description of the proposed development including the nature and scale of development: a. development envelope areas; b. buildings and structures, including fences outbuildings and tanks; c. roads; d. infrastructure services (i.e. power, water, bores, dams, sewer or onsite effluent disposal areas, stormwater systems, telecommunications, driveways, easements, and accesses); e. proposed clearing; f. a plan of the proposed earthworks showing the extent of ground disturbance and clearing including cut and fill, trenching for infrastructure, and Tree Protection Zones of remaining vegetation; g. asset protection zones; h. other activities or infrastructure as appropriate.	✓	✓
1.4 Trigger for Field Ecological Assessment	A description of the values identified in the relevant Biodiversity overlay.	✓	✓
2.0 Methodology			
2.1 Author's Qualifications	The name and relevant professional qualifications of the person/s preparing the ecological assessment.	✓	✓
2.2 Desktop Review	Explanation of the desktop and literature review conducted for known and ecological values, including database searches listed but not limited to those listed in SC6.1 Appendix 2 Reference documentation.	✓	✓
2.3 Methods for Field Assessment	Including date, time, temperature, and weather conditions while the surveys were undertaken. Also include justification for the selected field survey methods and timing.	✓	✓
	Methods adopted for each element: a. flora; b. vegetation communities; c. waterways and wetlands; d. trees; e. fauna.	✓	✓
	Map(s) showing the location of all surveys conducted. All maps in the ecological assessment must include: a. a north point; b. a scale; c. suitable background information (e.g. aerial, cadastre) and labels as required so the location can be readily identifiable. Separate and more detailed maps will be required for accompanying management plans.	✓	✓
3.0 Results			
3.1 Desktop review	Results of the desktop assessment including maps and database searches for the site and as required for within 5-10km of the site boundary.	✓	✓
3.2 Error identification (where applicable)	Information that provides a supporting case for not addressing a relevant mapped feature or value, if applicable. For example, a mapping error where a feature is mapped on the site however it		

	<p>is obvious from the aerial photography or on ground assessments that the feature is not present in the mapped location. Written and photographic evidence is to be provided.</p> <p>Where there is a regional ecosystem mapping error, maps, photos, and the appropriate information as required for the Herbarium to make a mapping change is provided.</p> <p><i>Note—This part does not apply to vegetation that may have been cleared without the requisite permits/approvals.</i></p>	✓	✓
3.3 Results of Field Assessments			
3.3.1 Flora species	<p>A flora list should be established for the site that adequately samples all vegetation communities present. At a minimum, the species list must include the common name, scientific name and status (conservation status or pest status).</p> <p>Maps and photos showing location of these specimens. Also provide GIS data of GPS points.</p> <p><i>Note—A separate report may be required under State requirements in accordance with the Flora Survey Guidelines - Protected Plants prepared by Department of Environment and Science. If such a report is prepared it should be included as an appendix to the ecological assessment.</i></p>	✓ In part	✓
3.3.2 Vegetation communities	<p>Describe the vegetation types (including the use of photos) present across the site with regards to structure and floristics, including dominant communities and the site features they are concurrent with (such as topography, aspect, land zone or soils). Include maps showing their location mapped at a property scale (at a scale of 1:10,000 or better).</p> <p>Provide a map for and describe the vegetation communities (written and photographic) present on the site, including any incorrectly mapped areas. Include the <i>Vegetation Management Act</i> status, a short description and the area of each Regional Ecosystem type across the site.</p> <p>Describe and map any previous disturbance, the current land use/ management, significant weed infestations, pest disturbance, evidence of dry land salinity, erosion, and fire history (written and photographic).</p>		✓
3.3.3 Waterways and wetlands	Describe and map the presence, location and condition of wetlands.	✓	✓
3.3.4 Trees	<p>In some instances, it may be necessary to perform a tree survey to identify impacts and to describe where the proposed development is aiming to protect specific habitat trees, incorporate trees into landscaping, streetscaping or park areas, or protect trees.</p> <p>A separate map will be required as part of a Vegetation Management Plan in these instances.</p>	✓	✓
3.3.5 Fauna			
3.3.5.1 Fauna habitats	Description and photos of the various habitats within the site.	✓	✓
3.3.5.2 Habitat condition	Description of the habitat condition including previous disturbance, the current land use/ management, significant weed infestations, pest disturbance and fire history in relation to habitat, feeding and breeding resources for fauna (written and photos).	✓	✓
3.3.5.3 Fauna Species	A fauna list should be established for the site that adequately		

	<p>samples all habitat types of communities present. It is important to cater the survey methodology to the species and their habitat that are likely to be found on the site. Threatened species identified in the desktop assessment should be targeted. At a minimum, the species list must include the common name, scientific name, and status (conservation status or pest status).</p> <p>Maps showing location of these specimens. Also provide GIS data of GPS points. Photographic evidence of species found using camera traps or targeted surveys.</p>	<p>✓ In part</p>	<p>✓</p>
3.3.5.4 Fauna Breeding Places	<p>Show on a map and with photos (and provide GIS data of GPS points) all known or possible fauna breeding places. See tree survey requirements above.</p>	<p>✓</p>	<p>✓</p>
3.3.6 Connectivity	<p>Corridors will in part be identified as part of the desktop review with reference to overlay maps and aerial photography plus through field work.</p> <p>Location, alignment, and width of ecological corridors including regional, local and site based corridors are to be mapped. Stepping-stone corridors must also be considered. The degree to which a site contributes to corridor function must be discussed (some sites may be entirely located within a corridor).</p> <p>Consideration of corridor pinch points including existing and proposed road crossings.</p>	<p>✓</p>	<p>✓</p>
4.0 Design and impact assessment			
4.1 Combined Ecological Values/Opportunities and Constraints	<p>Supply an opportunities and constraints map combining the ecological values data from the results above. This map should show a continuum from the highest value ecological areas of the site to the lowest value ecological areas of the site.</p> <p>The assessment of impacts shall consider and describe the biological requirements of the flora and fauna species that have been recorded from the site or are considered likely to occur on the site, and the implications of the development on the viability of the species and the ecosystem.</p>	<p>✓</p>	<p>✓</p>
4.2 Response to Ecological Values	<p>How the development proposal considers the identified ecological values and ecological processes across the site. Important ecological values should be retained and, in some instances, buffered from the impacts of development. Buffers to wetlands and waterways should follow current best practice. Corridors and connections should allow for uninhibited fauna movement at both local and regional scales. Other necessary ecological processes must be considered (e.g. hydrological regimes that maintain groundwater dependent ecosystems).</p> <p>Measures to enhance ecological values and ecological processes, such as integration of ecological restoration and wildlife movement infrastructure, must be identified.</p> <p>The report must clearly identify how impacts (direct and secondary) ecological values have been:</p> <ol style="list-style-type: none"> a. avoided; b. minimised. 	<p>✓</p>	<p>✓</p>
4.3 Potential Impacts and recommended Mitigation Measures	<p>Describe the likely temporary and permanent impacts (both direct and secondary) on ecological values from the proposed development (both positive and negative).</p> <p>Mitigation measures to avoid or reduce the impacts of the proposed development and any proposals to enhance, restore</p>	<p>✓</p>	<p>✓</p>

	or revegetate the ecological values where appropriate, both during construction and once the development is complete. Management plans may be required to describe mitigation measures and are to be included as appendices.		
4.4 Residual Impacts	Describe the likely residual impacts of the proposed development on MNES, MSES and MLES. For MLES identify significant residual impacts following avoidance, minimisation and mitigation identified in the previous sections.	✓	✓
5.0 Environmental Offsets	Identify whether or not environmental offsets are required and if so the proposed approach. An offset management plan may be required.	✓	✓
6.0 Recommendations	Summarise proposed mitigation, offset measures and provide a list of recommendations pertaining to other necessary measures including by not limited to: a. the need for other approvals such as protected plant surveys and species management plans required under the <i>Nature Conservation Act</i> or referrals under the <i>Environment Protection and Biodiversity Conservation Act (Cth)</i> ; b. other aspects of the development application such as recommendations for species selection for street trees or detention basins.	✓	✓
7.0 Conclusions	Restate the scope of the report, summarise the key findings, potential impacts, and recommended mitigation measures.	✓	✓
8.0 References	List of documents referred to in the study	✓	✓
Appendices	As required but as a minimum should include: a. relevant reference material that has been relied on (e.g. online wildlife records); b. species lists; c. management plans (refer to SC6.1.8 Requirements for supporting documents). d. Response to Biodiversity overlay code.	✓	✓

SC6.1.8 Requirements for supporting documentation

SC6.1.8.1 Vegetation management plan

1. A vegetation management plan may be prepared as a report supported by a series of A3 plans or simply as a series of A3 plans provided requisite information is included.
2. Information to be included in the vegetation management plan:
 - a. a scaled tree survey map overlaid on the development layout (including proposed above and below ground infrastructure/services and earthworks), identifying the location of:
 - i. individual trees, ensuring each tree is numbered;
 - ii. those trees proposed for retention;
 - iii. those trees proposed for removal;
 - iv. tree protection zones, in accordance with AS 4970-2009 Protection of trees on development sites;
 - b. a table which includes:
 - i. the number for each tree identified on the tree survey map;
 - ii. height (in metres);
 - iii. Diameter at Breast Height (DBH) (in centimetres);
 - iv. Tree Protection Zone (in accordance with the Australian Standard Protection of Trees on Development Sites AS 4970-2009);
 - v. condition/health;
 - vi. evidence of fauna uses or habitat value including, scratch marks, hollows, nests, arboreal termitarium, dreys and scats;
 - vii. where in mapped koala habitat, those trees regarded as non-juvenile koala habitat trees including species in the genera of *Angophora*, *Corymbia*, *Melaleuca*, *Lophostemon* or *Eucalyptus* genera (i.e. being 4m tall and greater or 10cm diameter and greater at 1.3m above the ground);
 - viii. trees to be removed;
 - ix. trees to be retained;
 - c. any other supporting information provided by a qualified arborist.
 - d. methods for protecting retained vegetation during site works, construction and other site activities (e.g. in accordance with AS 4970 Protection of trees on development sites). Where the development will result in any encroachment into tree protection zones of trees to be retained, the tree survey plan is to be supported by an Arborist Report;
 - e. methods for vegetation clearing (including fauna management) noting any clearing of koala habitat trees must ensure the clearing is carried out in a way that complies with the sequential clearing conditions in Part 3 section 10 of the the Nature Conservation (Koala) Conservation Plan 2017;
 - f. methods for management of any restricted and invasive weeds present across the entire site prior to, during and after construction (not just the construction area).
 - g. construction practices to minimise impacts to wildlife through sequential clearing and allowing animals time to relocate. Instances where a wildlife spotter is to be involved with clearing activities must be identified including notes stating the vegetation management plan must be read in conjunction with the fauna management plan;
 - h. measures to prevent/control erosion during vegetation clearing works including links to soil management plans as required;
 - i. where vegetation is unavoidably cleared, methods of disposal and repurposing/salvage. Trunks can be used as ground habitat in retained areas, 'habitated' and installed as standing nesting opportunities, and branches can be similarly used with salvaged hollows and habitated branches installed in retained trees;
 - j. roles and responsibilities during works.

SC6.1.8.2 Fauna Management Plans

1. A fauna management plan may be prepared as a report supported by a series of A3 plans or simply as a series of A3 plans, provided requisite information is included.
2. A fauna management plan must identify in separate plans the measures required to manage fauna during construction works and mitigation measures to be established to support wildlife during operation.
3. A fauna management plan must link closely with any vegetation management plan and ecological restoration plan developed for the site and include, but is not limited to, the following items:
 - a. purpose and objective;
 - b. relevant legislation and standards;
 - c. reference to other relevant studies including notes stating the plan must be read in conjunction with the vegetation management plan and as needed, the ecological restoration plan;
 - d. roles and responsibilities;
 - e. a summary of species surveyed as using, or are likely to use the site identifying the following:
 - i. how these species may be currently using and or moving through the site;
 - ii. which of these are likely to be adversely impacted by works occurring in the development area;

- iii. how impacts are proposed to be mitigated;
- f. a scaled map showing existing habitat values overlaid on the development layout (including proposed above and below ground infrastructure/services and earthworks), identifying the location of important habitat (e.g. particular vegetation communities and/or movement corridors) and habitat features (e.g. hollow-bearing trees, wetlands);
- g. the plan should be structured to consider individual impacts during the construction and operational phases along with targeted mitigation measures. Responsibilities and timing for each must be identified. **Table SC6.1-4** provides examples of likely impacts and potential mitigation measures;
- h. a schedule of meetings, including pre-starts, and reporting;
- i. a monitoring plan and schedule;
- j. a plan for corrective actions/treatments;
- k. evaluation and review.

Table SC6.1-4: Fauna management plan mitigation measures

Phase	Impact	Management/mitigation measure	Responsibility	Timing
Construction	Including but not limited to: <ul style="list-style-type: none"> • clearing and ground disturbance; • deliberate interference with animals; • traffic or interactions with vehicles; • noise and vibration; • light; • dust; • vibration; • odour; • pollution; • erosion; • changes to hydrology; • introduced flora and fauna, including dogs onsite during construction; • fire; • hydrocarbon and chemical spills; • inadequate waste management; • dewatering. 	Examples include: <ul style="list-style-type: none"> • referencing specific elements of the vegetation management plan; • specific management procedures for potential or known habitat trees and fauna breeding places; • details of Spotter Catcher roles and responsibilities, contacts, and certification. At a minimum spotter catchers must: <ul style="list-style-type: none"> ◊ undertake pre-clearing inspections and provide a pre-clear report to Council; ◊ advise contractors when it is appropriate to commence works; ◊ be available for pre-start meeting with Council if required; ◊ be present during topsoil stripping where subterranean species of reptiles or amphibians are likely present; ◊ assess and possibly attend mulching or moving of stockpiled vegetation; ◊ clearly marking (flagging) vegetation containing fauna or fauna habitat and visually and verbally communicating such information to the tree feller to ensure flagged trees are not felled until authorised and instructed to by the Fauna Spotter; ◊ keep and submit requisite records and reports; ◊ submit post-clearing report to Council. • clearing procedures in accordance with the sequential clearing conditions in Part 3 section 10 of the Nature Conservation (Koala) Conservation Plan 2017 and a Species Management Program (SMP) approved by DES (where applicable). • a directional clearing plan. • a temporary fauna exclusion fencing plan to reduce possibility of wildlife interactions with vehicles on roads • prohibit dogs onsite during construction. 		
Operation	Including but not limited to: <ul style="list-style-type: none"> • limiting wildlife movement opportunities in hostile environments; • impacts of domestic animals; • impacts from vehicles; • impacts associated with lighting, noise, odour, vibration and dust management; • soil erosion and sediment control; • stormwater runoff. 	Examples include: <ul style="list-style-type: none"> • wildlife movement infrastructure; • fauna friendly and exclusion fencing; • underpasses or overpasses fencing; • directional fencing; • traffic calming devices; • signage; • wildlife sensitive lighting; • installation of artificial hollows; • dog and cat curfews; • consideration of breeding requirements of wildlife (e.g. halting certain development activities during breeding events); • co-locating new infrastructure networks. 		

SC6.1.8.3 Ecological restoration plans

1. Ecological restoration may be required for multiple reasons such as:
 - a. creating a buffer zone between a development and a significant ecological value;
 - b. restoring a riparian area or wetland;
 - c. enhancing areas of retained vegetation communities / habitat;
 - d. reducing edge effects and edge to area ratios;
 - e. reinstating an ecological corridor.
2. Depending on the level of existing native vegetation cover, weed extent and natural capacity for the site to regenerate (i.e. its 'resilience') different approaches to ecological restoration may be required. The Southeast Queensland Ecological

Restoration Framework identifies the following approaches to ecological restoration:

- a. Natural regeneration - where resilience is intact and recovery is automatic with the removal of the cause of the damage;
 - b. Assisted natural regeneration - where degrees of resilience exist and “triggering” interventions (either disturbance or resource provision) can affect recovery by natural regeneration;
 - c. Reconstruction - where resilience is depleted, and abiotic or biotic elements need wholesale importation or major amendment before recovery can commence;
 - d. Fabrication - where conditions are permanently changed and better-adapted local systems can be regenerated or constructed to restore integrity to the landscape.
3. In most instances development projects will require the use of Assisted natural regeneration (e.g. where weed removal is required from the understorey of a forest) or Reconstruction (e.g. where a riparian corridor requires planting). Fabrication will occasionally be required (e.g. on a fill batter that buffers a cropping area). Multiple approaches may be required for a single project.
 4. For Assisted natural regeneration and Reconstruction projects it will be necessary to aim for the establishment of the pre-clearing regional ecosystem for the location. SC6.1 Appendix 1 Regional Ecosystem Species Lists includes species lists for the regional ecosystems of the region.
 5. Fundamental to any ecological restoration project is to establish a clear aim for the entire project and/or for particular restoration zones. The aim guides the approach and objectives/quantifiable performance indicators. Table SC6.1-5 presents an example of how this may be structured is presented below (noting the Performance Indicators are Council’s minimum acceptable standard).

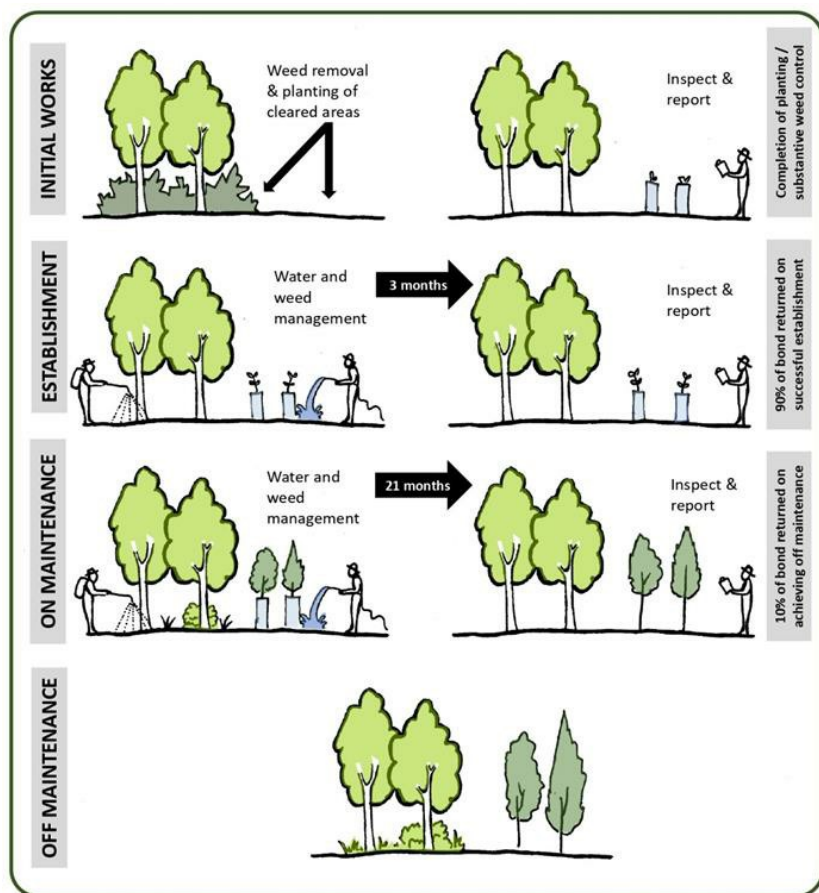
Table SC6.1-5: Example aims and objectives and minimum acceptable performance indicators

Aim	Objective	Performance indicators
Reinstate self-sustaining native vegetation.	Establish species and structure consistent with regional ecosystem 12.3.3 within the mapped riparian area.	<ul style="list-style-type: none"> • <i>Biosecurity Act</i> listed weeds are to be absent or controlled (90% removal) after 12 months, and absent after 24 months; • Environmental weeds are to be absent or controlled (50% removal) after 12 months, and absent or controlled (75% removal) after 24 months; • Plant survival and plant density — replace mortalities as required to maintain 90% survival rate after 3 months and in perpetuity; • Erosion and sediment control/mulching — maintain an 80% ground cover across the rehabilitation at completion of initial works and in perpetuity. This can include established grass, ground cover plants, mulch or jute matting; • Nest boxes are correctly installed in accordance with “Nest boxes for wildlife, a practical guide by Alan and Stacy Franks”; • All revegetation works are to be conducted in accordance with: Chenoweth EPLA and Bushland Restoration Services (2012) South East Queensland Ecological Restoration Framework: Manual.

6. Once a clear understanding of project aims and objectives are established an ecological restoration plan can be prepared.
7. An ecological restoration plan may be prepared as a report supported by a series of A3 plans, or simply as a series of A3 plans provided requisite information is included.
8. An ecological restoration plan must contain the following as a minimum:
 - a. the objective of the restoration (e.g. restore to the pre-clear regional ecosystem, restore koala habitat, improve connectivity);
 - b. site overview/background;
 - c. a scaled map showing the different management zones with respect to the proposed development layout in addition to access trails, asset protection zones and bushfire management lines (if required);
 - d. the ecological restoration approach for each management zone in accordance with the Chenoweth EPLA and Bushland Restoration Services (2012) South East Queensland Ecological Restoration Framework: Manual;
 - e. performance criteria that, at a minimum, accord with Council’s minimal performance indicators;
 - f. the steps and timing required for each management zone including:
 - i. site preparation;
 - ii. weed management;
 - iii. earthworks (if required);
 - iv. sediment and erosion control;
 - v. planting;
 - vi. maintenance;
 - g. if planting is required, the:
 - i. plant specifications including:
 - A. plant schedule;
 - B. species;
 - C. densities and quantities;
 - D. locally sourced seed stock;
 - E. sun hardened;
 - F. pot size;
 - ii. the planting method including:
 - A. excavation;

- B. soil conditioning;
 - C. planting method;
 - D. fertilisers;
 - E. mulch or other weed suppressant methods including Jute mats;
 - F. tree protection (tree guards);
 - G. initial watering regime.
- h. where ecological restoration areas are located within mapped medium, high or very high potential bushfire intensity areas or the mapped potential impact buffer, they are restored in a manner that maintains or reduces the existing fuel load;
- i. a maintenance schedule for a total of 2-years including necessary tasks such as watering, weed management and replacement plantings;
- j. required qualifications of restoration contractor;
- k. details of proposed legal security mechanisms for preserving and enhancing retained or rehabilitated vegetation (e.g., a vegetation protection covenant), including a plan showing the location and a description of the activities that are proposed to be permissible and prohibited in these areas;
- l. priced bill of quantities for the ecological restoration (itemised for the works, 3-month establishment period and 2-year on-maintenance period).
9. Reporting and inspection schedule (see Figure SC6.1-3):
- a. notify Council when all plants have been planted or, where planting is not required, following substantive control of weeds. Upon acceptance, a 3-month 'establishment period' commences.
 - b. an inspection and report will be required by a competent person with experience in ecological restoration to determine whether works have been completed to such a standard (i.e. meeting performance criteria) that they can be accepted 'on maintenance'. Certification by the competent person to be submitted to Council. Upon acceptance the on maintenance period commences.
 - c. an inspection and report by a competent person with experience in ecological restoration will be required after 21-months from the commencement of the 'on maintenance' period to ensure rehabilitation performance criteria have been met. Certification by the competent person to be submitted to Council. Upon acceptance the works will be accepted off maintenance.
10. Ecological restoration works are to be subject to a performance bond (see Figure SC6.1-3: Maintenance for restoration works):
- a. where the bond value is set at 150% of the total priced bill of quantities;
 - b. bonding is to be in the form of a Bank Guarantee in a form acceptable to Council. Amongst other matters the Bank Guarantee must comply with the following:
 - i. Council's policies in relation to credit risk;
 - ii. detail the name of the customer/applicant;
 - iii. for reasons of practicality, two separate Bank Guarantees may be required, one set at 90% of the bond value ('Incomplete works') and the other at 10% ('maintenance bond');
 - c. where works are accepted 'on maintenance' by Council all, or part, of the 'Incomplete works' component of the bond will be reinstated;
 - d. latent defects reported to Council by the competent person three months prior to the end of the maintenance period must be promptly rectified to enable the ecological restoration works to be accepted 'off maintenance'.

Figure SC6.1-3: Maintenance for restoration works



11. Specific requirements for particular circumstances are tabulated below:

Table SC6.1-6: Specific requirements for restoring waterways and wetlands

Waterways	Wetlands
<p>1. To improve waterways and minimise impacts from development the following minimum widths of ecological restoration are required on both sides of a waterway as measured from the defining banks:</p> <ul style="list-style-type: none"> • 10m wide for stream orders 1-2; • 25m wide for stream orders 3-4; • 50m wide for stream orders 5 and greater. <p>2. Fences are located along the outer edge of restoration to control access to the restored area. Fixed watering locations are provided for stock. Creek crossings may use laydown fences or gates.</p>	<p>1. To improve wetlands and minimise impacts from development, restoration planting is a minimum width of 50m from the outer edge of open water for seasonally inundated wetlands or for all other wetlands, the outer edge of groundwater dependant vegetation;</p> <p>Outer extent of wet season inundation 50m</p> <p>2. Where a wetland is a riverine wetland, the above wetland requirements apply, and a minimum 75% riparian shade cover is achieved across the waterway within 10 years of restoration;</p> <p>3. Fences are located along the outer edge of restoration to control access to the restored area.</p>

SC6.1.8.4 Pest management plan

1. Where not adequately covered by an ecological restoration plan (e.g. if pest animals are present; or if pest plants are to be controlled in the absence of an ecological restoration plan) a pest management plan may be required.
2. The pest management plan is to include:

- a. an assessment of the current level of pest occurrence;
 - b. treatment schedule for identified all pest plants, ensuring those scheduled under the *Biosecurity Act 2014* are removed/treated appropriately prior to removing trees or conducting any earthworks on the site.
3. Where necessary, a treatment schedule is to be provided for identified pest animals including necessary fencing to exclude pests from significant habitat, restoration areas and/or environmental offsets.
 4. Steps must be identified to prevent the spread of fire ants. Refer to the National Fire Ant Eradication Program website for contemporary information pertaining to fire ant management requirements.
 5. Weed treatment approaches may include mechanical and/or chemical methods. For both methods, the following must be considered:
 - a. weed management includes strategies that prevent erosion occurring because of soil exposure;
 - b. weed management includes strategies to prevent 'off target' impacts;
 - c. exclude chemical use in riparian areas unless where specified by the approved product label or the safety and use conditions specified by the Australian Pesticides and Veterinary Medicines Authority;
 - d. exclude root-absorbed broad-spectrum or residual herbicides.

SC6.1.8.5 Environmental offsets

SC6.1.8.5.1 Documentation

1. The applicant must submit an Offset Delivery Form 1 - Notice of Election and any other associated forms relevant to the offset delivery approach chosen prior to commencement of any works that impact on the offset matter in accordance with section 18 of the *Environmental Offsets Act*. Refer to the Queensland Government's website for the location of all forms associated with environmental offsets.
2. If a developer driven (land-based) offset or a combined land-based/financial settlement offset option is chosen, the proponent must prepare an offset delivery plan in accordance with section 18 of the in *Environmental Offsets Act* and the latest version of the Queensland Offsets Policy.
3. Upon agreement between Council and the developer about the developer's planned delivery of the offset (and within 40 business days after receiving the notice of election), Council will issue an Agreed Delivery Arrangement in accordance with sections 19 and 19A of the *Environmental Offsets Act 2014*. This agreement forms a contract between the parties and details the delivery of the offset. The developer is to enter into an agreed delivery arrangement with Council prior to commencement of any works that impact on the offset matter in accordance with section 19B of the *Environmental Offsets Act*.
4. A legally binding mechanism must be in place over the receiving site within 12 months of clearing works occurring on the impact site.

SC6.1.8.5.2 Environmental offset management plans

1. The offset delivery plan in accordance with section 18 of the in *Environmental Offsets Act* and the latest version of the Queensland Offsets Policy may provide sufficient detail to act as the environmental offset management plan. Council will identify whether the developer is to prepare a separate report to fulfil the requirements of the environmental offset management plan following receipt of the offset delivery plan.
2. Environmental offsets may require ecological restoration and/or pest management. Where ecological restoration and/or pest management is required, the approaches outlined in SC6.1.8.3 and SC6.1.8.4 are to be adopted for the environmental offset management plan.
3. The offset management plan must also integrate bushfire management planning in accordance with Planning Scheme Policy SC6.2 Bushfire management plan.
4. However, owing to the uncertainty and risks associated with delivering environmental offsets the offset site must be managed/maintained for a period of 5 years. The performance bond for ecological restoration works will cover this period with reimbursement milestones identified by Council prior to commencement according to the level of risk associated with the specific offset.
5. The environmental offset management plan is to be structured as follows:
 - a. a description of the background to the environmental offset including a description of the impact site, its ecological values, how the mitigation hierarchy was observed and how offsets have been calculated for the offset site;
 - b. a description of the site including lot on plan and an appropriately scaled map showing offset areas;
 - c. a description of the method of legal protection;
 - d. a summary of key dates/timelines including when management works is to commence, the duration of works and when works will cease being maintained by the applicant;
 - e. a description of management measures incorporating relevant plans as appendices including:
 - i. ecological restoration;
 - ii. pest management;
 - iii. bushfire management.
6. Reporting associated with the following milestones:
 - a. at completion of planting;

- b. quarterly for the first 12-months;
- c. annually thereafter;
- d. a final assessment at the end of the five-year period.

SC6.1.8.6 Covenant management plan

1. A covenant management plan will be required by Council where land is to be legally secured by way of a statutory covenant under the *Land Title Act 1994*.
2. The covenant management plan must identify and map the location of ecological values with respect to the covenant and cadastral boundaries. The location of any targeted ecological restoration works, fencing or other management measures pertaining to the covenant must also be mapped.
3. The covenant management plan must state the activities not permitted in the covenant area. At a minimum this must include a statement noting the following activities are not permitted:
 - a. harm or cause harm to any native animal;
 - b. restrict any native animal from accessing the covenant area;
 - c. remove any native plants or native animals from the covenant area except where the maintenance of weeds is required;
 - d. damage any native plants;
 - e. pollute the covenant area;
 - f. plant or grow non-native plants in the covenant area;
 - g. conduct burning off, application of herbicide or other chemical or any other process in the covenant area which might adversely affect native plants or native animals;
 - h. allow or permit entry in the covenant area of any domestic animal that may harm or interfere with native animals or adversely affect native plants;
 - i. use motorised vehicles, including motor bikes, within the covenant area (unless required for management purposes);
 - j. construct, create or path any path, road or access way;
 - k. carry out any works, construction, or build anything in the covenant area including but not limited to buildings, swimming pools, tennis courts, retaining walls, car-parking, waste disposal areas, excavations, foundations, filling, paving and services;
 - l. carry out any process which may cause erosion.
4. Where the covenant is required for the purpose of legally securing an environmental offset, then the environmental offset management plan is to be included as an appendix to the covenant management plan.
5. Where the covenant is required for the purpose of legally securing an area other than an environmental offset, then the following must be included:
 - a. a summary of key dates/timelines including when management works is to commence, the duration of works and when works will cease being maintained by the applicant;
 - b. a description of management measures incorporating relevant plans as appendices including:
 - i. ecological restoration;
 - ii. pest management;
 - iii. bushfire management.

SC6.1 Appendix 1: Regional ecosystem species lists

See Council's revegetation species list on Councils' website.

SC6.1 Appendix 2: Reference documentation

REFERENCES	ECOLOGICAL ASSESSMENTS				MANAGEMENT PLANS					
	Flora	Fauna	Vegetation communities	Design & Impact assessment	Vegetation MP	Fauna MP	Pest MP	Ecological Restoration Plans	Environmental Offset MP	Covenant MP
AS 4970 Australian Standard Protection of Trees on Development Sites	✓			✓	✓					✓
Bavins, M., Couchman, D. and Beumer, J. (2000) Fisheries Guidelines for <i>Fish Habitat Buffer Zones</i> , Department of Primary Industries, Queensland, Fish Habitat Guideline FHG 003, 37 pp.				✓	✓	✓		✓		✓
Calvert, M. (2014) <i>Spatial Pest Attributes Standard Queensland, Invasive Plants and Animals</i> , Biosecurity Queensland, Department of Agriculture, Fisheries and Forestry.	✓				✓		✓	✓	✓	✓
Challen, S. and Long, P. (2004) <i>Fisheries Guidelines for Managing Ponged Pastures</i> , Department of Primary Industries, Queensland, Fish Habitat Guideline FHG 005, pp 27.				✓		✓	✓			
Chenoweth EPLA and Bushland Restoration Services (2012) <i>South East Queensland Ecological Restoration Framework: Code of Practice</i> . Prepared on behalf of SEQ Catchments and South East Queensland Local Governments, Brisbane.				✓				✓		
Chenoweth EPLA and Bushland Restoration Services (2012) <i>South East Queensland Ecological Restoration Framework: Manual</i> . Prepared on behalf of SEQ Catchments and South East Queensland Local Governments, Brisbane.				✓				✓		
Commonwealth of Australia (2020) <i>National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds</i> , Canberra.				✓		✓				✓
Department of Environment and Heritage Protection, Queensland Government. <i>Guideline: Developing a species management program</i> .				✓		✓				
Department of Environment and Resource Management (2011) <i>Queensland Wetland Buffer Planning Guideline</i> , 54 pp, Queensland Wetlands Program, Brisbane Queensland.				✓	✓	✓		✓		✓
Doerr, V, Doerr, E & Davies, V (2010), <i>Does Structural Connectivity Facilitate Dispersal of Native Species in Australia's Fragmented Terrestrial Landscapes?</i> Collaboration for Environmental Evidence Systematic Review no. 44, CEE, Bangor, Wales.				✓				✓	✓	

Eyre TJ, Ferguson DJ, Hourigan CL, Smith GC, Mathieson MT, Kelly, AL, Venz MF, Hogan, LD & Rowland, J. (2018) <i>Terrestrial Vertebrate Fauna Survey Assessment Guidelines for Queensland</i> . Department of Environment and Science, Queensland Government, Brisbane		✓								
Hilty, JA, Lidicker, WZ & Merenlender, AM (2006), <i>Corridor Ecology: the science and practice of linking landscapes for biodiversity conservation</i> , Island Press, Washington DC.				✓				✓	✓	
Long, K and Robley, A (2004). <i>Cost Effective Feral Animal Exclusion Fencing for Areas of High Conservation Value in Australia</i> .				✓			✓			
Mackey, B, Watson, J & Worboys, G (2010), <i>Connectivity Conservation and the Great Eastern Ranges Corridor, Independent report to the Interstate Agency Working Group (Alps to Atherton Connectivity Conservation Working Group)</i> , Department for Environment, Climate Change and Water, Canberra.				✓						✓
Markwell, K and Breen, P. (2010) <i>Waterway and Channel Rehabilitation Guidelines</i> , Ipswich City Council, Ipswich				✓				✓		
National Recovery Plans and listing advice for species and threatened ecological communities including but not limited to: a. Koala b. Brigalow c. Bats/Grey headed flying foxes	✓	✓	✓	✓	✓	✓		✓	✓	✓
National standards for the practice of ecological restoration in Australia.				✓				✓		
National Threat abatement plans including for invasive ants.				✓			✓			✓
Neldner, V.J., Wilson, B.A., Dillewaard, H.A., Ryan, T.S., Butler, D.W., McDonald, W.J.F, Addicott, E.P. and Appelman, C.N. (2020) <i>Methodology for survey and mapping of regional ecosystems and vegetation communities in Queensland</i> , Queensland Herbarium, Queensland Department of Environment and Science, Brisbane.			✓							
Queensland Department of Environment and Heritage Protection (2020) <i>Koala-sensitive Design Guideline: A guide to koala-sensitive design measure for planning and development activities</i> , Queensland Government, Brisbane.				✓		✓		✓		
Queensland Department of Environment and Resource Management (2011) <i>Queensland Wetland Definition and Delineation Guideline</i> ,				✓						

Queensland Government, Brisbane.										
Queensland Department of Environment and Science (2020) <i>Flora Survey Guidelines - Protected Plants</i> , Queensland Government, Brisbane	✓									
Queensland Department of Environment and Science (2020) <i>Information Sheet, Species Management Program, Requirements for tampering with a protected animal breeding place in Queensland</i> , Queensland Government, Brisbane				✓		✓				
Queensland Department of Transport and Main Roads (2024) <i>Fauna Sensitive Transport Infrastructure Delivery manual</i> , Queensland Department of Transport and Main Roads, Planning, Design and Environment Division, Brisbane.				✓		✓		✓		
SEQ Catchments & Hampson, R (2014) <i>South East Queensland Land Types Booklet — Lockyer Catchment Version 2</i> , SEQ Catchments, Brisbane.			✓							
Links to the following resources may be found at Useful wildlife resources: <ul style="list-style-type: none"> • Aquatic Conservation Assessments (ACA) and AquaBaMMs • Atlas of Living Australia • Australia's Virtual Herbarium • Australian Species profile and threats database • Biodiversity planning assessments • Biomaps • BirdLife Australia • Census of Queensland flora • Conservation status of Queensland wildlife • Environmental reports online • Generalised distribution and densities of Queensland wildlife • Habitat suitability models series • MapsOnline API • Modelled potential habitat for selected threatened species in Queensland • Online Zoological Collections of Australian Museums • Queensland Confidential Species • Queensland Herbarium specimen data - HerbreCs • Queensland Museum data • Queensland wildlife data API • Regrowth benefits indicative map • Search regional ecosystems descriptions • Species lists • Species profile search • WetlandMaps • WetlandSummary—facts and maps • WildNet wildlife records 	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

SC6.1 Appendix 3: Fauna survey techniques

SURVEY TECHNIQUE	METHODS	MINIMUM DURATION
Diurnal Search	<p>Two x 30 minute searches within two different 50 x 50 metre quadrants of the survey area. This involves intensive investigation of streams, ground layer (under logs, rocks and leaf litter, cracks in soil), low vegetation (under bark and in tree stumps) and caves for target invertebrates and all amphibians, reptiles, bats and other evidence of habitation, e.g. scats, owl pellets, remains and tracks.</p> <p>Animal Ethics (AE) consideration - Where rocks or logs are lifted to check for fauna, they are replaced as found with minimal disturbance of fauna.</p>	1-2hr/day during the middle of the day for each community
Pitfall Traps	<p>A pitfall trap line should contain a minimum of 2 buckets (20L containers) at 7.5m intervals and appropriate drift fencing (30-40 cm high). At least one pitfall trap line for each habitat type or community.</p> <p>AE considerations - Pitfall traps should be cleared early morning and late afternoon. Adequate moisture and litter and a float must be provided in pitfall traps. Pitfall traps should be decommissioned if forecast to flood.</p>	Four nights
Opportunistic Records	Covers all fauna outside the systematic survey times.	None
Funnel Traps	A minimum of 6 funnels should be placed along alternate sides of drift fence usually between a pitfall array. AE consideration — Funnel traps should be covered with leaf litter or other insulating material to minimise exposure to heat or cold.	Four nights
Spotlighting	<p>Two 30 minute surveys using a combination of high-powered spotlights and head torches to be carried out on foot only. This method surveys nocturnal fauna within a 100x100m survey area.</p> <p>AE consideration - During nocturnal surveys, care will be taken to ensure that spotlighting does not disorientate or frighten fauna. Appropriate red filters or infrared beams should be used for prolonged observation periods.</p>	Two nights
Elliot Traps	<p>The Elliot transects should comprise of approximately 20 Elliots at 5-10 metre intervals) positioned in a T configuration. At least one Elliot transect for each habitat type or vegetation community</p> <p>AE considerations - Elliott traps should be checked every six hours to minimise stress caused to individuals and well covered with leaf litter or other insulating material to minimise exposure to heat or cold.</p> <p>Specimens should be released into appropriate habitat features to prevent predation from other fauna.</p> <p>Time spent handling animals must be minimised to reduce stress or mortality or potential for myopathy.</p> <p>Care should be taken when handling marsupials with advanced pouch young which are prone to ejecting young when under stress.</p> <p>Lactating females may also need to return to feed young.</p>	Four nights
Wire Cage (possum) and Arboreal Traps	<p>One wire cage trap per site open for four nights and up to 5 platform mounted arboreal traps which are secured to selected trees.</p> <p>AE consideration - Cage traps should be covered to reduce stress to captured animals.</p>	Four nights
Bird Surveys	Six 5-10 minute area searches within 100 x 100 metre survey site or a transect search where 100m transect is walked with 5-10 minutes spent at each transect. Birds are recorded indicating method of identification	1hr a day and night

	(i.e. call or visual observation). Surveys are conducted for 1 hour from dawn to early morning, 1 hour at dusk to early evening and 1 hour during night for nocturnal species.	
Call Playback	<p>This technique uses call playback to determine the presence of species that may be difficult to detect visually (e.g. owls and frogs).</p> <p>For amphibians — Two sessions of call playback to simulate calling activity of breeding males. Usually crepuscular survey carried out for 15-30 minutes over 1-2 nights.</p> <p>AE consideration - Overuse of mimicry calls should be avoided</p>	1-2 nights
Ultrasonic bat Call Detectors	<p>Echolocation call detectors that record the ultrasonic calls of microchiropteran bats should be deployed over 3-4 nights and programmed to record continuously from sunset to sunrise. Detectors should be placed on the edge of flyways through vegetation, approximately 1-1.5m above ground level. Data can be recorded in full spectrum or memory efficient zero crossing formats depending on level of analysis required. The call sonograms are compared with those of reference calls from southern Queensland and/or with published call descriptions (Reinhold et al. 2001; Pennay et al. 2004) using a range of acoustic analysis software. Reporting should follow the Australasian Bat Society standards for the interpretation and reporting of bat call data (Reardon 2003). Species nomenclature should follow van Dyck et al. (2013) unless otherwise specified.</p>	3-4 nights
Harp Traps and Mist Nets	<p>For the capture of micro chiropteran bats. One harp trap or mist net per site open for two to four nights.</p> <p>Mist nets are ideal for catching bats over isolated and/or shallow waterbodies such as water tanks and watercourses and other open habitats. Mist nets are set for 3-4 hours after sunset and must be monitored constantly. Only contractors and their employees that have obtained an Australian bat lyssavirus vaccination and/or have maintained adequate titre levels against Australian Bat Lyssavirus will be responsible for handling bats. In the case of a scratch or bite, contractors or employees will follow the C3 bat protocol that involves wound washing; application of antiseptic solution; and follow up medical attention (Qld Health 2010).</p> <p>AE considerations - Harp traps should be checked every two hours to minimise stress caused to individuals. Harp traps will be cleared and closed at least 2 hours before daylight so that microbats are not housed during the day. All bats will be released at the capture site. Extreme caution should be exercised at times of the year when females are likely to be heavily pregnant or carrying young as they may become dislodged. The mist nets must not be used to capture bats at the entrance of caves or mines unless there is some prior knowledge of the number of bats within, and the number is not large.</p>	2-4 nights
Hair Tubes	<p>Different sizes of hair tubes should be left on site for a minimum of four nights and up to two weeks as an additional method of mammal detection. Recommended for targeted surveys of cryptic small to medium sized mammals (e.g. quolls).</p>	4-14 days
Scats, Tracks and Feed marks	<p>Evidence of fauna can be determined from scats, tracks, scratches, bones, or feed marks. Scat and sign search can coincide with the systematic diurnal active searches. Targeting Koala habitat assessment in known or predicted koala habitat (the Spot Assessment Technique or Koala Rapid Assessment Method are recommended)</p>	Coincidental
Camera Traps	<p>This method involves the setting of baited camera traps for the purposes of recording species as they move into a specific area.</p> <p>Remote camera traps are deployed, and GPS marked with two or three cameras per sampling location.</p>	Over 4-14 days

	<p>Camera traps are set for a minimum of 4 days per survey event with one visit per week of deployment to refresh baits.</p> <p>Camera traps are baited with either a chicken frame or a combination of peanut butter and oats or a few drops of truffle oil which act as a fauna attractant.</p> <p>In areas of dense vegetation, the vegetation between the camera and bait should be cleared by hand to increase the field of view and minimise the chance of wind-blown vegetation triggering the sensor.</p> <p>AE consideration - Wire used to tie chicken carcasses will be tied tightly and coiled at the ends to avoid eye injuries to approaching fauna.</p>	
Automated Acoustic Recording	Automatic recording devices allow acoustic surveys for extended periods of time and are useful to detect specific acoustically conspicuous species, particularly in combination with species recognition algorithms and expert listeners. Any automatic recording design needs to be specifically adapted to optimise detection of the target species (or group) in its habitat.	Unspecified
Thermal Infrared Imaging of Nocturnal Fauna	Thermal imaging provides an effective, non-invasive method for the survey of nocturnal fauna for which there is enough contrast in temperatures, such as bats and birds against a cooler night sky. Because of their high cost and the level of technical expertise required, thermal imaging cameras are best employed for surveys of targeted species or for specialised investigations (e.g. behaviour of nocturnal fauna around an impact).	As required to achieve purpose of survey
Aquatic Bait Trap or netting	<p>Various methods of aquatic surveying should be undertaken where there is a water body on the subject site.</p> <p>Fish or tadpole or aquatic invertebrate sampling with hand dip net should be carried out over 30 minutes to 2 hours depending on size of waterbody. Involves sampling using 5-10mm dip net for fish or tadpoles or 0.5um net for invertebrates, and multiple sweeps across various micro-habitats (e.g. pool or riffle) present.</p> <p>AE consideration - All fauna should be released unharmed.</p>	To be undertaken when water body is present on site
Other contemporary sampling methods	e.g. fauna detection dogs, drones	To be determined in consultation with Council