



Biodiversity, Riparian Corridors & Bushfire Protection Assessment

Scope of Work

A significant amount of technical analysis has been prepared in recent years to investigate the development potential and constraints of the proposed Ingleside Release Area. The Precinct Working Group (PWG) is currently undertaking a gap analysis to confirm those elements of the previous work that are still valid and those areas where further investigation is required. Whilst not currently complete, it is envisaged that the gap analysis report will be available for review once the successful contractor is engaged to undertake this project.

Given the uncertainty of the gap analysis, the Department requires the successful contractor to undertake an initial scoping stage where the final detailed scope of works will be discussed and agreed with the PWG. The gap analysis will be undertaken with reference to the Detailed Scope of Works outlined at Stage 2 below.

Stage 1 – Initial Scoping Stage

The initial scoping stage will require the successful contractor to:

- meet with the PWG to discuss the gap analysis and understanding of the brief as part of the project inception meeting;
- review the completed gap analysis report and provide comment, as required;
- undertake a desktop review of relevant background material;
- discuss and agree with the PWG variations to the detailed scope of works (Stage 2), as necessary;
- prepare a brief report confirming the proposed approach to the Stage 2 works.

Note that the outcomes of this phase of work may result in a variation to the scope of the contract, which will be set on the basis of an upper limiting fee.

Stage 2 – Detailed Scope of Works

The following detailed scope of works will ultimately need to be fulfilled by the successful contractor and should form the basis of quotations.

Biodiversity and Habitat Conservation Assessment

The Biodiversity Conservation Assessment component of the report should establish a basis to ensure delivery of conservation outcomes in the long term and ultimately an overall improvement or maintenance of biodiversity values and conservation of habitat and diversity. The intention of this assessment is to allow for biodiversity certification for the land and the methodology should take this into account.

The preparation of the Assessment may be considered a 3-part process:

1. Desktop study and baseline ecological surveys:
 - review background information and previous studies;
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- undertake ecological surveys and 'ground truth' regional scale vegetation mapping (if available) to determine the existing biodiversity and habitat values.
 - surveys should identify threatened flora and fauna species, endangered ecological communities and habitats listed under the Threatened Species Conservation Act 1995 (TSC Act) and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act);
 - document baseline information, including the extent of survey work undertaken, any site specific surveys undertaken for threatened species and endangered ecological communities, mapping of remnant vegetation within and adjacent to the site, the classification of these assemblages and possible vegetation linkages;
 - identify any major ecological factors impacting on the site such as erosion, feral animal populations, bushfire management requirements, current fire regime, edge effects, barriers to wildlife movement and noxious weeds; and
 - undertake a desktop assessment of biometric vegetation classes according to the Biodiversity Certification Assessment Methodology (BCAM) as a first step in pursuing biodiversity certification of the site.
2. Determination and assessment of biodiversity:
- map extant vegetation and known threatened species habitats;
 - ensure that bushfire management, and infrastructure provision is catered for in the conservation of remnant vegetation;
 - assess the conservation significance of the vegetation on site, based on size, condition and connectivity of patches;
 - assess the recovery potential of vegetated areas (including cleared land) within the subject site. This should enable further consideration of linkages that could be made as part of the development and assessment of priorities for the improvement in the condition of remnant vegetation on site;
 - assess the significance of habitat for threatened, regionally and locally significant fauna and flora species;
 - assess the overall ecological value of remnant vegetation types and the recovery potential and presence of threatened species or their habitats. Quantify these areas using the relevant vegetation classification and prepare a map denoting areas of native vegetation of high, medium or low ecological value (as well as areas with little or no habitat values). It is anticipated that a native vegetation protection mapping layer will be one of the primary outputs of the study, given status under an environmental planning instrument (EPI). Therefore, the output should be sufficiently accurate to support subdivision at the parcel level with line work generated at an appropriate scale;
 - provide an overall appraisal of how existing biodiversity and habitat values will be improved or maintained with the current and future constraints of the precinct;
 - consider strategies for managing road kill on major roads; and
 - work with DP&I to develop a number of conservation/development scenarios and quantify the credit balance according to the BCAM methodology.
3. A clear set of conservation and management recommendations to inform the precinct planning (with reference to the 'Biodiversity Planning Guide for NSW Local Government'). These recommendations should address:
- areas suitable for development with no further ecological constraints;
 - tenure and management arrangements;



- areas of biodiversity value that should be considered for retention;
- measures to protect biodiversity values and reinstatement of environmental flows in creek systems;
- priority areas that could be considered for restoration, regeneration or revegetation;
- recommended development controls that would facilitate conservation outcomes, such as setbacks, tree preservation, etc. Note that the recommended development controls must be suitable for inclusion in the DCP;
- any proposed mechanisms for implementation of these recommendations; and
- measures to control ecological impacts identified on sites.

Terrestrial ecology

Further to the above, the terrestrial ecology component of the study should include the following:

- identify any vegetation communities or plant species that are of local, regional or state conservation significance (including threatened species), populations, ecological communities or critical habitat listed under the NSW Threatened Species Conservation Act 1995 (TSC Act). The criteria for establishing significance should be documented;
- identify dominant weed species within the site bounds;
- provide a description of known or expected fauna assemblages within the study area;
- identify fauna habitat likely to be of local, regional or state significance (including habitat of threatened species, populations, ecological communities or critical habitat listed under the TSC Act);
- ensuring that large public owned reserves (e.g. Warriewood Wetlands and Ingleside chase) are not “isolated” from Garigal and Ku-ring-gai National Parks by identifying and mapping habitat and wildlife corridors and linkages between areas of remnant native vegetation and provide an assessment of the conservation significance of these and details on the provision of effective wildlife movement;
- provide a map of the biodiversity values of the site, identifying areas of high conservation value, buffers and any recommended habitat reconstruction; and
- assess the likely impact of land use and zoning proposals on the above attributes (quantification of the extent of impact where practical). For example the impact on the provision of bushfire management and the development and location of future infrastructure;

Aquatic ecology

The aquatic ecology component of the study should consider aquatic species and habitat, as well as groundwater dependent ecosystems, as follows:

- identify the existing aquatic habitat and any groundwater dependent ecosystems occurring in the Precinct or its catchment. Identify any species, populations or ecological communities listed under the TSC Act or the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) or the Fisheries Act. Identify any requirements for further work under the TSC act and EPBC Act.
- identify any noxious aquatic weed species listed under the Noxious Weeds Act 1992 (NSW);



- ground-truth and validate habitats and identify threatened species (aquatic and groundwater dependent) through field surveys as appropriate;
- prepare a preliminary scaled map of the Precinct, identifying riparian and aquatic communities, and groundwater dependent ecosystems. Undertake a site visit with the Project Manager to ascertain recommended boundaries of riparian corridors;
- provide a map of the identified threatened species on the site, including areas of habitat value for threatened and regionally significant species;
- provide a map of the biodiversity values of the site, identifying areas of high conservation value, buffers and any recommended habitat reconstruction. Also identify and map agreed riparian corridors which are required to be protected under the provisions of the Rivers and Foreshores Improvement Act;
- liaise with the water cycle management contractor regarding the development of drainage options, riparian zone management, maintenance/improvement of environmental flows and potential risks to aquatic ecology.

Riparian Corridor Assessment

Riparian corridors should be mapped in accordance with the *Guidelines for Riparian Corridors on Waterfront Land* (NSW Office of Water, July 2012).

The contractor is to work collaboratively with the contractor preparing the Water Cycle Management Strategy and is to undertake the following:

1. Classify watercourses and identify riparian corridor widths:
 - determine the location of all watercourses shown on the 1:25,000, 1:50,000 or 1:100,000 topographic maps (whichever is the smallest scale available) and categorise each watercourse using the Strahler system of ordering watercourses; and
 - determine the required riparian corridor widths by applying Table 1 of the *Guidelines for Riparian Corridors on Waterfront Land* (NSW Office of Water, July 2012).
2. Prepare a preliminary scaled map of the site and adjoining precincts, identifying the location of:
 - watercourses (label names of watercourses where relevant), wetlands and existing dams;
 - top of bank from the above;
 - riparian corridor boundaries (i.e. the outer edge of the Vegetated Riparian Zone);
 - existing riparian corridor vegetation; and
 - those parts of the riparian corridor that are to be rehabilitated.
3. Develop plan view diagrams that show:
 - the riparian corridor;
 - any proposed encroachment and offsetting (e.g. for detention basins, stormwater outlet structures, road crossings, cycleways and paths);
 - watercourse crossings; and
 - potential development areas.
4. Develop cross sectional diagrams that show, inter alia:



- the agreed riparian footprint;
 - existing vegetation and areas to be rehabilitated;
 - the location of any proposed riparian corridor encroachment and offsetting; and
 - watercourse crossings.
5. In the context of the above, consider the use of riparian corridors as habitat and wildlife corridors connecting with downstream reserves.
 6. Develop a GIS layer which shows all agreed riparian corridors for inclusion in the draft Indicative Layout Plan (ILP), Development Control Plan (DCP) and Environmental Planning Instrument (EPI). Agreed boundaries should be either mapped in collaboration with a surveyor engaged separately by the Department, or using GPS, whichever is the most appropriate.
 7. The draft plan views and cross sections to be prepared by the Water Cycle Management and Flooding Specialist Contractor are to be integrated with a revised Riparian Corridors Assessment, to be provided to OEH, NOW and the PWG for review. Hydraulic model results for low flow regimes including 1 year and 2 year ARI design flood events (representing bank-full flows) are to be made available to the contractor undertaking the Riparian Corridor Assessment, so that geomorphic processes and erosion hazard potential may be assessed. A field inspection may be required with OEH and/or NOW officers and the PWG to discuss these products and agree on any changes needed to finalise them.
 8. Develop a report and map that recommends the planning controls to be included in the EPI and the DCP required to protect significant vegetation and riparian corridors.
 9. The development of an ILP is an iterative process and will require ongoing input by the Contractor. A review of the draft ILP is to be undertaken by the contractor, once it has been significantly developed in response to technical input, to advise of any key inconsistencies or issues in relation to the contractor's recommendations. The results of the draft ILP review are to be included in the draft and final reports.

Riparian Vegetation Management Strategy

The Strategy is to provide detailed requirements for managing existing vegetation that is to be retained and the areas to be rehabilitated. The Strategy is to be consistent with the *NOW Guidelines for Vegetation Management Plans on Waterfront Land*. The Strategy should estimate the funding required to achieve the agreed objectives for reinstatement, rehabilitation and management. The Strategy is anticipated to be included as an appendix to the DCP to guide the preparation of Vegetation Management Plans for the rehabilitation and management of protected vegetation and riparian corridors.

Bushfire Assessment

The planning process will require the contractor and master planner to work together to produce appropriate bushfire planning outcomes.

An assessment will need to address the following:

- identify, assess and document the bushfire risk associated with the development of land within the study area;



- ensure the statutory requirements for bushfire protection are met;
- fully integrate with the master planning process and various other technical aspects, including but not limited to biodiversity, riparian land management and transport; and
- achieve innovative management frameworks for bushfire protection and vegetation issues; and
- Ensure that biodiversity and habitat values are considered in bushfire management, through the determination of strategic fire advantage zones, asset protection zones, fire trails and other access points and appropriate fire frequency.

The following detailed scope of work is to be addressed:

- undertake a Bushfire Assessment of the study area consistent with the 117 (2) Directions of the EP&A Act (Section 4.4 Planning for Bushfire Protection) and Clause 44 of the Rural Fires Regulation 2008. The assessment will include a detailed asset protection zone (APZ) GIS layer that identifies a suitable APZ from features such as riparian corridors and protected vegetation for the purpose of drafting the EPI mapping layers and Indicative Layout Plan;
- prepare a Bushfire Management Plan for the study area if deemed necessary to support the Precinct Planning documentation, in collaboration with the project manager, master planner and other technical consultants;
- ensure the Biodiversity and Habitat Conservation Assessment is considered when focusing on the Bushfire Assessment.
- address staging of development within the Precinct as new development occurs next to existing bushland that is proposed to be removed in the future. It may also be necessary to recommend suitable building envelopes for areas where bushland is only to be partially removed. All such recommendations shall be accordance with Planning for Bushfire Protection (2006);
- prepare bushfire protection objectives and measures suitable for inclusion in a DCP. This may include suggested subdivision controls, requirements for single lot housing and medium density housing. As a guide for DCP controls reference could be made to Planning for Bushfire Protection 2001 Appendix 1; Sample Development Control Provisions for Subdivisions in Bushfire-Prone Areas;
- review the implications of the Draft ILP and its various iterations in terms of bushfire impact, including routes for bushfire evacuation and road widths for emergency vehicles and plant, and suggest modifications to the ILP to address bushfire management requirements;
- respond to competing issues in the development of the Draft ILP, including the conservation of riparian areas and remnant bushland and residential development yields. It is therefore imperative that this work be undertaken in collaboration with the project manager, master planner and various technical specialists engaged to assess water cycle management, landscape, transport, community and open space, indigenous and non indigenous heritage issues, and utilities;
- liaise with the RFS and prepare appropriate recommendations and actions to ensure that a Precinct-wide approval may be considered by the RFS; and in collaboration with Pittwater Council, DP&I and RFS, prepare an updated Bushfire Prone Land Map relevant to the Ingleside Precinct.