Illawarra Regional Business Park
78 Tongarra Road, Albion Park

Proposed Business Park Subdivision – Concept Plan

Vegetation Management Plan

May 2007

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1 INTRODUCTION

1.1 Background

A substantial business park development is proposed on lands to the immediate west of the Illawarra Regional Airfield at Albion Park, south of Sydney in the Illawarra Region (Figure 1). The subject site is known as Lot B in DP 109816 and Lot 6 in DP 1100435 Tongarra Road, Albion Park, and occupies a total area of 74ha (not including that part of the land to the northwest of the Illawara Highway).

The proposed subdivision and development of the site is the subject of consideration pursuant to Part 3A of the *Environmental Planning & Assessment Act 1979* (EP&A Act). The *Concept Plan* to which this *Flora & Fauna Assessment Report* is attached has been prepared by reference to the Director-General's Requirements (DGRs) provided by the Department of Planning (DoP) for the project in November 2006.

An integral element of the proposed development is the rehabilitation of vegetation along Frazers Creek and around the major wetland on the site (which is immediately west of the Business Park). The site is currently highly modified and has long been used for grazing and agricultural purposes. Substantial rehabilitation works are required to regenerate native riparian vegetation on the site, as documented in this *Vegetation Management Plan* (VMP).

1.2 Proposed Development

The proposed development for the subject site at 78 Tongarra Road, Albion Park is for the creation of a 47.4ha Business Park on farmlands which are currently grazed adjacent to the Illawarra Regional Airport at Albion Park. The proposed development also includes the rehabilitation and re-establishment of a substantial riparian zone and habitat corridor along Frazers Creek (including the major wetland on the subject site) within the *Environmental Management Zone* (EMZ), occupying a total of 21.5ha of land (Figure 3; see *Flora & Fauna Assessment Report*).

The proposal will require earthworks to be undertaken over a substantial proportion of the site to remove material from the more elevated areas and place it elsewhere on the site to provide flood-free land for the subsequent development activities. The earthworks will ultimately cover approximately 43.53% of the subject site at Albion Park, including the relocation of a portion of Frazers Creek (in the southern parts of the site). That activity will be the subject of consideration by the Department of Environment & Climate Change (DECC), and the provision of a *Part 3A Permit* pursuant to the *Rivers & Foreshores Improvement Act 1948* (RFI Act).

Subsequent development of the site will involve the construction of an access road and the installation of services, and the subsequent construction of industrial or commercial premises on a total of 61 lots. As noted above, the project also involves the implementation of an extensive riparian and wetland regeneration program (in the 'Riparian Buffer' area) over approximately 15.43ha along Frazers Creek and within the wetlands on the site.

Following approval of the *Concept Plan* for the project, development of the site would be undertaken in four stages:

- Stages 1 and 2 - the conduct of earthworks and the placement of fill material on the development area south of the airport, the installation of services and the initiation of riparian rehabilitation works;
- Stage 3 - construction of the first part of the road and the initial industrial lots in the southeastern part of the site;
- Stage 4 - construction of the remainder of the Business Park development south of the Illawarra Regional Airport; and
- Stage 5 - construction of the final parts of the Business Park development north of the east-west runway of the Illawarra Regional Airport.

Protection and enhancement of the riparian zones and wetlands through the western parts of the subject site (within the designated *Environmental Management Area* - EMA) will be undertaken from the initiation of Stage 1 of the project. Importantly, the Stage 1 works (and any subsequent works) will be undertaken in a manner which avoids adverse impacts upon the Riparian Buffer and wetlands.

1.3 Aims and Scope

The aims of this *Vegetation Management Plan* (VMP) for the Illawarra Regional Business Park development site at Albion Park are:

- to provide a plan for the implementation of riparian rehabilitation works on the subject site in order to generate a significant environmental benefit from the project;
- to optimise the long-term viability and health of the native vegetation to be retained and rehabilitated on the subject site;
- to create a substantial element in a habitat corridor along Frazers Creek and its associated wetlands; and
- to address the goals of various relevant planning policies with respect to the natural environment and particularly to watercourses and wetlands.

The specific objectives of the VMP, which derive from the above aims, are:

- to implement the *Vegetation Management Strategy* (the "*Strategy*") outlined in Chapter 3 of this VMP;
- to reduce the abundance and diversity of weed species in the EMA, and to increase the diversity and abundance of native species;
- to control or manage the current threats to the vegetation on the subject site, particularly weed invasion, cattle grazing and physical disturbance;
- to enhance the quality of the fauna habitats within the site, particularly in the wetlands and the riparian zone;
- to contribute to the establishment of a habitat corridor along Frazers Creek; and
- to establish a monitoring and maintenance program to ensure compliance with the measures outlined in the VMP and to monitor the success of the riparian rehabilitation and management on the subject site.

This VMP applies to the area of vegetation within the subject site which is to be managed for riparian and conservation purposes in accordance with the *Concept Plan* for the proposal. It does not apply to any landscaping works within the development area or to tree management and arborist services.

2 SITE ASSESSMENT

The subject site at Tongarra Road, Albion Park has long been used for agricultural and horticultural purposes. Most of the land has been cleared and grazed over a long period, and there is evidence of horticultural or pasture improvement activities at a number of locations on the site (Figure 2).

The site is gently undulating in nature, sloping generally away (to the north, west and south) from the Illawarra Regional Airport at Albion Park. There is a small elevated rise in the southeastern part of the subject site, but approximately half of the site (most of the western parts) is located below the 1:100 year flood line.

Frazers Creek flows in a northerly direction through the western parts of the subject site, leaving and then re-entering the site in the southwest (Figure 2). Most of Frazers Creek has only a sparse and highly modified riparian vegetation cover, as a result of the long established agricultural activities on the subject site. There are small stands of she-oaks along parts of the Creek, although most consist of isolated large specimens some of which (at the end of the airport runway) are regularly lopped.

Substantial parts of the Frazers Creek channel have been either artificially constructed or substantially modified in the past, as indicated by the straight lines of several of the channels (particularly in the northern half of the subject site). In addition, there are mounds of earth at the edge of the Frazers Creek channel at various locations on the subject site, indicating the use of excavators to deepen and possibly straighten the original natural channel.

The subject site supports two wetlands which have both been modified by earthworks and by ongoing cattle grazing. The southern wetland (located near the western boundary in the centre of the subject site and immediately southwest of the east-west runway of the airport) has been designated a *Coastal Wetland* (No. 382) pursuant to *State Environmental Planning Policy No. 14 – Coastal Wetlands* (SEPP 14). Detailed consideration of that wetland and the SEPP 14 boundary is contained in a separate *Report* for the Illawarra Regional Business Park (Whelans InSites 2007).

A low flow channel has been constructed along the western side of the southern wetland on the subject site, and there is a mound of earth in the centre of the northern wetland. Both wetlands are subjected to regular and significant impacts from cattle grazing and physical disturbance.

The only other native vegetation present on the subject site at Albion Park is a stand of three large fig trees in the centre of the site (adjacent to the east-west runway of the airport) and a stand of Paper Bark in the southeastern corner of the site.

The subject site at Albion Park supports four main terrestrial vegetation types (Figure 2):

- the modified wetland vegetation in the two wetlands in the centre and in the north of the subject site;
- the modified and artificial riparian vegetation along Frazers Creek (through the western parts of the site);
- the stand of paperbark swamp forest in the southeastern corner of the subject site; and
- the extensive areas of pasture and artificial vegetation through the majority of the site.

The paperbark swamp forest in the southeastern corner of the site will be the subject of a separate and specific VMP.

3 VEGETATION MANAGEMENT

3.1 Vegetation Management Strategy

The *Vegetation Management Strategy* (the "*Strategy*") to be implemented on the subject site at Albion Park (as indicated in Figure 3) aims:

- to eliminate or control the weeds and introduced pasture plants which currently characterise most of the *Environmental Management Area* (EMA) on the subject site;
- to control weeds on the site during subsequent occupation and use of the industrial subdivision;
- to rehabilitate existing areas of disturbed agricultural land within the protected portion of the site (the EMA);
- to establish a self-sustaining natural environment within the EMA along Frazers Creek and in the associated wetlands; and
- to provide supplementary habitat for native biota (particularly in the Frazers Creek corridor as envisaged in the *Illawarra Regional Strategy*).

The *Strategy* will involve a variety of management activities, including:

- primary and secondary weed control att selected locations, utilising standard bush regeneration techniques;
- the replacement of agricultural pasture with native riparian vegetation;
- revegetation, involving seed collection, transplanting, propagation and supplementary planting;
- erosion and sedimentation control; and
- ongoing maintenance and monitoring activities.

3.2 Control of Weeds and Introduced Plants

3.2.1 Issues

Most of the vegetation within the EMA on the subject site at Albion Park is improved pasture dominated by pasture grasses and introduced weeds. There are also significant areas of weeds along Frazers Creek and within the wetlands, although these are often localised.

Issues of relevance include:

- the existing levels of weed infestation on the site;
- the potential for ongoing weed invasion from adjoining lands;
- the potential for further weed infestation of the Conservation Area as a result of the movement of soil around the site; and
- the extent of pasture grasses in the Riparian Buffer Area.

3.2.2 Weed Control Techniques

Weed control techniques to be employed in the Conservation Area will include:

- hand removal - for herbaceous species and small seedlings of woody weeds where in low density;
- broad-scale use of herbicides where appropriate (*eg* in areas of extensive Kikuyu). This will involve the use of spray back-packs or vehicle-mounted spraying;
- the mechanical removal of weeds in degraded and disturbed lands only, where dense patches or near-monotypic stands of weeds are present;
- the selective use of herbicides for larger weeds, utilising the 'cut-and-paint' method, where undiluted herbicide is painted onto the freshly cut stems of woody weeds;
- the use of sterile cover crops or mulch material to protect areas of exposed soil following broad-scale weed removal; and

- the installation of erosion control/weed control matting on batter slopes adjacent to the EMA during the period of their rehabilitation.

Appropriate weed control methods for specific circumstances will be determined by the Bush Regeneration Contractor, based on local physical constraints, the specific control methods required for certain weed species and the nature of the weed infestation.

It is not proposed that all introduced grassland in the Riparian 'Buffer' area be removed within the first 5 years of the project. The adverse impact of such an extensive removal of vegetation would outweigh the benefits, and the program should be implemented over a long period.

3.3 Revegetation

3.3.1 Issues

Most of the EMA will require revegetation using indigenous species given that most of the area to be rehabilitated is improved pasture with no native plants. Most of the EMA on the subject site is to be rehabilitated as a 'Riparina Buffer', and parts of the Business Park are also to be managed for conservation and buffering purposes (Figure 3).

Specific issues of concern in respect of the proposed revegetation activities within the EMA on the subject site at Albion Park include:

- the need to rehabilitate existing cleared or disturbed portions of the EMA;
- the opportunities for rehabilitation of the modified areas of the FWCF community (an "*endangered ecological community*" listed on the TSC Act);
- the provision of additional areas of the paperbark swamp community within the EMA to offset the loss of some of that vegetation from the southeastern corner of the site;
- the potential for ongoing disturbance to or degradation of rehabilitated areas;
- the opportunities for using native vegetation approved for removal from the development portions of the site in the rehabilitation program; and
- the maintenance of rehabilitated areas until the establishment of a self-sustaining native vegetation within all the EMA.

3.3.2 Management Measures

Revegetation works to be implemented as part of the VMP will include:

- the identification of native vegetation and/or individual plants on the site for salvage and propagation activities, so that plants and salvaged plant material can be distributed into the appropriate communities within the EMA;
- the salvage of native trees and shrubs located within the proposed development area, for later re-planting into appropriate stands of vegetation or into rehabilitation areas within the EMA. Individuals suitable for transplanting will be excavated prior to the commencement of construction and relocated either directly into the EMA or into a temporary nursery;
- the collection of seeds and other propagative material from native plants presently growing within native vegetation on the subject site, prior to the commencement of development activities, for later use in all revegetation works;
- the propagation of collected seed and preparation of planting 'stock' (cellstock and tubestock) for later re-introduction to the site. Plants from the different communities will be identified for translocation into the appropriate vegetation within the EMA;
- the planting of indigenous native plant species (propagated from material collected on-site) in appropriate locations, based on topography and the proximity or presence of specific plant communities; and

- the planting of native grasses, sedges and low shrubs indigenous to the area on the fill batters which abut or are part of the EMA.

3.4 Soil Erosion and Sedimentation

3.4.1 Issues

There is the potential for soil erosion during the site development phase and during the riparian rehabilitation works from two main sources:

- the substantial earthworks and the placement of fill material within the development area; and
- the removal of weed material and pasture grasses during primary weeding within the EMA.

These activities will involve the exposure of and disturbance to surface and subsurface soils, which, without appropriate management, could lead to the discharge of sediment into adjacent areas of native vegetation or into the wetlands and/or Frazers Creek.

3.4.2 Management Measures

Erosion and sedimentation control measures for the development portion of the site are outlined in the *Soil & Water Management Plan* (SWMP), prepared by Costin Rowe (*Drawings C005E* and *C007E* - attached).

Specific erosion control measures are required for the protection of the SEPP 14 Wetland and the remainder of the EMA on the subject site, including:

- the installation of a silt fence along boundary between the EMA and the development areas, to prevent surface wash of sediment from the construction areas into the EMA;
- the use of either mulching or of jute mesh and/or sterile cover crops to protect the fill batters and control sediment runoff;
- the revegetation, mulching and/or brush-matting of cleared and disturbed areas; and
- the provision of sedimentation basins during construction activities to control any "*dirty runoff*", including sediment-laden stormwater, for treatment prior to discharge.

4 MANAGEMENT ACTION PLAN

4.1 Vegetation Regeneration Program

The works detailed in the VMP will be undertaken by a suitably qualified Bush Regeneration Contractor, commencing at the initiations of works on the site. The VMP is to be implemented through the mechanisms of the *Management Action Plan* (MAP) throughout Stages 1, 2 and 3 of the project, and subsequently by the implementation of Section 88B instruments placing positive covenants on the Title Deeds for each relevant lot in the Business Park (see below).

A timetable for the bush regeneration works has been prepared (Table 1), which details the activities to be undertaken and the proposed timing. Transplanting and seed/propagule collection activities will be initiated prior to the clearing of the subject site, together with the collection of trees, shrubs and branches to be used as brush-matting within EMA.

Temporary exclusion fencing is to be erected around the EMA prior to the commencement of any construction works. Primary and secondary weeding activities will take place during the construction phase of the development, and maintenance weeding will be part of the ongoing management regime for the site.

4.2 Implementation of the VMP

Implementation of the VMP will involve two stages:

- implementation by the developer of the Illawarra Regional Business Park initially (during the earthworks and early development phases); and
- subsequent management in perpetuity by Shellharbour Council with funding provided by the lot owners in accordance with the relevant Sectio 88B instruments placed on each lot.

Table 1 Bushland Rehabilitation Program

Action	Responsibility	Timing
Phase 1 - Initial Works (Pre-construction and Construction Phases)		**6-12 months (approximately)**
Seed and other propagule collection	Bush Regeneration Contractor	Prior to and during construction
Transplanting of native plants located within the development area	Bush Regeneration Contractor	Prior to construction
Collection of logs, shrubs and branches from the development areas on the subject site	Bush Regeneration Contractor	Prior to construction
Install protective fencing and tree protection measures along the periphery of the Business Park	Civil Contractor under supervision of Gunninah	Prior to construction
Primary weeding	Bush Regeneration Contractor	During construction
Propagation of seed and other propagules	Bush Regeneration Contractor	Throughout construction (according to seasonal availability)
Secondary weeding	Bush Regeneration Contractor	Throughout program
Phase 2 - Rehabilitation Program (Construction and Post-construction Phases)		**Through Stages 1, 2 and 3 of the project**
Maintenance weeding – as required	Bush Regeneration Contractor	Construction and post-construction
Supplementary planting of native plants	Bush Regeneration Contractor	Throughout program
Direct seeding and other propagation	Bush Regeneration Contractor	Throughout program
Mulching of cleared land and batters	Bush Regeneration Contractor	Throughout program
Mulching of cleared land and batters	Bush Regeneration Contractor	Throughout program
Planting of batters	Bush Regeneration Contractor	Throughout program
Maintenance of replanted vegetation	Bush Regeneration Contractor	Throughout program
Phase 3 – Ongoing Management (In Perpetuity subject to Deeds of Agreement)		**In perpetuity**
Supplementary weeding and control	Bush Regeneration Contractor	Ongoing
Supplementary planting of riparian and wetland areas	Bush Regeneration Contractor	As required
Replacement of dead or diseased plants	Bush Regeneration Contractor	As required
Removal of rubbish and urban debris	Bush Regeneration Contractor	As required

5 MAINTENANCE & MONITORING PROGRAM

5.1 Maintenance Program

Intensive vegetation maintenance activities will be conducted by the Bush Regeneration Contractor for at least two years following completion of the revegetation works, and will involve regular maintenance weeding and maintenance of revegetation works (Table 2).

Maintenance weeding will involve inspections of the Conservation Area by a small (probably two-person) crew on a regular basis during the spring, summer and autumn months, with occasional inspections during winter.

Maintenance of planted tubestock will involve inspections of the health of seedlings, removal of dead individuals, replacement of those individuals with new tubestock, observations of any threatening processes that could be affecting the revegetation, and identification of requirements for remedial action. Where necessary, supplementary plantings and rehabilitation areas will be watered during dry periods.

Table 2 Maintenance and Monitoring Program.

Action	Responsibility	Timing
Phase 1 – Pre-construction and Construction		
Establish vegetation monitoring stations (survey quadrats)	Gunninah	Project initiation
Collect seeds and other plant propagules	Bush Regeneration Contractor	Project initiation
Salvage material for brush matting from development areas	Bush Regeneration Contractor	Project initiation
Phase 2 – Rehabilitation Phase		
Survey vegetation monitoring stations	Gunninah	Quarterly during Stage 1; six-monthly during Stages 2 and 3
Maintain native plantings	Bush Regeneration Contractor	First 3 years
Carry out maintenance weeding	Bush Regeneration Contractor	First 3 years
Identify requirements for remedial action in retained vegetation	Bush Regeneration Contractor	As required
Monitor progress of bush regeneration works	Gunninah	Quarterly during Phase 1; six-monthly during Phase 2
Phase 3 – Ongoing Management		
Maintenance of plantings	Bush Regenerators	Annual *Reports*
Maintenance weeding	Bush Regenerators	Annual *Reports*
Survey vegetation monitoring stations	Gunninah	Annual *Reports*

5.2 Monitoring & Reporting

The monitoring program will be implemented by Gunninah Environmental Consultants, in conjunction with the appointed Bush Regeneration Contractor. The program will involve regular site inspections and vegetation monitoring surveys throughout the construction and post-construction phases of the development, and regular reporting to Shellharbour Council and the DECC (Table 2).

The Bush Regeneration Contractor will maintain records of the works completed, and provide quarterly progress reports during Phase 1 of the program, and six-monthly progress reports during Phase 2 of the program.

Monitoring will document the condition of native vegetation, to identify weed problem areas and the success of rehabilitation and replanting activities. Monitoring activities will aim to assess:

- the success of weed control measures;
- the diversity and abundance of native vegetation and the success of revegetation works; and
- the condition of vegetation within the *Environmental Management Area*.

A series of vegetation survey quadrats (of 10mx10m) will be established within the *Environmental Management Area* (EMA) to provide baseline data on the existing vegetation, and to monitor changes over time in vegetation structure, species diversity and abundance and levels of weed infestation. A flora species inventory will be obtained for each survey quadrat, as well as data on weed densities and species diversity. The quadrats will be distributed through the EMA in both areas of existing native vegetation and areas of significant rehabilitation activities.

During the 'initial works' phase of the bush regeneration program, monitoring of the retained vegetation will occur quarterly. Thereafter (following the planting of propagated plant material), monitoring will occur for a period of 3 years at six-monthly intervals (Table 2).

The contractors and site workers will be made aware of the conditions and their obligations regarding the areas of retained vegetation, through the implementation of an induction session at the commencement of construction activities.

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Figure 1 Location of the subject site at Tongarra Road, Albion Park.

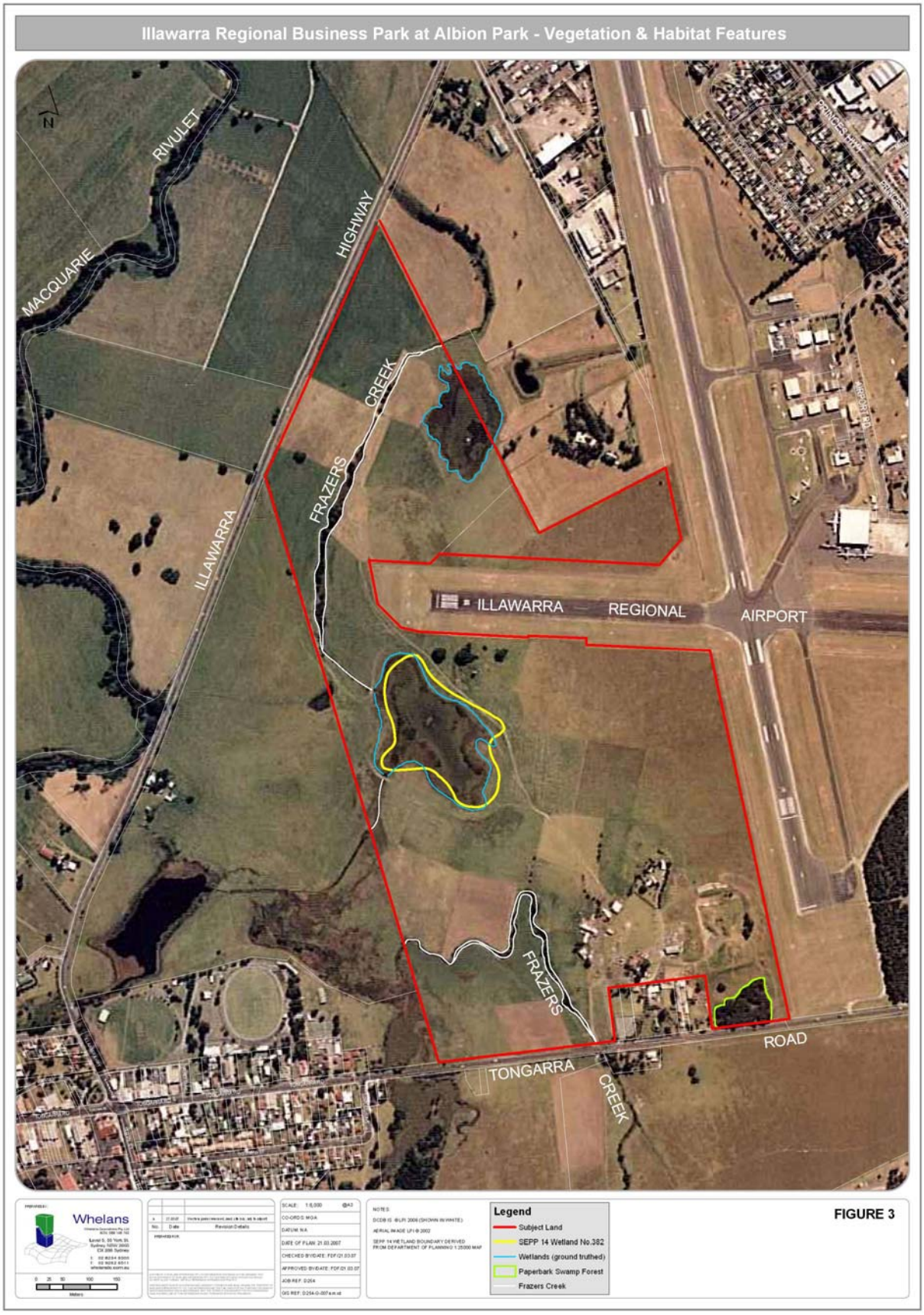

Figure 2 Aerial photograph of the subject site at Tongarra Road, Albion Park.

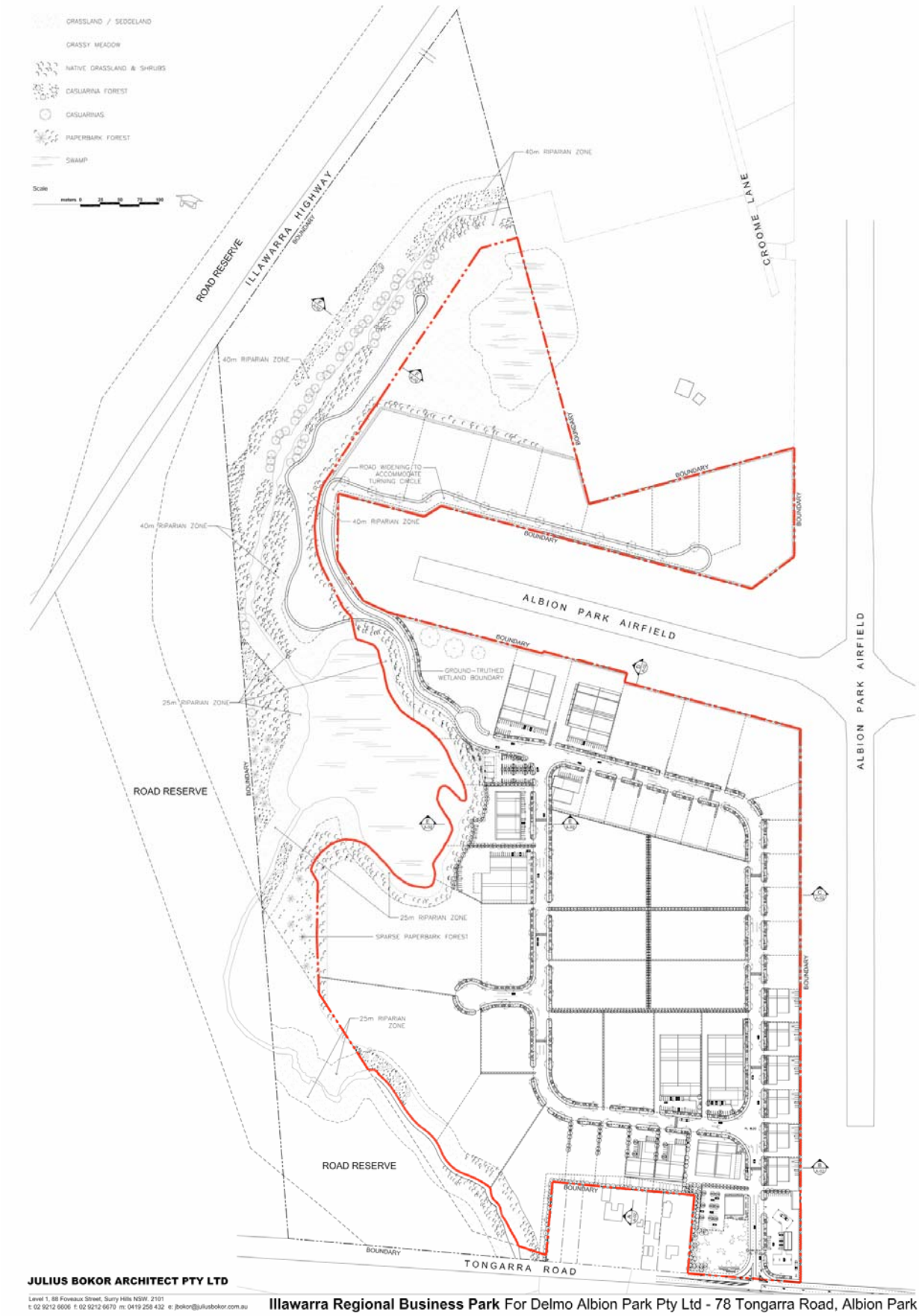

Figure 3 Vegetation management within the *Environmental Management Area* on the subject site at Tongarra Road, Albion Park.