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DRAFT

DRAFT Plan of Management

Somersby Industrial Park

***NSW Premier's Department
Gosford City Council***

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Appendix B

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Glossary of Abbreviations and Terms

Aboriginal objects	Any deposit, object or material evidence relating to the Aboriginal habitation of an area before or concurrent with the occupation of an area by non-Aboriginal persons.
AHD	Australian Height Datum: a standard reference level used to express the relative elevation of features to a common reference point
ARI	Annual Recurrence Interval
APZ	Asset Protection Zone: Often referred to as a fire protection zone. It is an area surrounding a development managed to reduce the bushfire hazard to an acceptable level. The APZ comprises an inner protection area (IPA) and outer protection area (OPA). The width of the APZ varies with slope, land use and construction type. Within the SIP, a minimum APZ of 10 metres is recommended
Biodiversity	Encompassing biological variety at genetic, species and ecosystem scales
Buffer	An area of land separating two conflicting activities or land uses, or an area that is established to minimise the impact of one land use on another.
Building work	Any physical activity involved in the erection of a building.
Bushfire hazard	The potential severity of a fire, usually measured in terms of intensity (kW/m). Factors that influence a bushfire hazard include climate and weather patterns, vegetation (fuel quantity, distribution and moisture) and slope.
Bushfire Risk Management Plan	A document that sets out the bushfire hazard of a particular area and which indicates the requirements for APZ areas.
Bushfire prone land	Land recorded as bush fire prone land on a bush fire prone land map for the area.
Catchment	The area which will contribute to the discharge of a stream after rainfall at the point under consideration.
Council	Gosford City Council
DCP	Development Control Plan
DEC	Department of Environment and Conservation (formerly the NSW National Parks and Wildlife Service)
Development	Development has the same meaning as in the <i>Environmental Planning and Assessment Act, 1979</i> (as amended): "Development includes the use of land, the subdivision of land, the erection of a building, the carrying out of a work, the demolition of a building or work, any other act, matter or thing that is controlled by an environmental planning instrument."
DIPNR	Department of Infrastructure, Planning and Natural Resources (formerly PlanningNSW and the Department of Land and Water Conservation)
Ecologically Sustainable Development (ESD)	Development, both now and in the future, in a way that maintains the ecological processes on which life depends. Key components of ESD are intergenerational equity, maintenance of biodiversity, improved economic evaluation of environmental costs and benefits and the precautionary principle
Ecosystem	A functional system which includes communities of living organisms and their associated physical, non-living environment, which interact to form an ecological unit, such as a wetland or forest
Edge effects	The deterioration of native vegetation at its edges due to the adverse direct and indirect effects of adjoining land uses such as weed invasion, erosion and sedimentation, and water quality impacts.
Edge to area ratio	For specific parcels of land the ratio of the length of the edge to the area of land. A low length to edge ratio minimises edge effects..

Endangered species	Those plants and animal species likely to become extinct unless action is taken to remove or control the factors that threaten their survival
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
Erosion	The loosening and transportation of soil, chiefly by wind and running water
FM Act	<i>Fisheries Management Act, 1994</i>
Habitat	The place where an organism lives. Habitats are measurable and can be described by their flora and physical components
Habitat linkage	An area of land or series of interconnected areas that facilitates movement by native fauna. These may or may not always be directly connected and is species dependent.
Infrastructure	The system of essential services, utilities and public and community facilities necessary to enable human communities to function
Inter-generational equity	The principle that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
LEP	Local Environmental Plan
Mitigation	Reduce the severity
NPWS	National Parks and Wildlife Service (former)
NPW Act	<i>National Parks and Wildlife Act, 1974</i>
Overland flow	downslope, surface movement of run-off other than in defined channels
POM	Plan of Management.
Precautionary principle	The principle that, if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation
Riparian	Situated on or relating to a stream bank
Riparian zone	Any land which adjoins, directly influences, or is influenced by a body of water
RF Act	<i>Rural Fires Act 1997</i>
RFI Act	<i>Rivers and Foreshores Improvement Act, 1948.</i>
Run-off	the portion of precipitation (rain, hail, snow) which flows across the land surface and does not soak into the ground; can be a major agent of water erosion
Statement of Significance	A statement of the values of the SIP which provide a detailed explanation of the value. These are supported by Performance Objectives and Management Actions within the POM
SIP	Somersby Industrial Park
TSC Act	<i>Threatened Species Conservation Act 1995</i>
Wildlife Corridor	A continuous area of habitat that can be utilised for faunal movement.

Executive Summary

Background

Gosford City Council and the NSW Premier's Department commissioned Connell Wagner to prepare a Plan of Management (POM) for the Somersby Industrial Park (SIP). The SIP is a significant economic and environmental resource in the Central Coast area. Over time, items of ecological and indigenous heritage value have been identified within the Park, including threatened flora and fauna species, and Aboriginal sites and artefacts. These items have caused a high level of uncertainty as to the intensity and location of development that can take place within the area, as well as generating concern over potential delays in assessment of development applications. The satisfactory resolution of these matters is a key project outcome.

Somersby Industrial Park Task Force

The SIP Taskforce, which is chaired by the NSW Premier's Department, has been set up to oversee the preparation of the POM. The Taskforce brings together all agencies and stakeholders (including landholders) with an interest or statutory role in the future development of the SIP to provide a holistic approach to the future management of the area. The Taskforce agreed to prepare the Plan of Management and has overseen a range of investigations into the SIP to enable formulation of a workable management framework for the future development of the SIP.

Somersby Industrial Park Values

The SIP is located on the Somersby Plateau section of the Hunter Range on the Central Coast of New South Wales. The SIP is approximately 300 hectares in size, and is located four to five kilometres west of Gosford.

The key values of the SIP are:

- Economic values that provides substantial employment and industrial development opportunities.
- Ecological and environmental values relating to the remnant native vegetation which provides significant habitat and linkages for a range of threatened flora and fauna species as well as other species.
- Aboriginal heritage values arising from previous indigenous occupation of the area and represented by unique rock art and culturally significant sites.

To maintain and enhance these values, the POM must provide management strategies that can be transformed into statutory provisions that a future Local Environmental Plan (LEP) and a Development Control Plan (DCP) can adopt. This includes the specification of aims and objectives, as well as specific development controls.

Key Management Issues in the SIP

The key management issues relating to the SIP values can be summarised as:

- Clearing of native vegetation and habitat removal.
- Maintenance of significant habitat linkages and wildlife corridors.
- Changes to natural hydrological (water) flow regimes and water quality impacts.
- Preservation and protection of Aboriginal heritage sites.

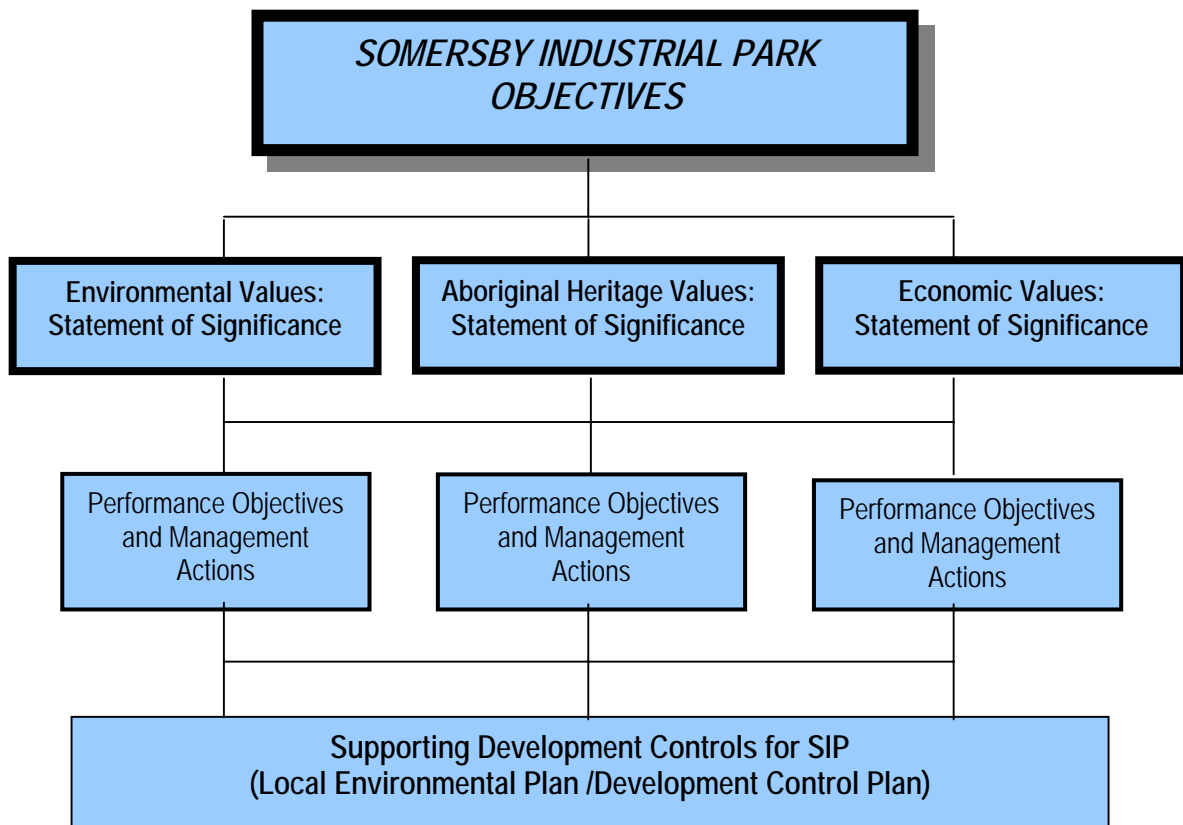
- Physical constraints to development.

This will require the definition of a range of controls to ensure that future development in the SIP does not adversely impact on the ecological and environmental values of the SIP. These controls are set out in the final sections of this POM.

There is also a need to provide a more consistent framework for the assessment of development applications within the SIP. At present, individual landholders are required to undertake detailed archaeological and flora/fauna assessments on their land which adds to the cost of development and the timing of approvals. The benefit of the POM is that there will be many sites that have been given clearances from undertaking further assessments (eg assessment of Aboriginal sites) as the previous studies that have been undertaken as a prelude to this POM have provided a more complete understanding of the constraints within the SIP.

SIP Management Framework

The framework of the POM is shown in the figure below. This structure defines and places the SIP values as the highest priorities for consideration, with specific management controls flowing from the definition of these values.



As shown in the POM framework, these management strategies are “layered” in the following order of importance:

- *SIP Objectives* – these provide the overall framework for the future management of the SIP. All future developments must conform with these objectives (or at least, not conflict with them).
- *Statements of Significance* – these are a statement of the values of the SIP (Ecological/Environmental; Aboriginal Heritage; Economic) which are supported by

Performance Objectives and Management Actions. All future development must conform with the Performance Objectives and Management Actions.

- **Supporting Development Controls** – these are the final layer of management and will include a Local Environmental Plan and Development Control Plan. Development will be expected to conform with these controls.

POM Implementation

The statement of values provides a platform for the POM. Mechanisms are required to achieve the aims of the brief, which are to:

- Outline solutions for land to be developed.
- Provide certainty for developers.
- Provide strategies for long term protection and management of Aboriginal heritage.
- Provide strategies for long term protection and management of threatened species and biodiversity.

These mechanisms include the creation of management zones based on key constraints identified within the SIP refined to recognise current land use patterns and the ability in the longer term to implement future controls in a consistent fashion.

The principles applied to the definition of the management zones are:

- Where wildlife corridors exist, management zones have been placed on property boundaries where possible to minimise the effect on development potential.
- Where lots are developed and a corridor cannot be achieved, no management zone is imposed.
- Where existing crown roads can serve as a corridor or habitat area, these are proposed for closure to minimise impact on private property.
- Where there are minor watercourses or watercourses that are narrow, the management zone have been developed in line with the significance of the water course. In the upper areas of the catchment where the watercourse is narrow, for example, the management zone is similarly narrow.

The proposed management zones are outlined in Table 1.1. Detailed management controls in each zone are outlined in the POM and detailed in Figure 4.1.

Table 1.1: Summary of SIP Management Zones

Management Zone/Sub-Zone	Areas Identified
Zone No 1 <ul style="list-style-type: none"> • Sub-zone 1(a) Aboriginal heritage • Sub-zone 1(b) <i>Prostanthera junonis</i> • Sub-zone 1(c) <i>Darwinia glaucophylla</i> • Sub-zone 1(d) <i>Hibbertia procumbens</i> • Sub-zone 1(e) Riparian zones and Habitat Protection 	<ul style="list-style-type: none"> • All Aboriginal heritage sites identified by AMBS including management zones. • Core Habitat for <i>Prostanthera junonis</i> • Core habitat for <i>Darwinia glaucophylla</i> • Core habitat for <i>Hibbertia procumbens</i> • Habitat for threatened species recorded in the SIP • Riparian zones and Habitat Protection
Zone No. 2	<ul style="list-style-type: none"> • Habitat Links
Zone No. 3	<ul style="list-style-type: none"> • Areas with Physical Constraints to Development such as slope, flooding, servicing. Also includes lines of sight between certain Aboriginal heritage sites.

Note: Refer to Table 3.1 for more details of constraints

Each of the management zones have specific development restrictions in consideration for future management of each zone and the values of the SIP. These management controls can be used as the basis for future development controls through a Local Environmental Plan (LEP) and Development Control Plan (DCP).

The POM will benefit landholders who adhere to the parameters of the Plan and the management controls as:

- Landholders will have reduced requirements in undertaking any necessary flora and fauna, and Aboriginal heritage assessments.
- The assessment of development applications will be significantly streamlined.
- Developers will have forewarning of the likely constraints on their land.

Ecologically Sustainable Development

The POM must also address issues relating to the principles of Ecologically Sustainable Development. In respect of the SIP, the investigations to date have identified the key values of the area and have identified key threats to these values. Through this process, the key tenets of ESD have been considered and the POM will achieve the principles of ESD as:

- It provides certainty with respect to key values and there will be no postponement of measures to minimise degradation.
- It will permit future generations to understand and protect the values of the area.
- It recognises biological diversity and ecological integrity.
- It includes environmental values in the overall assessment of economic values of the SIP.
- It recognises that economic development can take place in an environmentally responsible manner in accordance with ESD principles.

1. Introduction

1.1 Overview

Gosford City Council and the NSW Premier's Department commissioned Connell Wagner to prepare a Plan of Management (POM) for the Somersby Industrial Park (SIP).

The SIP is a significant economic and environmental resource in the Central Coast area. Over time, items of ecological and indigenous heritage value have been identified within the Park, including threatened flora and fauna species, and Aboriginal sites and artefacts. These items have caused a high level of uncertainty as to the intensity and location of development that can take place within the area, as well as generating concern over potential delays in assessment of development applications. The satisfactory resolution of these matters is a key project outcome.

Various environmental/ecological and Aboriginal heritage investigations have been previously carried out that have either included the SIP within a larger study area or have focused exclusively on the SIP. All of these previous investigations have been taken into account in the preparation of the POM.

1.2 Legislative Background

The SIP land is subject to New South Wales (NSW) and Commonwealth environmental statutes, notably the NSW *Environmental Planning and Assessment Act, 1979 (EP&A Act)*, NSW *Threatened Species Conservation Act, 1995 (TSC Act)*, *National Parks and Wildlife Act, 1974 (NPWS Act)*, *Rivers and Foreshores Improvement Act, 1948 (RFI Act)* *Fisheries Management Act 1994 (FM Act)* and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. Threatened species are located within the SIP that are listed under both the *TSC Act* and *EPBC Act*. Given the interaction between Commonwealth and State environment legislation, there is an obligation on all authorities to protect and conserve environmental and Aboriginal attributes. The following briefly describes these provisions.

1.2.1 *Environment Protection and Biodiversity Conservation Act 1999*

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)* is the key piece of legislation providing protection for areas of environmental and social significance. It has the following objectives:

- To provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance.
- To promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources.
- To promote the conservation of biodiversity.
- To promote a co-operative approach to the protection and management of the environment involving governments, the community, land-holders and indigenous peoples.
- To assist in the co-operative implementation of Australia's international environmental responsibilities.
- To recognise the role of indigenous people in the conservation and ecologically sustainable use of Australia's biodiversity.
- To promote the use of indigenous peoples' knowledge of biodiversity with the involvement of, and in co-operation with, the owners of the knowledge.

The EPBC Act requires that approval from the Commonwealth Minister for the Environment is required if the proposal is likely to have or would have a significant effect on a matter of 'National Environmental Significance' (an "NES matter").

For the purposes of the *EPBC Act*, NES matters are defined as:

- World Heritage properties.
- Ramsar wetlands.
- Nationally threatened species and ecological communities.
- Migratory species.
- Commonwealth marine areas.
- Nuclear actions.

The *EPBC Act* also provides that approval from the Commonwealth Environment Minister is required for:

- An action on Commonwealth land that has, will have, or is likely to have a significant impact on the environment.
- An action outside Commonwealth land that has, will have or is likely to have a significant impact on the environment on Commonwealth land.
- An action undertaken by the Commonwealth which has, will have or is likely to have a significant impact on the environment anywhere in the world.

Within the SIP, the Somersby Mintbush (*Prostanthera junosis*) is the only fauna or flora species listed under the *EPBC Act* as a threatened species.

1.2.2 Environmental Planning and Assessment Act, 1979

The *Environmental Planning and Assessment Act (EP&A Act) 1979* controls planning and development in NSW. The *EP&A Act* and the *Environmental Planning and Assessment Regulation 2000 (EP&A Regulation)* establish a process of environmental assessment and approvals for development.

The objects of the *EP&A Act* are:

- (i) To encourage:
 - the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment;
 - the promotion and co-ordination of the orderly and economic use and development of land;
 - the protection, provision and co-ordination of communication and utility services;
 - the provision of land for public purposes;
 - the provision and co-ordination of community services and facilities;
 - the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats;
 - ecologically sustainable development;
 - the provision and maintenance of affordable housing.
- (ii) To promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and
- (iii) To provide increased opportunity for public involvement and participation in environmental planning and assessment.

1.2.3 National Parks and Wildlife Act 1974

In relation to the SIP, the *National Parks and Wildlife Act 1974 (NPW Act)* provides the basis for conservation and protection of native flora/fauna as well as Aboriginal places.

The objectives of the *NPW Act* are:

- (i) The conservation of nature, including, but not limited to, the conservation of:
 - (a) habitat, ecosystems and ecosystem processes,
 - (b) biological diversity at the community, species and genetic levels,
 - (c) landforms of significance, including geological features and processes, and
 - (d) landscapes and natural features of significance including wilderness and wild rivers.
- (ii) The conservation of objects, places or features (including biological diversity) of cultural value within the landscape, including, but not limited to:
 - (a) places, objects and features of significance to Aboriginal people,
 - (b) places of social value to the people of New South Wales, and
 - (c) places of historic, architectural or scientific significance.
- (iii) Fostering public appreciation, understanding and enjoyment of nature and cultural heritage and their conservation.
- (iv) Providing for the management of land reserved under the Act in accordance with the management principles applicable for each type of reservation.

The *NPW Act* provides the primary basis for the legal protection and management of Aboriginal sites within NSW. The implementation of the Aboriginal heritage provisions of the Act is the responsibility of the NSW Department of Environment and Conservation (DEC) which was formerly known as the National Parks and Wildlife Service.

The rationale behind the Act is the prevention of unnecessary or unwarranted destruction of Aboriginal objects and the active protection and conservation of Aboriginal objects that are of high cultural significance. With the exception of some artefacts in collections, or those specifically made for sale, the Act generally defines all Aboriginal artefacts to be 'Aboriginal objects' and to be the property of the Crown. The Act then provides various controls for the protection, management and destruction of these objects.

1.2.4 Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995 (TSC Act)* provides the basis for protection and management of threatened species, populations and ecological communities.

The objectives of the *TSC Act* are to:

- Conserve biological diversity and promote ecologically sustainable development.
- Prevent the extinction and promote the recovery of threatened species, populations and ecological communities.
- Protect the critical habitat of those threatened species, populations and ecological communities that are endangered.
- Eliminate or manage certain processes that threaten the survival or evolutionary development of threatened species, populations and ecological communities.
- Ensure that the impact of any action affecting threatened species, populations and ecological communities is properly assessed.

- Encourage the conservation of threatened species, populations and ecological communities by the adoption of measures involving co-operative management.

1.2.5 Fisheries Management Act, 1994

The objects of the *Fisheries Management Act 1994 (FM Act)* are to conserve, develop and share the fishery resources of NSW for the benefit of present and future generations. The particular objects of this Act of relevance to the POM include:

- (a) conserve fish stocks and key fish habitats, and
- (b) conserve threatened species, populations and ecological communities of fish and marine vegetation, and
- (c) promote ecologically sustainable development, including the conservation of biological diversity,

Threatened fish and marine vegetation are managed under part 7A of the *FM Act*. It is noted that fish are not technically fauna for the purposes of the *TSC Act*. The definition of 'fish' includes marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history (whether alive or dead). This includes aquatic invertebrates and, hence, includes the Adam's Emerald Dragonfly (*Archaeophya adamsi*).

1.2.6 Rivers and Foreshores Improvement Act 1948

The *Rivers and Foreshores Improvement Act 1948 (RFI Act)* provides for the carrying out of works for the removal of obstructions from and the improvement of rivers and foreshores and the prevention of erosion of lands by tidal and non-tidal waters. This Act is progressively being repealed and its provisions incorporated into other Acts, most notably the *Water Management Act 2000*.

The NSW Department of Infrastructure, Planning and Natural Resources (DIPNR) has an approval role, under the *RFI Act*, for any works within 40 metres of a "river" as defined under the Act. In undertaking this approval role, DIPNR is seeking positive outcomes for the environment from any proposed development adjacent to any "river". If development is proposed within 40 metres of a "river" and there is not expected to be a positive outcome for the environment, then DIPNR may not give approval for that development.

Without an overall strategy for a development site, an individual assessment of each watercourse would be required which is a potential point of delay for any development.. This POM provides an overall strategy for the SIP and the approval process under the RFI Act will therefore be more streamlined.

While the *RFI Act* does not specify how close development can occur to a watercourse ("river" as defined under the *RFI Act*), DIPNR takes into consideration a number of factors in determining an appropriate riparian buffer:

- The number of watercourses and the overall management strategy for those watercourse and buffers within the development area. The management strategy would include any rehabilitation of the watercourse and riparian vegetation, and the long term maintenance and management of the buffer area.
- The location of the watercourse within the catchment and whether it is a minor tributary.
- The current condition of the bed and banks of the watercourse (if it is degraded or in a natural state).
- The current extent, condition and type of any riparian vegetation.
- The potential impacts of the proposed development adjacent to the buffer.

As a general guide, for watercourses that are tributaries, a minimum buffer of 20 metres on both sides of the watercourse would be acceptable provided a program of rehabilitation and maintenance of the

watercourse and buffer is included in the proposal. As the importance of the watercourse increases, the width of the buffer would be expected to increase.

Smaller or no buffers may be agreed to for watercourses that are minor tributaries, where those watercourses are degraded and with poor riparian vegetation, if the proposal includes the rehabilitation and maintenance of other riparian areas that provide an overall positive impact for the environment.

1.3 Objectives of the POM

The POM brings together in a single document the central findings of various investigations into the SIP that will facilitate assessment of development and management of the SIP. The POM will allow more effective management of the SIP through conservation and protection of significant values of the area.

The objectives of the POM as stated in the study brief are to:

1. Identify areas where development can proceed (subject to development assessment and approval processes).
2. Identify areas of biodiversity value that should be protected.
3. Identify sites of Aboriginal heritage significance, as well as areas of significance to the Darkinjung people.
4. Identify management strategies for the future protection and conservation of the SIP, including mitigation and monitoring works required.

It is envisaged that the POM will ultimately lead to a Local Environmental Plan (LEP) and Development Control (DCP) which would be developed by the Gosford City Council.

The POM will benefit landholders who adhere to the parameters of the Plan as:

- Landholders will have reduced requirements in undertaking any necessary flora and fauna, and Aboriginal heritage assessments.
- The assessment of development applications will be significantly streamlined.
- Developers will have forewarning of the likely constraints on their land.

1.4 Somersby Industrial Park Taskforce

The SIP Taskforce, which is chaired by the NSW Premier's Department, has been set up to oversee the preparation of the POM. The Taskforce brings together all agencies and stakeholders (including landholders) with an interest or statutory role in the future development of the SIP to provide a holistic approach to the future management of the area.

The Taskforce has agreed to prepare the Plan of Management and has overseen a range of investigations into the SIP to enable formulation of a workable management framework for the future development of the SIP.

The Taskforce comprises:

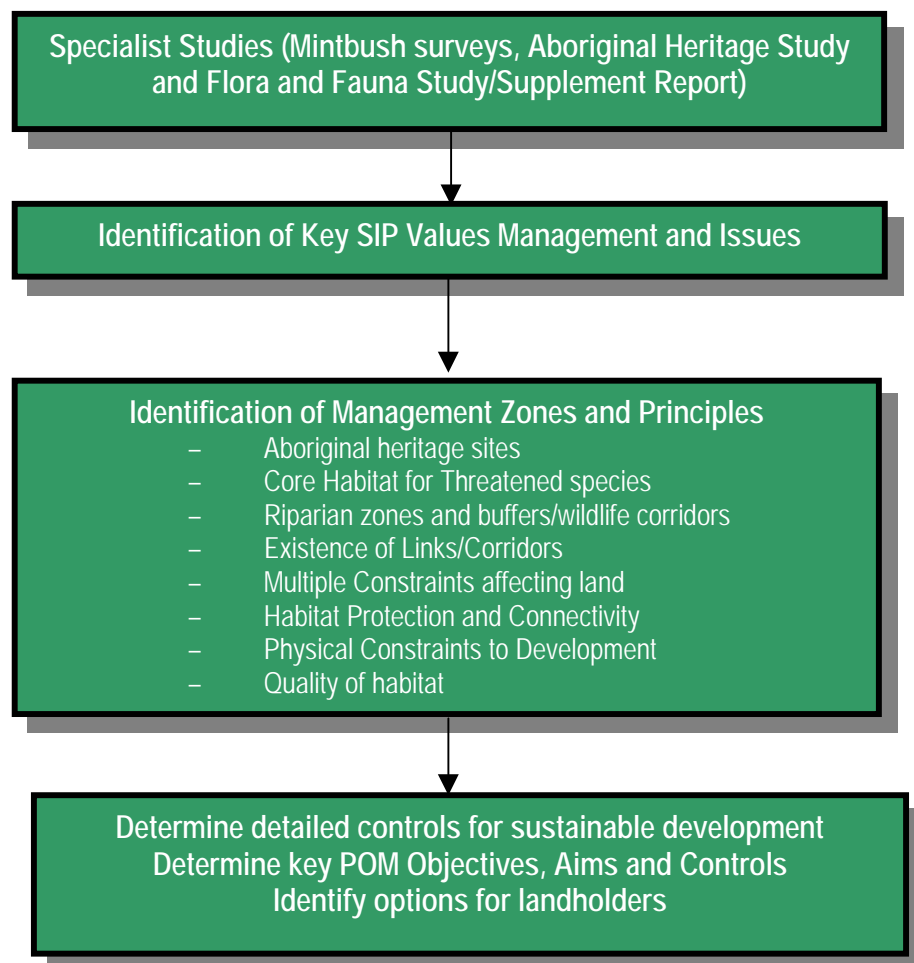
- NSW Premier's Department
- NSW Department of State and Regional Development
- Gosford City Council
- Business Central Coast
- Department of Environment and Conservation (formerly the NSW National Parks and Wildlife Service)
- Department of Infrastructure, Planning and Natural Resources (formerly PlanningNSW and the Department of Land and Water Conservation)

- SIP Land Owners Association
- Darkinjung Local Aboriginal Land Council
- NSW Rural Fire Service
- NSW Department of Primary Industry (formerly NSW Fisheries).

This project is being undertaken with the close co-operation of the Task Force as well as all key stakeholders.

1.5 POM Process

The diagram below shows how the study results have been considered in the preparation of the *Draft* POM including the determination of management controls.



1.6 Consultations

Consultation is a key component of the POM. The involvement of stakeholders including landowners, Council and relevant authorities is vital to ensuring the final Plan results in outcomes that actually reduce the barriers to development whilst conserving the environmental/Aboriginal attributes of the area.

A number of workshops have been held to discuss the Preliminary Draft POM and to provide a forum for feedback on the proposals. These workshops were held on:

- 26 August 2003 (environment groups)

- 27 August 2003 (Gosford Councillors briefing)
- 28 August 2003 (Landholders)
- 16 October 2003 (Landholders 2nd workshop)

Key issues raised during the consultation included:

- Impacts on individual property owners; particularly those most affected.
- Buffer zones: how were these objectively determined.
- Recourse for landowners/compensation/strategy for Incentives.
- It was suggested there could be an environmental levy that is imposed on the wider community to help compensate landowners.
- Ravenson Close – Compensation for severely affected sites (eg land swap).
- The impact of the Service Agreement
- Economic building envelope on lots have to be maintained/viability of SIP in danger.
- Timeframe for finalisation – concern over further delays.
- How will buffer/areas be measured.
- What defines Aboriginal carving/can these be proven to have been created by Aboriginal people?
- Economic value of SIP must be stressed.
- Various matters relating to detailed issues on individual properties such as the dimensions of proposed management zones.

At the workshop of October 16, opportunity was given to participants and other interested parties to lodge submissions and suggestions. Ten (10) submissions were received and these have been taken into account.

These workshops and the consideration of submissions have resulted in refinements to the Preliminary Draft POM with the aim of making the document more workable and allow a more ready translation into statutory controls.

Some of the landholders have made representations and submissions on the proposed recommendations of the Draft POM during the consultation period, and have indicated concerns with the potential impacts on economic development of the SIP. These have been taken into account in formulating this draft Plan of Management.

2. Identification of SIP Values

2.1 Introduction

This section briefly summarises the investigations that have been carried out into the natural and man-made environment of the SIP. This section also presents the key recommendations from these studies which include:

- Somersby Mintbush Surveys (NPWS)
- *Species Assessment Report, Somersby Industrial Park*, Australian Museum Business Services (1997)
- *Aboriginal Heritage Study for Plan of Management*, Australian Museum Business Services (2002).
- *Systematic and Targeted Fauna Surveys in the Gosford City Area*, Australian Museum Business Services (2000).
- *Flora and Fauna Study*, Connell Wagner (2003).
- *Supplement Report to Somersby Industrial Park Flora/Fauna Report*, Connell Wagner (2005)
- Various environmental assessments carried out for development applications within the SIP

The previous investigations have established that the SIP contains a number of significant environmental and Aboriginal values that warrant conservation and protection. To provide background to the POM values, the following sections briefly describe the SIP and then detail the recommendations of the various previous studies before outlining the key values of the SIP.

2.2 Location and Development History

The SIP is located on the Somersby Plateau section of the Hunter Range on the Central Coast of New South Wales. The SIP contains approximately 300 hectares of land zoned for industrial purposes and is located four to five kilometres west of Gosford (Figure 2.1).

The SIP is bisected by the Sydney-Newcastle F3 freeway which was constructed in the 1980s, and there are direct connections to the F3 from the SIP. The SIP is also served by a number of internal roads that provide access to all allotments in the park.

Early settlement in the Somersby area occurred in the later 1800s. The Somersby area was exploited for timber and for the resin of the grass trees. When land subdivision took place, a number of settlers moved into the area and established orchards and other agricultural activities (AMBS, 1997).

Around 1910, there was relatively little land under cultivation, however, post-WW1 the extent of land cleared increased significantly although it still remained confined within the general bounds of the SIP. The most significant alterations to the landscape occurred following the gazettal of the industrial park in 1981. By 1999 only a few isolated pockets of untouched bushland remained with the majority of the SIP having been built upon, cleared of trees and/or shrub understorey cleared by heavy machinery (AMBS, 1997:8).

The SIP was officially opened in June 1980. In July 1981, Local Environmental Plan (LEP) No. 22 was gazetted which zoned the majority of the SIP for General Industrial 4(a1) with a small area zoned for Business 3(a2).

Figure 2.3 is an aerial photograph taken in December 2002, which shows the extent of development that now exists in the area. The main developments in the area include warehouses and factories with service roads constructed to provide access to new allotments. Around 100 hectares (around 30%) of the SIP has developed and, consequently substantial areas remain undeveloped. These undeveloped areas represent a significant source of employment lands in the Gosford LGA and the Central Coast region. The SIP is strategically located with respect to major transport corridors (F3 freeway) and the extent of available employment lands in the Gosford LGA is steadily declining.

The SIP has been the subject of subdivision and is now fragmented into approximately 120 individual ownerships (Figure 2.4). Given this fragmentation there is a need to ensure that there are consistent approaches to conservation and development of the remaining areas that have potential for industrial development.

2.3 Topography and Drainage

The topography of the SIP reflects the soil landscapes on the site (Figure 2.2). The SIP is situated on the Somersby Plateau and has a maximum elevation of 220 metres AHD (Australian Height Datum) falling to around 120 metres AHD in the south. Piles Creek is a creek that runs through the SIP which flows in a north-south direction, and is joined by a number of un-named tributaries that originate in the SIP. These are defined as "rivers" under the *Rivers and Foreshores Improvement Act, 1948 (RFI Act)* and specific controls under this Act apply to these lands. (Figure 2.2).

The SIP effectively constitutes the upper catchment of the western arm of Piles Creek which itself winds through the Brisbane Water National Park to meet Mooney Mooney Creek just south of the Mooney Mooney Bridge. For the purposes of this POM, Piles Creek and its un-named tributaries are collectively termed "Piles Creek". Any land which adjoins or directly influences the creek is termed the "Piles Creek riparian zone". This zone is largely contained within Council owned land, however, the riparian zone also extends onto private land in some areas. This is mostly in the upper reaches of the catchment where subdivision and dedication of this riparian zone has not occurred (as for the lower reaches).

The northern end of the SIP is characterised by a series of outcropping sandstone benches and isolated boulders. The lower, southerly terrain of the SIP is predominantly low lying open landscapes that previously contained a number of hanging swamps and swampy land.

Large sections of the SIP have been cleared since the industrial zoning of these lands. This has altered the landscape significantly, particularly in the central areas of the SIP. This has altered the topography of the lands as well as the vegetation cover. Some of the cleared areas have re-grown, while other areas have been maintained as cleared land or developed.

2.4 Soil Landscapes

The SIP contains three soil landscapes – Somersby, Sydney Town and Gynea (Murphy 1993: Figure 2.2). The Somersby soil landscape is located on the northern and eastern extremities of the SIP. The Somersby soil landscape is a residual soil landscape, characterised by gently undulating low rises to rolling rises on a deeply weathered Hawkesbury sandstone plateau. Slopes are typically less than 15% and with rock outcrops absent. Soils are moderately deep to deep yellow earths and earthy sands on crests and slopes with grey earths in poorly drained areas and sands along drainage lines.

The Sydney Town soil landscape is located across much of the SIP. The Sydney Town is an erosional soil landscape, characterised by undulating to rolling low hills moderately inclined slopes on quartz sandstone. Ridges and crests are moderately broad, slopes moderately inclined to gradient of 25%. Soils are shallow to deep yellow earths and sands on crests and slopes, shallow to moderately deep sands and grey earths in poorly drained areas. Moderately deep yellow podsolc soils and gleyed podsolc soils and yellow podsolc soils associated with shale lenses. Occasionally, rock benches are present.

The Gynea soil landscape is located in the north east of the SIP. The Gynea is an erosional soil landscape, characterised by broad convex crests, moderately inclined side slopes with wide benches and Hawkesbury sandstone rock outcrops on low broken scarps. Slopes vary from 10 to 25%. Soils are shallow to moderately deep yellow earths and earthy sands on crests and sands along drainage lines. Gleyed podsolc soils and yellow podsolc soils are associated with shale lenses.

2.5 Flora and Fauna

2.5.1 Pre-Development Vegetation

AMBS (2002) provides a brief description of the historic vegetation coverage that existed before the land clearing that has occurred in the SIP. The landscape around Mt Penang in the early 20th century was lightly timbered and relatively open with a grassy understorey. There were greater numbers of swampy areas and higher numbers of grass trees (*Xanthorrhoea* spp.).

Land surveyors' comments from the turn of the century (1892–1909) also provide some evidence of the historic landscape of the area. Within the SIP, the landscape was described as undulating terrain with a poor sandy soil (AMBS, 2002:5). Tree species described at this time included Gum, Oak, Stringybark, Bloodwood and Peppermint. The general interpretation for the change in the vegetation landscape, broadly speaking, from open to closed undergrowth, is a combination of tree clearing, agriculture, changed burning regimes and colonisation by exotic species (Benson & Howell 1990).

Figure 2.5 shows the SIP vegetation map as it exists today. This is based on the vegetation classification system adopted by the Lower Hunter and Central Coast Regional Environmental Management Strategy (LHCCREMS, 2000). This provides a common method of classification for the Lower Hunter and Central Coast Areas and it was considered appropriate to adopt this classification.

2.5.2 Flora/Fauna Studies

The flora/fauna of the SIP has been investigated in a number of studies, which vary from broad area studies, such as that of Benson and LHCCREMS down to the site specific study of AMBS (refer Table 2.1). The site specific study of AMBS (1997) has been the only other detailed assessment of the SIP itself and it is important to understand its relationship to the POM.

Comparison of the vegetation mapping efforts that have covered the SIP area show apparent and substantial differences in the boundaries and apparent classes of vegetation which is largely a result of the scale and effort used to investigate the SIP area. Table 2.1 shows the main differences in mapping scales and the key differences in the mapping results.

Table 2.1: Previous Vegetation Mapping

Investigation	Map Scale Used	Key Differences in Mapping
Benson and Fallding (1981) and Benson (1986)	1:100,000 to 1:50,000 (Broad)	Provides useful understanding of regional variations and differences in vegetation but uses very large scale that does not capture small scale differences. Not SIP specific mapping.
LHCCREMS (2000)	1:25,000. (Broad)	Comprehensive regional model using agreed and consistent vegetation descriptions. Uses large scale mapping that provides approximate vegetation boundaries. Not SIP specific mapping.
AMBS (1997)	1:16,000 (SIP specific mapping)	First detailed assessments of SIP flora/fauna. Uses vegetation classification system and larger scale mapping/aerial photography. SIP specific mapping.
Connell Wagner (2003)	1:4,000 (SIP specific mapping)	Most detailed assessments carried out to date on the SIP area. Adopts vegetation classification used in LHCCREMS for regional consistency but uses smaller scale mapping to accurately define vegetation class boundaries. SIP specific mapping.

Until relatively recently, a common method of vegetation classification was not available. However, vegetation mapping conducted under the Lower Hunter and Central Coast Regional Environmental Management Strategy (LHCCREMS, 2000) now provides a common method of classification for the Lower Hunter and Central Coast Areas. It is considered appropriate to adopt the vegetation

classification system of LHCCREMS (2000) for this study, as it provides for an objective system of classification that is directly applicable to the local area and region.

The vegetation mapping of AMBS (1997) was considered during this study, however, was not adopted as a baseline since it did not match the methodology or community classification of LHCCREMS, which led to differing unit boundaries. AMBS (1997) delineated vegetation communities according to structural differences observed on aerial photographs. Botanical descriptions of these communities were then compiled for each of the units according to standards used by the National Herbarium of NSW (AMBS 1997). LHCCREMS (2000), however, used floristic data (not structure) to define plant communities.

The differences in methodologies have resulted in a number of changes between the boundaries of vegetation units and a re-defining of vegetation units. The changes in boundaries of comparable vegetation units are a by-product of the use of different methodology, more detailed aerial photography in this study (1:4000 scale vs 1:16000 of AMBS 1997) and the changes to vegetation over time. The regeneration over time and disturbances since 1997 are also likely to have changed the boundaries of the AMBS (1997) map units. As the methods used in this study are based on the composition of a community, they are not considered likely to change over the life of the POM, unless heavily disturbed. The vegetation mapping of AMBS (1997) was considered during this study, however, was not adopted as a baseline since it did not match the community classification of LHCCREMS which led to differing unit boundaries.

Key recommendations from the AMBS (1997) study include:

- Consideration of purchase of lots with large populations of *Prostanthera junosis*.
- Council request that a species recovery plan for *Prostanthera junosis* be expedited.
- Council ensure that detailed assessment of sites containing *Prostanthera* sp. be undertaken.
- Restrict industrial developments in areas where *Darwinia glaucophylla* and *Gonocarpus salsoides* occurs.
- Ensure erosion and sedimentation controls take into consideration these species.
- Ensure that the hydrology of sites where these species occur is not significantly altered.
- Ensure that fire reduction burns (frequency regimes) and land disturbance be thoroughly investigated prior to execution.
- Provide further protection of areas of sedgeland habitats as they are important habitat for a number of significant and threatened flora and fauna species.
- Provide further protection of all threatened fauna habitat, particularly where regionally significant threatened populations occur including their habitats including sedgelands, hanging swamps and drainage lines (Red-crowned Toadlet), open forest/woodland and hollow bearing trees (Greater Broad-nosed Bat), riparian habitat along Piles Creek (Eastern Chestnut Mouse).
- Prepare species management plans for threatened fauna. Similar protective strategies should also apply, as a precautionary measure, to those species considered *highly likely* to occur on the study area owing to the presence of 'optimal' habitat. These species are the Giant Burrowing Frog and Rosenberg's Monitor.
- Ensure retention of Open Forest and Woodland areas along the northern portion of the study area.
- Hollow-bearing trees to be retained where possible within landscaped areas on all sites.
- Maintenance of Closed Heathland Communities.
- Minimal disturbance to existing drainage lines particularly those that feed Sedgeland areas.
- In addition to the drainage reserve bordering Piles Creek, a 50 metre vegetation buffer should be provided on either side of the creek north of the Pacific Highway and south of Somersby Falls Road. This would likely assist in the protection of habitat (known and potential) for *Darwinia glaucophylla*, Red-crowned Toadlet and Eastern Chestnut Mouse.

Additional recommendations included:

- Monitoring and control of effluent and contaminants entering Piles Creek.
- Monitoring of pH levels within Piles Creek.
- Removal of masonry rubble from within Piles Creek.
- Implementation of erosion control measures on all proposed development sites.
- Implementation of maintenance programs to reduce 'edge-effects' such as weed invasion, where native vegetation is retained.

2.6 Somersby Mintbush

2.6.1 Somersby Mintbush Surveys

The former NSW National Parks and Wildlife Service (NPWS: the Service has been incorporated into a new Department of Environment and Conservation – DEC) has undertaken surveys of the Somersby Mintbush (*Prostanthera junonis*) over the past three to four years to define more precisely the extent of the spatial distribution of this species in the SIP. These surveys have identified additional locations of the Mintbush, with the extent of the known major populations shown in Figure 2.5.

2.6.2 Somersby Mint Bush Recovery Plan

A recovery plan has been prepared for the Somersby Mintbush. This species is a low spreading shrub 0.1-0.3 m high, with small pale mauve flowers. It has dull green leaves on long branches generally entwined amongst other vegetation.



Somersby Mintbush

P. junonis is listed as nationally endangered under the *EPBC Act*. It is also listed as endangered on Schedule 1 of the *TSC Act*. *P. junonis* is currently known from a north-south range of 19 km on the Somersby Plateau, north west of Gosford, NSW. The total number of individuals is currently estimated to be greater than 3200, distributed across thirteen populations

The *P. junonis* Recovery Plan was prepared in accordance with the provisions of both the *EPBC Act* and the *TSC Act*. The *TSC Act* requires Ministers and public authorities (including the DEC) to take appropriate action to implement those measures in a Recovery Plan for which they are identified as being responsible.

In addition, a Minister or public authority must not undertake actions inconsistent with an approved Recovery Plan. Public authorities identified as having responsibilities under this plan are the DEC (NPWS), Gosford City Council, Wyong Shire Council, and the Department of Infrastructure, Planning, and Natural Resources (DIPNR – formerly the Department of Land and Water Conservation – DLWC). Consequently, these public authorities have agreed to manage *P. junonis* and its habitat in accordance with this recovery plan.

The specific objectives of the Recovery Plan are to:

- Ensure that *P. junonis* populations are not destroyed as a consequence of habitat loss, and that an increased level of security is provided over lands which support *P. junonis* populations (Reservation/Conservation Status of Populations);
- Minimise the risk of *P. junonis* populations from declining in the long term through encouraging the implementation of appropriate threat and habitat management practices (Threat and Habitat Management);
- Establish the full extent of the distribution of *P. junonis* (Survey);
- Ensure the management of *P. junonis* habitat is informed by essential aspects of the species' biology and ecology (Biological Research);

- Determine whether a declaration of critical habitat for *P. junonis* will provide greater protection for the species than which currently exists (Critical Habitat);
- Understand the requirements for safeguarding genetic diversity of *P. junonis* for the purpose of reintroduction, following the extinction or irreversible decline of natural populations (*Ex situ* Conservation); and
- Raise awareness among the broader community about the conservation status of *P. junonis*, and to involve the community in the species' recovery program (Education/Awareness and Involvement).

The Recovery Plan consists of seven specific objectives, which aim to achieve the overall recovery objective. Each of these objectives has a series of specific supporting actions, which identify the agency responsible for implementation, and a timeframe in which the action is to be completed (see implementation schedule). Recovery actions will be directed towards:

- Securing protection of populations of the species from habitat loss;
- Habitat management initiatives, including: the storing and communication of site locations, consideration of development applications and environmental assessment guidelines, fire management, and site specific management actions;
- Targeted survey to determine the extent of known populations and whether there are new undiscovered populations;
- Undertaking research which investigates key attributes of the species' biology relevant to management;
- Assessing the appropriateness and feasibility of declaring critical habitat for the species;
- Investigating the requirements for *ex situ* storage, if required; and
- A greater community involvement in the recovery program for the species

Landholders with properties that contained *P. junonis* populations were invited to meet with Gosford City Council and Taskforce representatives to discuss the implications of having this species on their sites and the existence of the species on their sites and to seek feedback in the preparation of the POM.

2.6.3 2003 Flora/Fauna Study

A Flora Fauna Report (Connell Wagner, 2003) was commissioned to further investigate the SIP in more detail and this confirmed that the SIP contains threatened vegetation and fauna species. While there are cleared areas, or areas with heavily modified vegetation, areas and ecosystems remain that are significant. Development has the potential to adversely impact on threatened flora/fauna and these areas of significance as identified in the Flora Fauna Report.

Subsequent to the preparation of the Flora and Fauna Report, an additional threatened species was identified within the SIP in 2005. *Hibbertia procumbens* (Labill.) DC (Dilleniaceae) is listed under the *Threatened Species Conservation Act 1995* as an endangered species. During the original survey for the SIP, this species was considered extremely rare in New South Wales with only two known records (Bell 2002) neither of which occurred in close proximity to the SIP. The closest occurrence was at Mt White some 10 kilometres to the south.

Despite numerous searches of areas within the SIP, including the comprehensive surveys of Connell Wagner (2003) and AMBS (1997), this species was not located until early 2005. The 2003 Flora Fauna Report identified *Hibbertia procumbens* as a threatened species that occurs in the Gosford local government area (LGA) and it was targeted during the 2003 investigations (refer Table 5.1 of the Somersby Industrial Park Flora/Fauna Report) but was not detected. It is noted that the 2003 survey was conducted during a prolonged dry period, with the distinctive flowering of *Hibbertia procumbens* possibly having been impeded by lack of rainfall. It was therefore concluded that there was a relatively low likelihood of occurrence given the fact that there were no recordings of *Hibbertia procumbens* over a number of surveys in and around the immediate areas of the SIP and its known

restricted occurrence. However, the absence of this species was not conclusive, as *Hibbertia procumbens* required flowering material in order to positively confirm its presence in the SIP.

After the 2003 Flora and Fauna Study was completed several new records were made in the local area, some within a short distance of the study area and one within the SIP itself. Records for this species now span an area from Mount White in the south to Mangrove Mountain in the north, the Mangrove Creek area to the west and Strickland State Forest to the East (DEC Online Atlas of NSW Wildlife, January 2005).

In response to the new records, Connell Wagner was commissioned to undertake additional investigations to determine the distribution of *Hibbertia procumbens*, its habitats and the conservation significance of these within and adjacent to the SIP. A *Supplement Report to Somersby Industrial Park Flora and Fauna Study* ("the *Supplement Report*") was prepared in 2005 to identify:

- Locations within the SIP of *Hibbertia procumbens*.
- Areas of habitat for *Hibbertia procumbens*.
- The conservation significance of *Hibbertia procumbens* in the SIP.
- Areas of significant habitat of *Hibbertia procumbens*; and
- Feasible impact mitigation measures or management recommendations based on the findings of this study.

Appendix A contains the complete *Supplement Report* while Figure 2.5 details the major populations identified by the 2005 surveys in and around the SIP.

Together with the Flora and Fauna Report, it has been concluded that threatened species within the SIP that were likely to be impacted by development of the SIP include:

- Three threatened flora species (*Darwinia glaucophylla*, *Hibbertia procumbens* and *Prostanthera junonis*).
- Several threatened fauna species including two amphibians (Red-crowned Toadlet and Giant Burrowing Frog), the Heath Monitor, two forest birds (Speckled Warbler and Brown Treecreeper), two non-flying mammals (Eastern Chestnut Mouse, Eastern Pygmy-possum), four flying mammals (Eastern False Pipistrelle, East Coast Freetail Bat, Greater Broad-nosed Bat, Southern Myotis) and Adams Emerald Dragonfly.



Red Crowned
Toadlet

Following consideration of the additional information contained in the *Supplement Report* and the information contained in the original the Flora Fauna Report, habitat areas within the SIP have been defined as being either *Significant Habitat* or *Habitats Linkages*. That is, for each of the identified "significant species", areas were defined that were considered to be of key importance to their long term survival of areas. Figure 2.6 overlays all of these individual layers for each species into one figure. This shows the existence of suitable habitat of threatened species in the SIP. It is noted that these areas defined for individual species have been prepared in isolation from the consideration of other threatened species in the SIP and overlap between different species' habitat occurs.

Table 2.2 briefly highlights the range of factors that have been considered when defining the extent of *Significant Habitat* or *Habitats Linkages* in the SIP to take into account this potential overlap.

Table 2.2: Factors Considered in Identifying Significant Habitat and Habitat Linkages

Factors Considered in Identifying Significant Habitat and Habitat	
Size and Shape of Habitat	<p>Ideally, significant habitats are areas with a low edge to area ratio as:</p> <ul style="list-style-type: none"> • <i>These areas are less vulnerable to threats from edge effects and edge predators;</i> • <i>From observations of habitats on the SIP, larger areas are also more likely to provide a greater range of resources than are smaller, disturbed habitats.</i>
Condition	<p>Better quality habitats are more likely to provide the natural processes that support a population of a threatened species. As such, significant habitats should:</p> <ul style="list-style-type: none"> • <i>Contain a diversity of native species and structure commensurate with vegetation approaching a natural state; and</i> • <i>Contain few to no weed species.</i> <p>Habitat can become degraded over time if it is situated in an area that is subject to disturbance from adjacent development or other more intensive land use (eg edge effects, lower water quality, changed hydrological regimes, pollution from accidental chemical spills). As such, significant habitats should:</p> <ul style="list-style-type: none"> • <i>Be located in a catchment that is largely vegetated and as such is less likely to become degraded from changes to hydrology and water quality from adjacent development (See King and Buckney 2000);</i> • <i>Be located up slope or across slope from more intensive land uses.</i>
Connectivity	<p>Ideally, significant habitats are linked to other habitats as:</p> <ul style="list-style-type: none"> • <i>Isolated habitat is more vulnerable to localised extinction from catastrophic events and as such are less likely to contribute to the long term viability of a local population;</i> • <i>Isolated habitats are likely to have a limited carrying capacity, which may result in inbreeding depression and ultimately the decline and extinction of a species from the isolated remnant.</i>
Representativeness	<p>As significant and core habitats are those most likely to be conserved or afforded some protection in the POM, it is necessary that these provide a representative range of the habitats of significant species. The greater diversity of habitats is likely to provide a more robust and reliable resource base for a species, and is seen to maximise the value of a significant habitat for a significant species.</p>
Key Threatening Processes	<p>There are a number of key threatening processes potentially relevant to the SIP and significant species, which includes:</p> <ul style="list-style-type: none"> • The clearing of native vegetation and removal of habitat • Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands • Alteration to water quality • Altered fire regimes • Weed invasion through poor management practices and use of non-indigenous plants; <p>While several of these processes can be controlled through development and management controls, a number of these may not be. As such, the likelihood and potential effect of these threatening processes must be considered when identifying significant habitats.</p>

This overlap provided an opportunity to refine the areas within the SIP that would be suitable for the long term protection of all threatened species. In consideration of these areas of overlap and the factors identified in Table 2.2, the key areas identified as having major significance for the long term survival of threatened species in the SIP included:

- The Piles Creek riparian zone. This area has previously been recommended for protection and it is a major habitat resource for many of the significant threatened species.

- Areas with significant populations of *Prostanthera junosis*.
- Areas of sedgeland (hanging swamps) as these provide habitat for significant threatened species such as *Darwinia glaucophylla*.
- Areas of Open Forest and Woodland along the northern portion of the study area.

These areas, defined as areas of "combined significant habitats", are shown in Figure 2.6. These are considered to be of greatest importance for the significant threatened species identified in the SIP.

2.7 Aboriginal Heritage

The Gosford area is identified by the Darkinjung Local Aboriginal Land Council as being of traditional significance to their history of occupation in the area. The SIP is known for its many Aboriginal objects identified from investigations carried out since the 1930s. In particular, the area is renowned for its rock art and there are many unique examples of this form of art within the SIP.

Sites within the SIP that comprise Aboriginal objects are considered to be of Aboriginal heritage significance. They are also protected by the NSW *NPWS Act*. Consequently, actions are required to protect and enhance them to ensure their value is preserved for future generations.

The Australian Museum Business Services Aboriginal Cultural Heritage Study of the SIP (AMBS, 2002) built upon previous work in the SIP and identified a range of key threats to the values of these sites. The study also outlined a series of management recommendations to preserve and enhance these values. These investigations and management recommendations have been carried out in close consultation with the Darkinjung Local Aboriginal Land Council.

The AMBS report made the following recommendations:

- Establish management zones that include the broadest range of natural and Aboriginal heritage values possible.
- Retain all sites with rock art within the SIP
- Retain a representative sample of grinding grooves within the SIP

These recommendations assist in developing performance controls for these sites and for later inclusion in the LEP/DCP. There are also a range of threats to the identified sites that will need to be managed through the POM:

- Land clearance and construction activities
- Soil erosion and encroaching vegetation
- Exposure and weathering
- Water flow
- Heavy machinery
- Storage and dumping of equipment/materials
- Inappropriate recreational use of rock platforms
- Airborne pollution
- Graffiti.

Some of these threats can be managed through the planning process (eg land clearance/construction activities that would be controlled through planning controls) while others will require management action/s by others (eg Council through the consent process/NPWS through protection measures under the *NPW Act*). It is noted that future development proposal on these lands will be required to demonstrate they do not adversely impact on the sites.

Management zones for larger sites and multiple sites, and buffers around individual sites, have been identified by AMBS as the key means of protection of these sites (refer Figure 2.7). All landowners

having such sites on their land have been contacted by the Council and Premier's Department and made aware of their existence and significance..

2.8 Summary of SIP Values

Previous investigations have revealed a range of values in the SIP that warrant conservation and protection. There are also a range of development constraints that also must be recognised in the overall management of the SIP.

It is necessary to define the values of the SIP as this serves a number of purposes:

- It allows identification of key environmental and Aboriginal heritage attributes worthy of protection and management.
- It recognises the value of the SIP in terms of its role in employment function as an industrial area.
- It provides the Council and community with a clear understanding of the manner in which the SIP can be developed.

The SIP contains vegetation and fauna species that are threatened and afforded the protection of NSW and Commonwealth legislation (the latter in relation to *P. junonis*). Further, the SIP contains a significant number of sites of Aboriginal heritage significance that are protected under the *NPW Act*.

Whilst these may be viewed as constraints to development, they are also values that should be recognised in the POM as they have the potential to make the SIP a unique industrial area where environmental and social values can co-exist with economic development.

In summary, the key values of the SIP are:

- **Economic values** in that the SIP provides substantial employment and industrial development opportunities.
- **Ecological and environmental values** relating to the remnant native vegetation which provides significant habitat and linkages for a range of threatened flora and fauna species as well as other species.
- **Aboriginal heritage values** arising from previous indigenous occupation of the area and represented by unique rock art and culturally significant sites.

To maintain and enhance these values, the POM therefore must provide management strategies that can be used as the basis for the preparation of appropriate statutory documents (Viz LEP/DCP). These considerations are outlined in the following sections.

2.9 Ecologically Sustainable Development

The POM must also address issues relating to the principles of Ecologically Sustainable Development. The key principles of ESD are:

- The ***precautionary principle***, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- ***Inter-generational equity***, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.
- ***Conservation of biological diversity and ecological integrity***, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.
- ***Improved valuation, pricing and incentive mechanisms***, namely, that environmental factors should be included in the valuation of assets and services.

3. Management Issues

3.1 Key Management Issues

The key management issues relating to the SIP values can be summarised as:

- Clearing of native vegetation and habitat removal.
- Maintenance of significant habitat linkages and wildlife corridors.
- Management of riparian areas.
- Changes to natural hydrological (water) flow regimes and water quality impacts.
- Impacts on Aboriginal heritage sites.
- Bushfire management.
- Physical constraints to development.

The resolution of these issues will require a range of management controls and actions to ensure that future development in the SIP does not adversely impact on the ecological and environmental values of the SIP. These management controls and actions are outlined in subsequent sections.

3.2 Conservation of Native Vegetation

The Flora and Fauna Study (Connell Wagner, 2003) and Supplement Report (2005) defined areas within the SIP as being of significance for threatened flora and fauna (Figures 2.5 and 2.6). As shown in Figure 2.6, the combined habitat of all threatened species identified in the SIP is extensive and there is overlap between the habitat requirements of some species. As a consequence, the application of the principles defined in Table 2.2 was made to arrive at the areas defined as "significant habitat" in the SIP as these areas:

- Generally display a low edge to area ratio. In other words, the areas that are potentially exposed to edge effects such as weed invasion. A low length to edge ratio minimises edge effects.
- Contain a diversity of native species and structure commensurate with vegetation approaching a natural state with few to no weed species.
- Have an ability to be viably linked to other habitats.
- Provide an opportunity to conserve a representative range of the habitats of threatened species that presently exist.
- Have greater potential to withstand major threatening processes.

While the areas defined in Figure 2.6 are considered to be of significance within the SIP, these have been largely determined with little reference to areas of natural vegetation and habitat outside the SIP that may also play a role in threatened species conservation. This has been necessary to obtain an understanding of the habitat present in the SIP, however, consideration must also be given to the conservation status and distribution of vegetation within and outside the SIP. This will allow decisions to be made as to the extent to which the remnant vegetation should be conserved within the SIP whilst balancing the future economic development of the SIP.

The following sections briefly describe the conservation status of vegetation communities and their habitat to permit identification of the areas that are required to be protected and conserved.

3.2.1 Exposed Hawkesbury Woodland

Exposed Hawkesbury Woodland covers large areas across crests and flat open plateaux over northern Brisbane Water National Park, Strickland State Forest and onto the Somersby Plateau (LHCCREMS 2000). Benson (1986) describes similar vegetation as being widespread in study area. However, due to its deeper soils being more amenable to agriculture, this vegetation has been heavily cleared in recent times. Benson and Fallding (1981) note that this vegetation is restricted to the plateaux, and is locally common north from Somersby Falls. This vegetation was noted to have been formerly widespread but much has been cleared for orchards and grazing land.

Within this community, small ephemeral drainage lines provide suitable habitat for the Red-crowned Toadlet and the Giant Burrowing Frog. This community contains scattered *Allocasuarina* sp that provide a very small amount of foraging habitat for the Glossy Black-Cockatoo.

This community also contains foraging habitat for the Eastern False Pipistrelle, East Coast Freetail Bat, Greater Broad-nosed Bat, Common Bent-wing Bat, Large Pied Bat and the Little Bent-wing Bat. The foraging habitats for the Southern Myotis are likely to be along drainage lines, over dams and other water bodies within this community.

Considering the level of clearing and the ongoing clearing of this community, the level of reservation in the public reserve system is not likely to be adequate. LHCCREMS (2000) describe this vegetation as having been associated with the following threatened species: *Acacia bynoeana*, *Eucalyptus camfieldii*, *Prostanthera junonis* and *Tetratheca glandulosa*.

3.2.2 Hawkesbury Plateau Banksia Woodland and Scrub

This community (both the woodland and scrub) is largely conserved in areas such as Brisbane Water National Park and Dharug National Park, and is considered widespread in the study area (LHCCREMS 2000). Unlike the Exposed Hawkesbury Woodland, which is more suited to agriculture, it has been subject to less clearing. As such, the level of reservation is likely to be adequate.

This community also provides suitable habitat for the Red-crowned Toadlet and the Giant Burrowing Frog, as well as foraging habitat for the Eastern False Pipistrelle, East Coast Freetail Bat, Greater Broad-nosed Bat, Common Bent-wing Bat, Large Pied Bat and the Little Bent-wing Bat. The foraging habitats for the Southern Myotis are likely to be along drainage lines, over dams and other water bodies within this community.

LHCCREMS (2000) associate *Darwinia glaucophylla* with this community. Benson and Fallding (1981) provide a detailed description, associating *Darwinia glaucophylla* with open scrub where rock outcrops occur in Map Unit 8 (closed to open scrub).

3.2.3 Sandstone Hanging Swamps and Heaths

LHCCREMS (2000) derived identification of these assemblages from the available aerial photo interpretation, and noted that the extent of this Map Unit is greatly underestimated.

Benson (1986) noted this community to occur mainly south of the Pacific Highway, and to be restricted in area. Benson and Fallding (1981) note that this community is uncommon in the area, and to often be associated *Darwinia glaucophylla* (Rocky Outcrops with Pockets of Heath).

This community provides suitable foraging habitats for the Red-crowned Toadlet and the Giant Burrowing Frog. The Eastern Chestnut Mouse has also been highly associated with this vegetation in the SIP. The Eastern Pygmy-possum is also thought to have suitable foraging habitats in this community, and has been observed in drier heath communities in Ku-ring-gai Chase National Park that contain a common number of nectar producing shrubs.

Threatened microbats (the Eastern False Pipistrelle, Common Bent-wing Bat, East Coast Freetail Bat, Greater Broad-nosed Bat, Large Pied Bat, Little Bent-wing Bat and the Southern Myotis) are also likely to forage over these open habitats.

The conservation status of this community is not likely to be adequate within the public reserve system. Consequently, areas of this community are considered to be of major significance.

The key areas of this community are located on sites on Somersby Falls Road, Pile Road and Kangoo Road. These sites also contain populations of *Darwinia glaucophylla* which increase their conservation status.

3.2.4 Conservation Status of *Prostanthera junonis*

This threatened species is subject of a Recovery Plan prepared under the *EPBC Act* and the *TSC Act*. The conservation status of this species is not well known and it is considered that the three areas defined by the DEC as core habitat areas for this species will be required for their long term conservation in the SIP.

Whilst there were other areas that did contain individuals and populations of *Prostanthera junonis*, the DEC has identified a "northern" and "southern" population the protection of which would fulfil the criteria defined in the Recovery Plan. The definition of these areas included not only the populations of *Prostanthera junonis* but also areas of suitable habitat and buffer areas. These were nominated as the core habitat for the *Prostanthera junonis*. The areas within the SIP that contain these core habitat areas are located in Raverson Close, Wisemans Ferry Road and Kangoo Road.

3.2.5 Conservation Status of *Darwinia glaucophylla*

Darwinia glaucophylla is a NSW endemic that is confined to the Gosford area, where it occurs in heaths and woodlands often in association with sandstone rock platforms. The species is killed by fire and population numbers may fluctuate in relation to time since the last fire (NSW Scientific Committee 2003). This species has been recorded from 56 sites, 36 of which are within the DEC estate (ie within National Parks and other reserve systems). Of these records, 29 are current records (made after 1990), 16 of which occur in the DEC estate (refer Atlas of NSW Wildlife Data). There is little information available on population size, abundance and security to determine if the species is adequately conserved or whether it is vulnerable. However, a precautionary approach suggests that any occurrences of this species should be considered of conservation significance until evidence suggests otherwise.

The population in the north west of the SIP has not been recorded prior to this study. Given the small number of known occurrences outside of the SIP, and the fact that the location of this species is at or approaching the north-western limits of its known distribution (refer Atlas of NSW Wildlife On-line database), the population on the SIP has conservation significance.

Within the SIP, the occurrence of this species varies from large populations in relatively large areas of vegetation, to smaller occurrences in little to no vegetation. The larger populations occur to the north of Somersby Falls Road ('northern' *Darwinia glaucophylla* population), with the smaller occurrences to the east of Warringah Close and to south of Warringah Close and west of Piles Creek ('southern' *Darwinia glaucophylla* population). The southern *Darwinia glaucophylla* population does not include the large occurrence to the south west of the SIP which is located outside the SIP boundary.

It is considered that the smaller populations in more restricted areas of vegetation, or in cleared areas, are less likely to be viable due to the relationship between fire and seed germination for this species. In a study of the conservation of endangered plants in fire prone habitats, Auld and Scott (1995) found that fires allowing the consumption of high levels of ground fuel should produce temperatures high enough to cause the dormancy of *Darwinia glaucophylla* seed to be broken. It is considered that specimens located in small areas of vegetation (the southern *Darwinia glaucophylla* population) are not likely to be subjected to a fire that consumes of high levels of ground fuel due to the proximity of buildings and industrial development. As such, the germination of seed over time is likely to decline over time since an appropriate fire management regime is unlikely in these areas.

Establishment of seedlings was unlikely due to competition from other established shrubs. However, it is worth noting that *Darwinia glaucophylla* has become established in the absence of fire in the SIP areas of vegetation that have been artificially thinned.

It is considered that, with the present conditions, the management of southern *Darwinia glaucophylla* population may ultimately be unsuccessful due to the impediments to implementing an appropriate fire regime and small population size, which are the result of the small areas of habitat. Unlike the southern *Darwinia glaucophylla* population, the northern *Darwinia glaucophylla* population is considered to have the potential to provide for viable long-term management of this species in the SIP. This is the result of the location of the northern *Darwinia glaucophylla* being situated in larger areas of vegetation, which are more likely to sustain a fire capable of breaking the dormancy of *Darwinia glaucophylla* seed.

The key areas of this community containing significant populations of *Darwinia glaucophylla* are located on sites on Somersby Falls Road. These areas are those identified as being of conservation significance.

3.2.6 Conservation Status of *Hibbertia procumbens*

Hibbertia procumbens is listed under the *Threatened Species Conservation Act 1995* as an endangered species. While *Hibbertia procumbens* was originally known from two locations, it is now known from 21 records from 12 locations on the Department of Environment and Conservation (DEC) database through searches of the DEC Online Atlas of NSW Wildlife (January 2005). The results of this study are likely to raise this number to 14 locations – Somersby Falls in Brisbane Water National Park and Somersby Industrial Park / Somersby Recreation Reserve. While the number of records is a significant increase from the original two locations, the number of locations from which this species is known is still considered small.

It is highly likely that new occurrences of this species will continue to be found, which could lead to the conservation status of the species being reviewed. However, it is fairly clear that the habitats of this species, being flat to undulating lands on or in the vicinity of the Somersby Soil landscape and the Sydney Town soil landscape, have been extensively cleared in the local area for agricultural, rural, rural-recreational and urban landuses. *Hibbertia procumbens* continues to be threatened by the progression of these landuses, especially considering the limited representation of these habitats in the local area conservation reserves. As such, it is considered highly likely that this species will remain listed as a threatened species under the *Threatened Species Conservation Act 1995*, and accordingly the SIP Management Plan should make provisions for the conservation of this species in the SIP.

3.2.7 Areas of Significance

The areas having significance in terms of native vegetation in the SIP include:

- The Piles Creek riparian zone and other habitat corridors and linkages.
- Significant habitat areas for populations of *Prostanthera junonis*, *Hibbertia procumbens* and *Darwinia glaucophylla*.
- Remnant areas of Sandstone Hanging Swamps and Heaths.
- Major stands of Hawkesbury Plateau Banksia Woodland and Scrub.

These provide significant areas for the protection and conservation of threatened species (as well as habitat linkages). Figure 3.1, which shows the key environmental and cultural values of the SIP.

3.3 Habitat Linkages and Wildlife Corridors

In the context of the discussions throughout this POM, the following definitions are used:

Habitat linkage	An area of land or series of interconnected areas that facilitates movement by native fauna. These may or may not always be directly connected and is species dependent.
Wildlife Corridor	A continuous area of habitat that can be utilised for faunal movement.

The SIP has a number of National Parks in close proximity including the Brisbane Water National Park and Popran National Park as well as large tracts of partially cleared and uncleared natural lands. The F3 Freeway bounds the SIP to the east and south, and to the north and west the SIP is bound by cleared, predominantly agricultural and rural residential lands.

The viability of wildlife corridors varies, with larger corridors generally considered more likely to provide habitat that is suitable or able to sustain a variety of species (Mackowski 1984, Shields and Kavanagh 1985, Bennett 1990, Gilmore 1990, Scotts 1991). In the case of the SIP, it is considered unlikely that vegetation connecting larger areas of habitat would be able to sustain species identified as significant and be considered as a viable wildlife corridor. Consequently, it is considered that the primary function of vegetation connecting larger areas of habitat is best described as that of a habitat linkage, connecting areas of suitable habitat and allowing fauna movement.

There are a number of habitat linkages (ie within and external to the SIP) that provide habitat as well as opportunity for native species to move between habitat areas. As noted in the SIP Flora and Fauna Report (Connell Wagner, 2003), vegetation units do not always correspond exactly to a habitat type for a significant fauna species or the presence of critical habitat features. For example, hollow bearing trees or undisturbed streams may provide suitable habitat outside specific identified habitat. The SIP Flora and Fauna Report took into account these additional features in the identification of habitat linkages.

There are 3 important habitat linkages that are of significance in the SIP:

- The **Piles Creek riparian zone**. This includes the areas in Council ownership as well as other privately owned land adjacent to the creek. The main north-south line of the creek is the key area that is worthy of conservation. This is particularly important along the lower reaches of Piles Creek where a wider zone is more important and readily achieved.
- The **habitat linkage on the northern boundary** of the SIP. This provides an east-west movement corridor and includes areas of significant vegetation and some Aboriginal heritage sites.
- The **smaller habitat linkage between vegetation on the eastern side of the F3 freeway** and that to the north. This primarily provides a linkage between the areas of significant habitat for *Prostanthera junonis* and *Hibbertia procumbens* and natural areas to the north.

The two main functions of habitat linkages in the SIP is to provide for the movement of fauna through forests to allow for access to foraging resources and for genetic exchange between populations, which is a fundamental function of habitat linkages and wildlife corridors elsewhere (Bennett 1990, Saunders 1990, Winter 1991, Goldingay and Kavanagh 1991).

These provide significant habitat linkages, and some minimum areas should be maintained to permit continued fauna movement within and outside the SIP as well as providing habitat. Figure 3.1 shows habitat linkages considered important for the long term survival of threatened species in the SIP.

In order to facilitate movement, the linkage must be of adequate width, and be buffered against edge effects and associated threatening processes. The linkages identified in the SIP may be important to connect populations of threatened species that may occur outside the SIP, which could potentially utilise the SIP as a movement corridor. This is especially important to allow for interaction between populations and facilitate re-population within the SIP.

The SIP Flora and Fauna Report (Connell Wagner, 2003) indicated that a terrestrial habitat linkage should ideally have a **minimum** width of 60m, which incorporates a 20m wide linkage with 20m of buffer on either side. Considering the function of the Piles Creek corridor, a **median** width of 90m would be ideal in locations where this is achievable particularly in the lower reaches of the creek within the SIP. A corridor of this width, however, is less critical in the upper reaches of the creek particularly

at the top of the catchment where the riparian zone is truncated by existing development or is relatively small. DIPNR has advised that large corridors are not necessarily required for all of these areas for *riparian* function. However, it is also noted that riparian areas also serve an important habitat function, and the DEC and DIPNR advise that habitat function should also be considered in setting corridor width.

The proposed main north-south riparian zone along Piles Creek has a substantial width for large distances which reduces gradually at the top of the catchment. The linkages between the main riparian corridor on Piles Creek to larger remnants of vegetation such as in the north-west corner of the SIP average at least 60 metres and are often larger. Linkages that are of minor significance (such as to the north-east around Vere Place) vary from 20-25 metres as the width of the riparian zone itself narrows or where development has occurred.

The east-west habitat linkage on the northern boundary of the SIP is generally 60 metres in width except for smaller sections of 20 metres width. These narrower sections are supported by much larger refuge areas to the east and west to achieve a net 60 metres width.

The north-south linkage between the large population of *Prostanthera junonis* and *Hibbertia procumbens* in the east of the SIP (on Kangoo Road) has a 30 metre linkage with a larger refuge of 60 metres width. Whilst this does not achieve the desired 60 metres minimum, it is noted that this corridor is largely to link these populations to natural areas to the north as a pollen vector as well as a linkage for fauna species such as forest birds and mammals.

Significantly larger linkages are unlikely to be achieved in the SIP considering the extent of development and clearing, and a linkage of continuous width is also unlikely given the pattern of subdivision that has occurred and the fact that the riparian zone naturally reduces in width towards the top of the catchment. The SIP Flora and Fauna Report also noted that the extent of existing development and clearing would indicate that the provision of full riparian function is no longer possible over much of the SIP. However, where possible movement corridors with sanctuary areas (larger areas providing refuge) would allow these corridors to function more in line with a full riparian zone.

The existing riparian zone along Piles Creek, which is in part bounded by developed or cleared and disturbed lands, plays a key linkage function as identified in the SIP Flora and Fauna Report This is clearly an area that is required to be conserved to ensure the linkage function (as well as the contribution of the vegetation in this linkage to habitat) is maintained. It is considered that the proposed riparian zones, when combined with other constraints (eg Aboriginal heritage), provide an adequate system of habitat linkages that will assist in ensuring the environmental and ecological values of the SIP are maintained.

It is noted that the Department of Infrastructure, Planning and Natural Resources (DIPNR) has advised that any development within 40 metres of the top of a bank of a watercourse (identified in the maps as a blue dotted line) would be considered a "river" under the Rivers and Foreshore Improvement Act and the consent of DIPNR would be required regardless of whether the watercourse is identified as a riparian zone or other management zone under this POM.

3.4 Water Quality and Hydrological Conditions

3.4.1 Soils and Erosion Hazard

The soils of the valley are derived from the Somersby, Sydney Town and Gynea soil landscapes. The erosion hazard of these soils is high particularly where they are disturbed on steep lands or where concentrated flows of stormwater runoff occur such as drainage lines and tracks.

Soil and streambank erosion can lead to poor water quality with consequent impacts on habitat value. Increased turbidity results in detrimental impacts on aquatic organisms and reduced photosynthesis for aquatic plants. The locations of these impacts are determined by the local catchment within which

these impacts originate. Controls for water quality can therefore be targeted on a sub-catchment basis.

Factors which have or will increase the threat of soil erosion which would adversely impact on habitat areas and riparian zones in the SIP include:

- Disturbance of vegetation cover.
- Construction activities for roads, buildings, utility installations and other development
- Poorly located, drained or constructed access tracks both in public lands and on private lands
- Continued streambank scour and erosion
- Lack of regeneration of existing erosion sites.

Further development in the SIP has potential to exacerbate these threats if not strictly controlled. These will require the imposition of appropriate conditions of development consent to include the preparation of Water and Soil Management Plans in accordance with the requirements of the Council.

3.4.2 Increased Nutrients and Pollution

In addition to these potential impacts, increased nutrients and pollutants from industrial land uses has potential to impact on water quality and riparian function. In particular, pollution from chemical and other point sources has the potential for catastrophic impact on water quality and significant habitat.

The issue of street runoff is problematical as this is more difficult to control at source. Street runoff is often contaminated with organic matter, litter and sediment which drains into the local creek system from a variety of locations.

Impacts on habitat quality is also related to water flows. Increases or decreases in water flows has the potential to modify habitat quality particularly in areas that have evolved with low nutrient inputs and particular hydrological regimes. Therefore, maintenance of water flows and imposition of quality controls (such as a requirement for gross pollutant traps and other devices), together with pollution control and reduction, are the most likely measures that will maintain the health of identified habitats. Community and landholder education on the impacts of disposal of potential pollutants would also be warranted to reduce effects of pollution.

3.5 Aboriginal Heritage

3.5.1 Access to Sites

Continued and unimpeded access to all protected Aboriginal heritage sites, particularly rock engravings and locations of pigment art is an important issue consistently raised by representatives of the Darkinjung Local Aboriginal Land Council (AMBS, 2002). At present, access survives on the goodwill of current land owners and this cannot be guaranteed into the future.

3.5.2 Surface Scatters

No surface scatters of artefacts or isolated finds of stone artefacts were detected during the AMBS (2002) cultural heritage survey. However, the most likely place for stone artefact to occur and be detected in the future will be along the banks and alluvial flats associated with the main branch of Piles Creek. Consequently, areas within proximity of Piles Creek (AMBS suggested 15 m) represents Potential Archaeological Deposit (PAD) which would be the most likely location to find sub-surface and perhaps stratified deposits.

3.5.3 Previously Recorded Sites

A total of 25 of the previously recorded 39 Aboriginal heritage sites were relocated by AMBS. However, 14 previously recorded Aboriginal heritage sites could not be located during the AMBS study. While it was considered that previous recordings supplied highly accurate locational details

(map coordinates) with rare exceptions, there may be some that are obscured with sediment, loose vegetation and/or heavy scrub while others may have been destroyed since the original 1981 surveys.

These sites remain protected as known sites and objects and as a consequence are afforded protection under Section 90(1) of the NSW *NPW Act 1974*. A precautionary approach is to identify a larger buffer zone until the existence (or otherwise) of the site is established (refer Figure 3.1).

3.5.4 Control of Soil and Water Movement

The encroachment of soil and water onto the surface of rock engravings has been identified as a major issue within the SIP. During periods of construction, land clearance and landscaping, changed patterns of soil movement and water flow are also identified as likely to adversely impact upon Aboriginal heritage sites, particularly rock engravings and grinding grooves. These controls could be similar to those that apply to water quality controls but be specifically targeted at Aboriginal heritage sites.

3.5.5 Rock Engravings

There are a total of 22 Aboriginal heritage sites with rock engravings within the Somersby SIP. Of these 22 sites, 10 are closely associated with axe grinding grooves and 1 site occurs on a sandstone platform above a rock shelter with pigment art. These are important elements in the overall Aboriginal heritage values of the SIP and their long term protection and conservation is essential.

3.5.6 Rubbish Dumping

The dumping of rubbish appears to be a common problem across the SIP. Easements that could provide vehicular access to Aboriginal heritage sites should be monitored to determine if dumped rubbish is impacting upon Aboriginal sites.

3.6 Bushfire Management

3.6.1 Background to Bushfire Planning

Planning for Bushfire Protection 2001, has been developed by the RFS in close consultation and collaboration with the NSW government and outlines the bushfire planning matters which need to be considered at various stages of the planning process. This includes those matters to be considered in the preparation of local environmental plans (LEPs), subdivision design, and building construction stages. One of the key features of the document is the linkage of bushfire hazard for a site with the implementation of appropriate bushfire related planning and development controls. These controls include: land use planning, siting and access considerations, vegetation management, water supply provisions and building construction requirements. Whilst *Planning for Bushfire Protection* applies to residential development, the fundamental principles that underlie bushfire management can be applied to all land use types. That is, planning should ensure that risk is identified and minimised.

Section 79BA of the *Environmental Planning and Assessment Act* applies to development applications involving the construction or modification of class 1, 2, and 3 buildings under the Building Code of Australia (BCA). While Section 79BA does not legally apply to commercial or industrial development, RFS has indicated that they are developing a Development Control Note for commercial and industrial development. Consequently, the POM must have regard to bush fire prone lands and bush fire planning generally.

3.6.2 Bushfire Prone Lands Mapping

Bushfire mapping of the Gosford LGA has been completed by the RFS which indicates that the majority of the SIP is bush fire prone. However, the SIP mapping may not have been extensively ground truthed and the map may not reflect what currently exists onsite. Amendments to the map could reduce the areas nominated as bush fire prone. In addition, the maps have been prepared

under the *Rural Fires Act* to require referral of development applications to the RFS and do not represent the absolute risk of bushfire, but rather the extent of vegetation that exists

RFS acknowledge that the long term development of the SIP will lead to the loss of some of this vegetation and that the areas identified as bush fire prone land will be reduced accordingly and there would be subsequent amendments to the bushfire prone map. Thus, RFS has indicated that there may be a need for interim measures to reduce bushfire threat such as short term APZ's but that imposition of substantial building setbacks in areas that would not be bush fire prone in the future would not necessarily be required. The requirement for APZs will be dependant upon the development proposed and development and vegetation on adjoining properties and management zones (including any proposals by the landholder for short term measures).

3.6.3 Suggested Approaches by RFS

The RFS has provided suggestions on the future planning controls for the SIP for development in areas identified as bush fire prone. Specifically, the RFS indicates that residential purposes should not be permitted within the SIP. Where any lot will have residential usage the property is to comply with *Planning for Bushfire Protection 2001* unless the residential use is existing.

As indicated above, *Planning for Bushfire Protection* does not specify an APZ for industrial purposes, however, the RFS has indicated that, as an indicator for APZ requirements, they should be no less than ten (10) metres for vegetation group 3 and not exceed twenty (20) metres for vegetation group 1 and 2 (these vegetation groups are defined in *Planning for Bushfire Protection*). Where a commercial or industrial development includes accommodation such as a caretakers dwelling, *Planning for Bushfire Protection* shall be applied as for dwellings. RFS has also noted that commercial and industrial building construction requirements are set down in the Building Code of Australia in relation to building construction.

The RFS has also indicated that the following measures could be incorporated into a Development Control Plan for the SIP:

- Minimum Asset Protection Zone of 10 metres between a structure and remnant bush land.
- Offices should be to a level 1 construction to limit the effects of ember attack.
- Roof vents and similar structures should be screened to limit entry of embers into the structure.
- Any future non residential development should consider building to a Level 1 as per AS3959-1991 Construction of Buildings in Bushfire Prone Areas.

The RFS indicated that the minimum APZ may be able to be varied where vegetation on an adjacent allotment is proposed to be removed. In these instances, an arrangement with the adjoining landowner would need to be entered into to ensure the minimum APZ of 10 metres is achieved.

The RFS also indicated that the POM should include strategies to address management of bushfire hazards on existing lots until such time that the lots are developed and any remnant vegetation on those lots. This may include, for example, the creation of easements for hazard reduction on adjacent allotments (eg 88B and 88E instruments under the *Conveyancing Act*). The RFS also indicated that management of remnant bushland identified should be aimed at reducing bushfire hazards between now and the time of development (excluding areas identified for environmental or habitat protection purposes).

Once bush fire prone land has been finally defined once the extent of developable land is identified and any interim measures identified, the RFS has indicated that the following land uses should not be permitted within bush fire prone lands:

- Power generating works
- Sawmills

- Junkyards
- Liquid fuel depots
- Offensive & hazardous industries
- Chemical industries
- Service Stations
- Ammunition storage / dumps
- Fireworks manufacture / storage

These land uses should also be situated greater than 100 metres from any remnant bushland or unmanaged grassland.

Bushfire management and habitat conservation could be competing objectives if not planned in a co-ordinated fashion. Bushfire management should be consistent with the environmental issues identified in the Plan of Management for the SIP, in particular, the conservation of significant and core habitat.

In this regard, DEC has indicated that APZ's should not be located within riparian and other identified environmental management zones but rather should be contained within the developable areas of an allotment. Given the APZ's suggested by RFS are relatively small, this is considered a reasonable requirement as clearing for APZ areas would further reduce the width of riparian zones and habitat corridors that have already been identified as being of environmental significance. It is therefore recommended that any APZ be located outside future management zones.

3.7 Physical Constraints

In addition to ecological and Aboriginal heritage values and constraints, the study area has a number of other limitations that will constrain future development of the SIP. These are discussed below.

3.7.1 Steep Land

Although the topography of the SIP is undulating, there are areas where land slope exceeds 20% (refer Figure 3.1). These areas also provide areas of habitat, which can be seen when the vegetation map is compared with site contours. Industrial development typically requires land to be relatively flat and, therefore, any lands that have substantial slope (greater than 20%) will require significant site earthworks that could have an adverse impact on areas of environmental significance.

3.7.2 Areas Subject to Flooding

While the SIP is located at the head of the catchment of Piles Creek, areas are subject to flooding from the 1% Annual Recurrence Interval (ARI) flood. These areas are largely confined to the Piles Creek corridor.

3.8 Definition of Areas of Key Constraint

It is clear that the SIP contains a range of constraints to development that must be recognised in future decision making. Figure 3.1 shows the combined limitations to development that have been discussed in the sections above. This figure shows:

- Combined "significant habitat" of threatened flora and fauna species.
- Habitat corridors and linkages.
- Areas of remnant vegetation providing habitat.
- Aboriginal heritage management zones (AMBS).
- Other physical constraints.

As noted previously, objectives of the POM are to:

1. Identify areas where development can proceed with relatively minimal constraints.
2. Identify areas of biodiversity value that should be protected.

3. Identify sites of Aboriginal cultural values, as well as areas of cultural significance to the Darkinjung people.
4. Identify management strategies for the future protection and conservation of the SIP, including mitigation and monitoring works required.

To define areas of biodiversity value that should be protected and areas of minimal constraint, application of key constraints according to their level of significance has been carried out in Figure 3.2. The three tier system of constraints is shown in Table 3.1 and comprise:

1. **LEVEL 1 CONSTRAINT:** The areas defined by AMBS as Aboriginal heritage management zones, areas of significant habitat for *Prostanthera junonis*, *Hibbertia procumbens* and *Darwinia glaucophylla*, areas of significant habitat for threatened and other fauna, and riparian zones.. For the purposes of management actions, five sub-zones under the Level 1 Constraint are shown.
2. **LEVEL 2 CONSTRAINT:** Areas that provide habitat linkages as well as habitat protection/connectivity.
3. **LEVEL 3 CONSTRAINT:** Areas that contain substantial physical constraints to development..

Figure 3.2 indicates the three levels of constraints as detailed in Table 3.1. These areas provide the basis for management controls to protect the identified values of the SIP.

Table 3.1: Key Development Constraints

Constraint	Type of Constraint	Areas Applied
Aboriginal heritage sites	Level 1 Constraint (a)	All sites identified by AMBS (2002) including management zones
Significant habitat for <i>Prostanthera junonis</i>	Level 1 Constraint	Significant habitat areas identified by DEC (NPWS)
Significant habitat for <i>Darwinia glaucophylla</i>	Level 1 Constraint	Significant habitat identified by Connell Wagner (2003).
Significant habitat for <i>Hibbertia procumbens</i>	Level 1 Constraint	Significant habitat areas identified by Connell Wagner (2005).
Riparian zones and habitat protection	Level 1 Constraint	Areas that act as movement corridors across the SIP particularly for less mobile species and provide habitat for multiple species (Giant Burrowing Frog, Red-crowned Toadlet, Heath Monitor, Glossy Black-Cockatoo, Brown Treecreeper, Eastern Chestnut Mouse, Eastern Pygmy-possum, Grey-headed Flying-Fox, Large Pied Bat, Little Bent-wing Bat, Common Bent-wing Bat, Eastern False Pipistrelle, East Coast Freetail Bat, Greater Broad-nosed Bat, Southern Myotis, Adams Emerald Dragonfly)
Habitat Links	Level 2 Constraint ^(b)	Areas that may provide links to National Parks and/or larger areas of native vegetation
Physical Constraints to Development or other limitations	Level 3 Constraint (c)	Physical limitations to development such as slope or flooding. There are also "sight lines" between Aboriginal heritage sites that impose limits on development. Whilst development could be carried out on this land, limitations on the height of development will need consideration to allow the continuance of lines of sight. These will be defined in future planning controls.

Notes:

- (a) Level 1 Constraint means that this area cannot be developed for industrial use or adversely impacted by adjacent development. Works such as bushfire management, essential emergency works and the maintenance of already approved works would be permitted.
- (b) Level 2 Constraint means that this imposes significant limitations to development. In some instances, this may mean that this area cannot be developed.
- (c) Level 3 Constraint means that appropriate control on development is required to minimise potential impacts resulting from future development. In some cases this may mean that some areas may not be able to be developed.

For example, areas of **Level 1 Constraint** have major limitations and development should not be permitted through appropriate planning controls (eg Local Environmental Plan/Development Control provision) to ensure their complete and permanent protection. The exception to this would be for bushfire management, essential emergency works and the maintenance of already approved works.

Areas of **Level 2 Constraint** should have restrictive controls in recognition of the level of constraint. This would ensure adverse impacts from development can be mitigated through appropriate planning controls such as zoning control, introduction of buffers and imposition of setbacks.

Areas of **Level 3 Constraint** should ensure development is required to implement management measures to limit the potential impact of development.

The definition of these constraints allows management measures to be developed in recognition of the importance of each level of constraint. Areas of Level 2 or Level 3 Constraint can be developed subject to strict development controls, however, development in the Level 1 Constraint areas should not be permitted except for the purposes of bushfire management, essential emergency works and the maintenance of already approved works.

4. Management Framework

4.1 Introduction

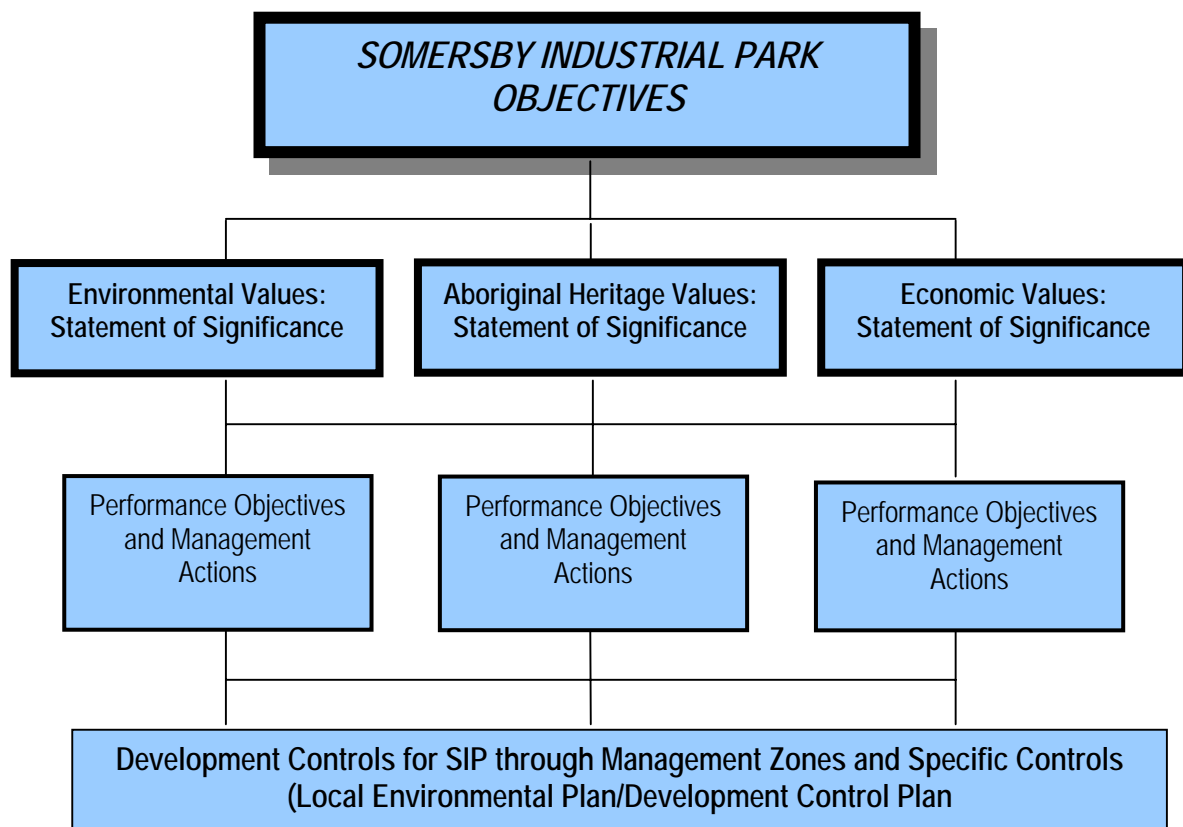
The various studies of the SIP have determined that there are a range of values, opportunities and development constraints that must be recognised in the future management of the SIP.

These values, opportunities and constraints have been identified in the previous studies of the SIP and are summarised in Sections 2.0 and 3.0 of this document. It is important to note that many of the SIP values are already protected by State and Commonwealth legislation, and development is restricted by these legislative provisions – the final POM will simply give effect to this protection in a transparent fashion.

The management framework for the SIP, which takes account of these values, opportunities and constraints, can then be translated into statutory provisions including a future Local Environmental Plan (LEP) and a Development Control Plan (DCP).

4.2 Management Framework

The framework of the POM is shown in the figure below. This structure defines and places the SIP values as the highest priorities for consideration, with specific management controls flowing from the definition of these values.



As shown in the POM framework, these management strategies are "layered" in the following order of importance:

- **SIP Objectives** – these provide the overall framework for the future management of the SIP. All future developments must conform with these objectives (or at least, not conflict with them).

- **Statements of Significance** – these are a statement of the values of the SIP (Ecological/Environmental; Aboriginal Heritage; Economic) which are supported by Performance Objectives and Management Actions. All future development must conform with the Performance Objectives and Management Actions.
- **Supporting Development Controls** – these are the final layer of management and will include a Local Environmental Plan and Development Control Plan. Development will be expected to conform with these controls.

The following Sections describe these provisions.

4.3 SIP Management Objectives

The management of the SIP will be based on the following objectives which reflect the values of the area:

- To accommodate industrial and related development that provides employment opportunities in the Gosford LGA whilst recognising environmental and Aboriginal heritage values.
- To ensure that development of the Somersby Industrial Park is sensitive to the environmental conditions of the locality, threatened fauna species and adjacent areas of environmental value.
- To protect and conserve area of core habitat for *Prostanthera junonis*, *Hibbertia procumbens* and *Darwinia glaucophylla*
- To ensure that development of the Somersby Industrial Park is undertaken in a manner that conserves and enhances Aboriginal cultural heritage values, specifically Aboriginal objects.
- To ensure that the function and appearance of future business subdivision/development is of a high standard in terms of both the built form and landscaping, as well as being complementary to the environmental and Aboriginal heritage landscape setting.
- To provide certain development controls and restrictions to achieve other objectives of this Plan.

This provides a “Whole of SIP” approach that can be augmented by specific controls over areas of key value/significance (see below). It is envisaged that the above objectives would form the core of the LEP/DCP.

4.4 Statements of Significance

For each of the SIP values, a Statement of Significance has been prepared. This defines the specific contribution of each value and is supported by a series of Performance Measures which are the first “layer” of development control. It is envisaged that these would also form part of the LEP/DCP.

Statement of Significance – Economic Development

The Somersby Industrial Park represents a significant economic asset and employment area for the Central Coast. It provides opportunities for sustainable employment development that will benefit the Gosford LGA and the Central Coast area. Ensuring the development of the SIP is achieved whilst conserving the natural and Aboriginal heritage will be key for the present generation to pass on to future generations an environment and Aboriginal heritage landscape that is sustainable.

Statement of Significance – Areas of Ecological and Environmental Significance

The natural heritage of the Somersby Industrial Park includes the biological and physical elements such as plants, animals and creeks some of which are unique to the area. This landscape is important for the long term survival of all flora and fauna in the SIP but specifically it is vital for the survival of threatened species. Conserving the biological and physical heritage is fundamental to the identity of present and future generations.

Statement of Significance – Aboriginal Heritage Sites

The natural heritage of the Somersby Industrial Park is also layered with human associations, stories, myths, personal histories and emotions. Aboriginal people have left tangible evidence in the form of Aboriginal objects. Conserving the Aboriginal heritage is fundamental to the identity of present and future generations.

4.5 Performance Objectives and Management Actions

To ensure the POM objectives are achieved and the Statements of Significance are addressed, the following outlines Performance Objectives and Management Actions for each of the SIP values.

4.5.1 Economic Development

Performance Objectives

1. Ensure development of the SIP conserves the natural and Aboriginal heritage of the area.
2. Ensure that sites that have some form of constraint are identified so that landowners have a clear understanding of the values of the SIP and issues that must be addressed through the development process.
3. Ensure clear advice is provided to landowners prior to applications for consent are lodged.

Management Actions

The management actions for Economic Development are as follows:

- Provide development controls that are clear and consistent with the other aims and objectives.
- Provide advice and assistance to landholder in identifying key constraints.
- Provide options to permit orderly and economic development while balancing environmental and Aboriginal heritage constraints.
- Establishment of a community awareness program including new land owners, employers and employees to build an understanding of the importance of Aboriginal heritage sites and significant habitat areas within the Park.
- Develop a brochure about the benefits of developing within the SIP including statements regarding the significant economic, environmental and cultural values of the area.

4.5.2 Ecological and Environmental Significance

Performance Objectives

1. Significant habitat for *Prostanthera junonis*, *Hibbertia procumbens* and *Darwinia glaucophylla* is managed to ensure that viable populations are maintained in accordance with the objectives of any Recovery Plan for these species.
2. Riparian zones are managed in a manner that protects riparian vegetation, habitat and in-stream water quality.
3. Identified habitat corridors are conserved and managed to ensure that vegetation is protected and the corridor function is maintained.
4. Significant habitat identified in the Plan of Management is managed in a manner that protects habitat values.
5. Reduce potential impact on the significance of the areas of ecological and environmental significance through adherence to specific development controls.
6. Conform with specific buffer requirements, setbacks and development requirements either within this Plan or other planning instruments

Management Actions

The management actions for areas of ecological and environmental significance are:

Threatened Species

- Provide protection to significant habitat areas of *Darwinia glaucophylla*, *Hibbertia procumbens* and *Prostanthera junonis* in accordance with the management zones identified in the POM and permit no industrial, business or similar development within the core areas.
- Provide protection to habitat of threatened fauna species to provide a sustainable basis for their long term survival in the SIP.
- Undertake an appropriate monitoring regime (at least annually) of populations of *Darwinia glaucophylla*, *Hibbertia procumbens* and *Prostanthera junonis* to record size, health and reproductive status of the populations.
- Ensure fire management practices within the SIP conform with the Recovery Plan for *Prostanthera junonis*
- Protect areas identified as significant habitat for other threatened flora and fauna species through appropriate management measures.
- Ensure Vegetation Management Plans (either for riparian zones or for individual sites) address habitat values, threats and ameliorative measures to ensure persistence of threatened species.

Habitat Areas, Corridors and Vegetation Management

- Protection of areas of significant habitat in accordance with the management zones identified in the POM.
- Protection of habitat corridors and linkages through establishment of a riparian corridor zone to Piles Creek and other riparian areas identified as corridors.
- Prepare a Vegetation Management Plan for riparian zones to address threats and conservation values including degradation and include a Weed Management Plan within or in addition to this Vegetation Management Plan.
- Restriction of development within riparian zones through prohibition of development in these buffer areas unless for maintenance of an already approved work.
- Close roads that are unopened and not required for access to serve as part of a corridor or buffer area.
- Control weed invasion in accordance with the Weed Management Plan
- Minimise potential impact of weed invasion of vegetation through requirement for landscaping with native species and identification of vegetation management practices where any wider Vegetation Management Plan exists. In the absence of a wider Vegetation Management Plan, site specific vegetation management plans will be required particularly for sites that contain riparian zones or corridors.

Water Quality & Quantity

- Protect water quality through the imposition of erosion and sedimentation controls as well as installation of specific water quality controls on existing and future development sites including gross pollutant traps or secondary pollutant traps.
- Install appropriate water quality control devices such as gross pollutant traps or secondary pollutant traps for all other stormwater drains connecting to riparian zones and maintain to minimise water quality impacts.
- Protect hydrological flows through maintenance of existing flows from sites to existing levels.
- Implement the 'Erosion and Sediment Control Regional Policy and Code of Practice **E5.04**' or any other relevant policy developed or adopted by Gosford City Council to control sediment and water flows.

4.5.3 Aboriginal Heritage Significance

Performance Objectives

1. Retain and conserve all sites and places of Aboriginal heritage significance including Aboriginal objects in accordance with the recommendations of the AMBS Report.
2. Reduce potential impacts on such sites to ensure their long term survival.
3. Be compatible with and, where appropriate, respect the setting of sites and places of Aboriginal heritage significance.
4. Permit access to sites of Aboriginal heritage significance by the Aboriginal community wherever possible.
5. Ensure that the cultural values identified by the Aboriginal community are appropriately incorporated into management zones.

Management Actions

The management actions for Aboriginal heritage sites are as follows:

Retention and Conservation

- Define and establish management zones for Aboriginal heritage sites that allow for long term protection and conservation.
- Encourage landholders to enter into Voluntary Conservation Agreements for Aboriginal management zones.
- Ensure management plans are prepared and implemented for sites that are to be developed which contain Aboriginal heritage sites to include consultations with representatives from the Aboriginal community and DEC (NPWS).

Impact Reduction

- An erosion and sediment control plan should be submitted by land owners on any allotments containing Aboriginal heritage sites to prevent soil and water run-off from entering the buffer zone and from accumulating on the surface of rock platforms containing rock art.
- Increase the effectiveness of existing sediment traps where these are not regularly maintained
- Prior to development, the 'site buffer zone' should be fenced.
- Where vegetation removal is required to protect Aboriginal heritage sites, ensure that DEC (NPWS) has been consulted concerning identification of protected vegetation, and appropriate permits under the *National Parks and Wildlife Act* have been obtained

Access

- Pursue a process of negotiation with the landholders with Aboriginal sites and the Aboriginal community for permanent access to protected Aboriginal heritage sites.
- Where practicable, use property set-backs or rights of way as the major access corridor to Aboriginal heritage sites within the Park.
- Where access to Aboriginal sites is proposed, rights of way are to be established prior to development proceeding.
- Where lines of site between Aboriginal heritage sites are required, impose limitations on the height of development to continue visibility between sites.

Artefact Scatters

- Maintain a 15 metre easement from the banks of Piles Creek to protect potential artefact scatters.
- Where development is planned to encroach in areas of artefact scatter potential, on this area a full archaeological assessment must be undertaken to guide planning.

Previously Recorded Sites

- Retain a buffer zone of 15 metres radius around any location where it is believed that an Aboriginal heritage site may exist until such time that the existence of the site is confirmed or otherwise.
- Where site existence is confirmed through subsequent research, the buffer zone is to be reduced to 10 metres.
- Where the precise location of an Aboriginal heritage site becomes a necessity, a permit for Preliminary Research Permit under the *National Parks and Wildlife Act* is to be obtained from the NSW DEC (NPWS) to physically remove soil in areas where it is believed that Aboriginal heritage sites are located. If sites are rediscovered, the relevant general management options regarding that site type, as outlined in this Plan of Management, will apply

Rubbish Dumping

- Monitor Aboriginal heritage sites near road edges and other easements for the presence of dumped rubbish.
- Any rubbish directly impacting upon Aboriginal heritage sites or indirectly affecting Aboriginal heritage sites, for example, by changing patterns of soil erosion and water flow, should be removed as soon as is practicable.
- Rubbish on Aboriginal heritage sites should be removed with care to avoid damage to site fabric, for example, avoid marking or breaking the sandstone surface where engravings or grinding grooves occur.

4.6 Management Zones

To achieve the above POM objectives and management actions, management zones are defined based on the key constraints identified in Section 3.0 which have been further refined due to current land uses and the ability to implement future controls in a consistent fashion.

The principles applied to the definition of the management zones are:

- Where wildlife corridors exist, management zones have been placed on property boundaries where possible to minimise the effect on development potential.
- Where lots are developed and a corridor cannot be achieved, no management zone is imposed.
- Where existing crown roads can serve as a corridor or habitat area, these are proposed for closure to minimise impact on private property.
- Where there are minor watercourses or watercourses that are narrow, the management zone have been developed in line with the significance of the water course. In the upper areas of the catchment where the watercourse is narrow, for example, the management zone is similarly narrow.

Application of these principles to Figure 3.2 results in the following proposed management zones:

- Management Zone No. 1: areas defined by Level 1 Constraints.
- Management Zone No. 2: areas defined by Level 2 Constraints with modification to reflect land use and development potential.
- Management Zone No. 3: areas defined with Level 3 Constraints.

These are outlined in Table 4.1 while Section 4.7 details the proposed management controls in each zone.

Table 4.1: SIP Management Zones

Identified Constraint	Areas Identified	Management Zone/Sub-Zone
Level 1	<ul style="list-style-type: none"> Sub-zone 1(a) Aboriginal heritage Sub-zone 1(b) <i>Prostanthera junonis</i> core habitat Sub-zone 1(c) <i>Darwinia glaucophylla</i> core habitat Sub-zone 1(d) <i>Hibbertia procumbens</i> core habitat Sub-zone 1(e) Riparian zones and Habitat Protection 	Zone No 1 Sub-zone 1(a) Aboriginal heritage Sub-zone 1(b) <i>Prostanthera junonis</i> Sub-zone 1(c) <i>Darwinia glaucophylla</i> Sub-zone 1(d) <i>Hibbertia procumbens</i> Sub-zone 1(e) Riparian zones and Habitat Protection
Level 2	<ul style="list-style-type: none"> Habitat Links 	Zone No. 2
Level 3	<ul style="list-style-type: none"> Areas with Physical Constraints to Development such as slope, flooding, servicing. Also includes lines of sight between certain Aboriginal heritage sites. 	Zone No. 3

Note: Refer to Table 3.1 for more details of constraints

4.7 Management Zone Controls

The following sections details the proposed development restrictions in each of the management zones and the consideration for future management of each zone. The approach in Section 3.0 of specifying Level 1, 2 and 3 constraints has been used as the basis for controlling and restricting development in each of the zones. The POM Objectives and Statement of Significance are also used to inform the proposed controls.

4.7.1 Zone No 1 Management Controls

Sub Zone 1(a) Aboriginal Heritage Sites

Description

These areas have been defined by AMBS through previous investigations. They include buffer areas to the actual Aboriginal heritage sites.

Control

No development will be permitted in these areas except development directly associated with the protection and management of the Aboriginal heritage values. Any such works will be in accordance with a management plan that has been approved by the Council and/or DEC.

Any development within an allotment containing areas identified as Sub-Zone 1 (a) – Aboriginal Heritage Sites but outside the Sub-Zone 1 (a) area will comply with the Statement of Significance and Performance Objectives/Management Actions.

Management Considerations

- Management for specific sites as set out in the AMBS (2002) document.
- Areas identified as Sub-Zone 1(a) cannot be used to satisfy the requirements for an Asset Protection Zones (APZ) on any site to be developed. Such APZ areas will be located outside the Sub-Zone 1(a) area.

Sub-Zone 1(b) *Prostanthera junonis* Significant Habitat

Description

The areas of significant habitat identified by the NSW DEC (NPWS). They are considered to be the minimum areas required to comply with the Recovery Plan.

Control

No development will be permitted within the core habitat areas nominated as Sub-Zone 1(b) *Prostanthera junonis* Habitat except development directly associated with the protection and management of any population of *Prostanthera junonis*, for bushfire management, essential emergency works or the maintenance of an already approved work. Any such works will be in accordance with a management plan that has been approved by the Council and/or DEC.

Any development within an allotment containing areas identified as Sub-Zone 1(b), but outside the Sub-Zone 1 (b) area, will comply with the Statement of Significance and Performance Objectives/Management Actions.

Management Considerations

Management considerations include:

- Allotments that contain Sub-Zone 1(b) *Prostanthera junonis* Habitat are to have a management plan prepared and implemented prior to development proceeding. This management plan is to comply with the requirements of the POM and the Recovery Plan (as appropriate).
- Development of allotments that contain Sub-Zone 1(b) *Prostanthera junonis* Habitat are to ensure that hydrological conditions associated with the core habitat area do not change as a result of development occurring. This may require a Water and Soil Management Plan to be developed and implemented in addition or complementary to, this Plan of Management.
- Where development within an allotment containing Sub-Zone 1(b) *Prostanthera junonis* Habitat is to be located to the north of the Sub-Zone 1(b) area, sufficient building setbacks are required to prevent overshadowing and maintain sunlight access for plant health and growth.
- Provision of adequate building and development setbacks from the Sub-Zone 1(b) boundary to permit management actions to be implemented such as targeted fire management.
- Areas identified as Sub-Zone 1(b) cannot be used to satisfy the requirements for an Asset Protection Zones (APZ) on any site to be developed. Such APZ areas will be located outside the Sub-Zone 1(b) area.

Sub-Zone 1(c) *Darwinia glaucophylla* Significant Habitat

Description

The areas of significant habitat identified in the Flora Fauna Report (Connell Wagner, 2003). They are considered to be the minimum areas required to allow the species to remain viable in the SIP.

Control

No development will be permitted within the Sub-Zone 1(c) *Darwinia glaucophylla* Habitat except development directly associated with the protection and management of any population of *Darwinia glaucophylla*, for bushfire management, essential emergency works or the maintenance of an already approved work. Any such works will be in accordance with a management plan that has been approved by the Council and/or DEC. Any such works will be in accordance with a management plan that has been approved by the Council and/or DEC.

Any development within an allotment containing areas identified as Sub-Zone 1(c) *Darwinia glaucophylla* Habitat area but outside the Sub-Zone 1(c) zone boundary will comply with the Statement of Significance and Performance Objectives/Management Actions

Management Considerations

Management considerations include:

- Allotments that contain Sub-Zone 1(c) *Darwinia glaucophylla* Habitat are to have a management plan prepared and implemented prior to development proceeding. This management plan is to comply with the requirements of the POM (as appropriate).
- Development of allotments that contain Sub-Zone 1(c) *Darwinia glaucophylla* Habitat are to ensure that hydrological conditions do not change as a result of development occurring. This may require a Water and Soil Management Plan to be developed and implemented in addition or complementary to this POM.
- Where development within an allotment containing Sub-Zone 1(c) *Darwinia glaucophylla* Habitat is to be located to the north of this Sub-Zone 1(c) boundary, sufficient setbacks are required to prevent overshadowing and maintain sunlight access for plant health and growth.
- Provision of adequate building and development setbacks from the Sub-Zone 1(c) boundary to permit management actions to be implemented such as targeted fire management.
- Areas identified as Sub-Zone 1(c) cannot be used to satisfy the requirements for an Asset Protection Zones (APZ) on any site to be developed. Such APZ areas will be located outside the Sub-Zone 1(c) area.

Sub-Zone 1(d) *Hibbertia procumbens* Significant Habitat

Description

The areas of significant habitat identified in the *Supplement Report* (Connell Wagner, 2005). They are considered to be the minimum areas required to allow the species to remain viable in the SIP.

Control

No development will be permitted within the Sub-Zone 1(d) *Hibbertia procumbens* Habitat except development directly associated with the protection and management of any population of *Hibbertia procumbens*, for bushfire management, essential emergency works or the maintenance of an already approved work. Any such works will be in accordance with a management plan that has been approved by the Council and/or DEC. Any such works will be in accordance with a management plan that has been approved by the Council and/or DEC.

Any development within an allotment containing areas identified as Sub- Zone 1(d) *Hibbertia procumbens* Habitat area but outside the Sub-Zone 1(d) zone boundary will comply with the Statement of Significance and Performance Objectives/Management Actions

Management Considerations

Management considerations include:

- Allotments that contain Sub-Zone 1(d) *Hibbertia procumbens* Habitat are to have a management plan prepared and implemented prior to development proceeding. This management plan is to comply with the requirements of the POM (as appropriate).
- Development of allotments that contain Sub-Zone 1(d) *Hibbertia procumbens* Habitat are to ensure that hydrological conditions do not change as a result of development occurring. This may require a Water and Soil Management Plan to be developed and implemented in addition or complementary to this POM.
- Where development within an allotment containing Sub-Zone 1(d) *Hibbertia procumbens* Habitat is to be located to the north of this Sub-Zone 1(d) boundary, sufficient setbacks are required to prevent overshadowing and maintain sunlight access for plant health and growth.
- Provision of adequate building and development setbacks from the Sub-Zone 1(d) boundary to permit management actions to be implemented such as targeted fire management.
- Areas identified as Sub-Zone 1(d) cannot be used to satisfy the requirements for an Asset Protection Zones (APZ) on any site to be developed. Such APZ areas will be located outside the Sub-Zone 1(d) area.

Sub-Zone 1(e) Piles Creek Riparian Zone

Description

This includes the areas already dedicated to the Council, areas within 40 metres of the top of the bank of the creek and zones identified as Sub-Zone 1(e) that have a riparian function and provide connections within the SIP and to natural areas outside the SIP as identified on the Plan.

Control

No industrial or building development will be permitted within Sub-Zone 1(e) Piles Creek Riparian Area. Any development within an allotment containing Sub-Zone 1(e) Piles Creek Riparian Area but outside the Sub-Zone 1(e) boundary will comply with the Statement of Significance and Performance Objectives/Management Actions. Development for the purposes of the maintenance of public utilities or an already approved work within Sub-Zone 1(e), or the establishment of new required works, will be permitted subject to Management Controls being implemented prior to and following development approval. Where new works are proposed, all alternatives are to be examined and new works will only be approved if such alternatives are not feasible or practical.

Management Considerations

Management considerations include:

- Development of sites adjacent to or containing Sub-Zone 1(e) to ensure that hydrological conditions do not change as a result of development occurring. This may require a Water and Soil Management Plan to be developed and implemented in addition or complementary to the POM.
- Areas identified as Sub-Zone 1(e) cannot be used to satisfy the requirements for an Asset Protection Zones (APZ) on any site to be developed. Such APZ areas will be located outside the Sub-Zone 1(e) area.
- Development for the purposes of maintenance of public utilities or of an approved work within an area nominated as Sub-Zone 1(e) is permissible provided impact minimisation techniques and appropriate environmental mitigation measures identified in the environmental assessment of the proposal are implemented.
- New utilities or services will be only be permitted if alternatives to their location within the 1(e) zone are not feasible or practical. In such circumstances, they must be designed to avoid sensitive areas and will be required to have an Environmental Management Plan to be prepared and implemented to minimise impacts.

4.7.2 Zone No 2 Management Controls

Habitat Linkages

Description

This includes areas identified as habitat links. They include roads proposed for closure.

Control

No industrial or building development will be permitted in these areas. Minor works (such as environmental protection works but excluding water quality control or detention works) may be permitted provided it does not adversely impact on the function and connectivity of the link. Any development within an allotment containing Zone 2 but outside the zone boundary will comply with the Statement of Significance and Performance Objectives/Management Actions. Development for the purposes of maintenance of public utilities or an already approved work within Zone 2 will be permitted subject to Environmental Management Controls. The width of this zone are set at a variable widths as shown on the Plan in recognition of the existing development pattern and opportunities to achieve appropriate widths for linkage purposes.

Management Considerations

Management considerations include:

- Development of sites adjacent to or containing habitat linkages to ensure that hydrological conditions do not change as a result of development occurring. This may require a Water and Soil Management Plan to be developed and implemented in addition or complementary to the POM.
- Development for the purposes of public utilities or environmental protection works within Zone 2 areas is permissible provided impact minimisation techniques and appropriate environmental mitigation measures identified in the environmental assessment of the proposal are implemented.
- Any works within Zone 2 areas will require a specific Environmental Management Plan to be prepared and implemented to address Statement of Significance and Performance Objectives/Management Actions
- New utilities or services will be only be permitted if they are designed to avoid sensitive areas and will be required to have an Environmental Management Plan to be prepared and implemented.
- Areas identified as Zone 2 cannot be used to satisfy the requirements for an Asset Protection Zones (APZ) on any site to be developed. Such APZ areas will be located outside the Zone 2 area.

4.7.3 Zone No 3 Management Controls

Physically Constrained Areas

Description

These sites include land that is prone to flooding (1% ARI) or where land slope is in excess of 20%.

Control

Development will be permitted in these areas based on the hazard they represent and such development to comply with the Statement of Significance and Performance Objectives/Management Actions.

Management Considerations

Management considerations include:

- No building development to be permitted in the 1% ARI flood zone. Minor development (eg storage, car parking) may be permitted provided appropriate measures are incorporated into structural design, materials and habitable floor levels to minimise flood risk to people and property. No storing of hazardous material should be permitted below the 1% ARI flood level
- The filling of land below the 1% ARI flood level is prohibited, unless it can be demonstrated that it does not result in any significant increased flood levels off site.
- Development of land where the slope of the land exceeds 20% should only be permitted where it can be demonstrated that any development is unlikely to cause harm to the environment through increased runoff, erosion, slippage or land instability, or other threat.
- The geotechnical stability of sloping land to support development is to be demonstrated. Consent should only be granted where it has been certified as being appropriate by a suitably qualified engineer as to the geotechnical stability of the land to support such development and an assessment of stormwater prepared by a suitably qualified hydraulic engineer.

Development Constraints Associated with Certain Aboriginal Sites

Description

These include the site lines between certain Aboriginal heritage sites in Ainslie and Raveson Close.

Control

Development will be permitted in these areas provided that the "line of sight" between the Aboriginal heritage sites is maintained. Any such development to comply with the Statement of Significance and Performance Objectives/Management Actions.

Management Considerations

Management considerations include:

- Any building or work will only be permitted where that building or work does not restrict the line of sight between the associated Aboriginal heritage sites as shown in Figure 4.1.
- Any proposal is to demonstrate that development will not adversely impact on the Aboriginal heritage sites

4.8 Supporting Management Controls

Statutory planning instruments (viz LEP/DCP) can be used to translate these principles into planning controls for the SIP. A commentary on the types of controls considered appropriate for the SIP are outlined in Table 4.2 below. This includes commentary on any existing Council controls that could be used for the future LEP/DCP.

Table 4.2: Supporting Management Controls

Issue	Rationale for Control	Proposed Control Mechanism
ESD and design principles.	There is a need to encourage ESD principles to be incorporated into future development	Building orientation preferences, solar access, building materials and energy use. Council has a range of existing controls within other planning instruments that could be used and/or adapted to address ESD issues. Existing Council controls would be sufficient to adopt or adapt.
Heritage protection	Archaeological sites are of significance and specific controls and guidelines are required to ensure that these items are not adversely impacted.	Many of the controls noted in this table will provide some level of protection, however, specific sites will need controls which will largely be based on the AMBS (2002) investigations.
Built form controls	Buildings have potential to impact on areas of ecological and Aboriginal heritage significance.	Built form controls to be specified to minimise impacts such as overshadowing, increased runoff. Again, existing Council controls and policies could form the basis for these management controls.
Site coverage	Increased impervious areas lead to greater water quality impacts and the need for more extensive stormwater controls.	The existing planning control in the LEP (no greater than 75% site coverage) should be maintained except where a site contains a specific POM management zone.
Gross floor areas	There is a need to limit the gross floor area of retailing where related to a site use	The existing planning control in the LEP (10% or 500 square metres limit) should be maintained except where a site contains a specific POM management zone
Setbacks	Setbacks from areas of significance are required to ensure protection of areas of significance.	Maintain existing controls except where a site contains a specific POM management zone.
Infrastructure provision	Provision of infrastructure includes utilities as well as upgrading of roads and drainage networks. Provision of infrastructure to be undertaken in a manner which minimises impacts on the environment.	Provision within the LEP/DCP for this infrastructure through plans and facility provision. Requirements for development to have adequate services prior to development. Requirements for infrastructure to be undertaken in a manner which minimises impacts on the environment. Through preparation of

Issue	Rationale for Control	Proposed Control Mechanism
Road access and circulation network	There is a need to ensure new roads are appropriate for the industrial purposes they serve	Environmental Management Plans. New roads to be designed in accordance with existing Council standards and in accordance with the management objectives and controls in the POM.
Parking provision	Provision of on site parking is required to minimise impacts on Council roads.	Parking areas to be provided in accordance with existing Council standards and in accordance with the management objectives and controls in the POM.
Environmental controls	A range of environmental controls are required to minimise impacts at the construction and operational phase.	Existing Council controls would be sufficient to adopt such as the requirements for Erosion and Sediment Control Plans to be in accordance with the management objectives and controls in the POM
Landfill	Landfill has the potential for significant impacts if not controlled.	Landfill is to have no adverse impact upon the visual and natural environment or adjoining and surrounding properties, and be in accordance with the management objectives and controls in the POM.
Bushfire control	<p>Fire radiation zones and fuel hazard reduction have potential to adversely impact native vegetation.</p> <p>Planning should recognise bushfire hazard that presently exists or which may exist in the future.</p>	<p>.Controls proposed by the Rural Fire Service should be implemented in relation to Asset Protection Zones and management of bushfire hazard.</p> <p>APZ areas are not to be located in areas of environmental significance as indicated by the POM and/or zoning plans.</p> <p>Bushfire mapping should be refined at regular intervals to reflect the extent of clearing that occurs.</p> <p>Where bushfire prone land exists on adjacent land and the minimum APZ or setback under planning controls are required, there may be a need for landholders to negotiate with adjacent owners to facilitate the creation of APZ areas on this adjacent land. This may require creation of easements in the short term.</p>
Stormwater and water quality controls	Control of stormwater and water quality is a significant issue particularly in ensuring this does not become a major impact.	<p>Existing Council controls would be sufficient to adopt to ensure diffuse-source pollution is minimised.</p> <p>Stormwater detention systems are to be visually unobtrusive and integrated with site landscaping. Development not subject to on-site stormwater detention requirements must drain via gravity to a Council constructed or natural drainage system, unless drainage to such a system is not possible, in which case stormwater may be retained and disposed of on-site, where it can be demonstrated soil conditions so allow.</p> <p>Detention systems to be designed, constructed and operated in accordance with the management objectives and controls in the POM and/or best practice measures.</p>

4.9 Planning and ESD Objectives

The objects of the EPA& Act include the encouragement of:

- The proper management, development and conservation of natural and artificial resources including ... natural areas, ... cities, towns and villages for the purposes of promoting the social and economic welfare of the community and a better environment.
- The promotion and co-ordination of the orderly and economic use and development of land.
- The protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities and their habitats.

Implicit in these objects is the achievement of an appropriate balance between development and conservation. This balance is an aim of the POM and the orderly development of land is one key to achieving that balance.

In respect of ESD principles, the investigations to date have identified the key values of the area and have identified key threats to these values. Through this process, the key tenets of ESD have been considered and the POM will achieve the principles of ESD:

- It provides certainty with respect to key values and there will be no postponement of measures to minimise degradation.
- It will permit future generations to understand and protect the values of the area.
- It recognises biological diversity and ecological integrity.
- It includes environmental values in the overall assessment of economic values of the SIP

5. POM Implementation

5.1 Planning Controls

This POM provides the foundation for a future Local Environmental Plan (LEP) and Development Control Plan (DCP) for the SIP. The POM, together with the Flora and Fauna Report and Supplement Report (and any other reports that may update these documents), provide the detailed rationale for any LEP/DCP much in the same fashion as a Local Environmental Study (LES). Reference back to the POM (or any update) when needed is therefore considered to be important to test future development proposals.

5.2 Options for Landholders

One of the key issues for the POM in these terms is the options that may be available to landholders that may have constraints to development that have been identified through this POM.

Options may include:

- Development allowances for sites that contain management zones.
- Variations to the Service Agreement.
- Entering into conservation agreements.
- Land swaps.

The following Sections briefly outline some of the options that could be applied to assist in future development of the SIP.

5.3 Development Allowances

The existing Local Environmental Plan (LEP) that applies to the SIP (LEP No. 22) contains a range of development controls and standards such as:

- Floorspace ratio – maximum of 1:1.
- Setbacks – front 10 metres (20 metres for Wisemans Ferry Road), side 5 metres.
- Subdivision size – minimum 4,000 m² (2,500 m² for 10% of holding) except for allotments with frontage to Wisemans Ferry Road.
- Site coverage – maximum of 75%.
- Land uses – only industry and allied uses (except for the area zoned “business”).

There may be potential to vary these standards for a particular site or transfer some of these rights to another site within the SIP. This could involve a system of tradeable development rights, where landholders with areas identified for conservation, are given development credits. Landowners with credits can apply to have the above controls varied. For instance, through increases in floorspace ratios or reductions in setbacks. A system similar to this already exists in Gosford through the increased development rights (viz density increases) for exchanges to implement the Coastal Open Space System (COSS).

There may be potential to relax certain development controls on a particular site based on the merits of an application and subject to compliance with the POM Statements of Significance, Objectives and Management Controls. These may include, for example:

- Floorspace ratios – allowances for increased ratios where management zones are located on a property.
- Front setbacks – allowances for reduced setbacks.
- Minimum subdivision areas – allowances for reduced setbacks.
- Site coverage - allowances for increased site coverage.

- Land uses – possible relaxation of land use controls to permit land uses of a non-industrial nature on unaffected land provided they are compatible with the future industrial use and subject to environmental constraints (eg possibly bulky goods retailing, limited commercial use). However, no residential uses would be permitted.
- Trading development rights – a system for trading of development rights with other landholders in the SIP.

5.4 Other Management Matters

There are a number of other management measures that do not rely on planning controls yet are of relevance to the ongoing management of the SIP. These are outlined below.

5.4.1 Road Closures

There are a number of “paper” roads that exist in the SIP that currently contain significant habitat (eg Yanda Road, Fir Road, Alder Road, part of Deodar Road). While the road reservation exists, there has been no road constructed within the reservation as they do not provide current access to any properties within the SIP and are unlikely to be required for future access. These roads have been recommended for closure as they either provide habitat areas and/or wildlife linkages that should be preserved. These closures reduce the need for additional habitat/wildlife linkages on private land.

5.4.2 Variations to the Service Agreement

The Service Agreement that exists for the SIP requires landholders to contribute to the provision of services within the SIP on a pro-rata basis (ie depending on the amount of land owned). There has been comment that any proposals which would limit the amount of land that could be developed on any one site may be seen as inequitable.

Any variations to the Service Agreement is a matter for Council based on legal advice, should a variation or alternative be proposed this may be able to be covered by a new Service Agreement. Alternatively, a Section 94 Contribution Plans or Section 64 Developer Contribution Plan could take the place of such an agreement. Both of these types of Plans (and possibly a revised Service Agreement) could make allowance for variable development potential across the SIP through a differential contribution.

Section 94 of the *Environmental Planning and Assessment Act* provides that:

1) Subject to subsection (2), if a consent authority is satisfied that a development, the subject of a development application or of an application for a complying development certificate, will or is likely to require the provision of or increase the demand for public amenities and public services within the area, the consent authority may grant consent to that application subject to a condition requiring:

- (a) the dedication of land free of cost, or*
 - (b) the payment of a monetary contribution,*
- or both.*

(2) A condition referred to in subsection (1) is to be imposed only to require a reasonable dedication or contribution for the provision, extension or augmentation of the public amenities and public services mentioned in that subsection.

Section 94(11) provides that a contribution can only be required if it is of a kind allowed by, and is determined in accordance with, an approved Contributions Plan (CP). Recent amendments also allow a Planning Agreement to be established to cover infrastructure provision. The CP or Planning Agreement could be developed as part of the LEP for the SIP and include similar contributions to the Services Agreement.

A Development Servicing Plan (DSP) under Section 64 of the *Local Government Act 1995* is a document which details the water supply and sewerage developer charges to be levied on development areas utilising a water utility's water supply and sewerage infrastructure. A DSP must be prepared in accordance with the "Guidelines for Calculating Developer Charges for Water Supply, Sewerage and Stormwater" (2001) issued by the Minister for Land and Water Conservation, pursuant to Section 306(3) of the *Water Management Act 2000*.

5.4.3 Conservation and Management Agreements

The following discussion briefly outlines the options that landholders may explore in relation to entering into conservation agreements on their land to offset potential impacts on their holdings. It should be noted that any material discussing tax laws or legal matters is provided for the information of landholders and any landholder should always consult with their tax advisers regarding the applicability of tax laws to their property.

Voluntary Conservation Agreements

A Voluntary Conservation Agreement (VCA) is an agreement between a landholder and the NSW government and is supported by the *National Parks and Wildlife Act, 1974*. The aim of a VCA is to ensure that nominated land is managed so as to preserve its conservation values. Appendix B contains further information on VCA's.

An agreement can apply to part or all of the land subject of a VCA. It is also possible to divide the land into various zones with different conditions to introduce more flexibility into the agreement. A VCA can be applied to areas that contain:

- Special natural environments.
- Aboriginal heritage places or objects of special significance.
- Native fauna and/or flora worthy of protection.

Benefits of VCAs include:

- Works such as fencing or conservation work on Aboriginal heritage sites can be funded by the government.
- Assistance can be provided with management of areas of conservation significance.
- Rate relief from Council rates. Through the provisions of Section 555(1) of the *Local Government Act 1995*, the land subject to a VCA is exempt from rates (however, only that part of the land subject to the VCA).
- Tax deductions for treatment and prevention of land and water degradation
- Relief from land tax obligations. Under Section 10(1) of the *Land Tax Management Act*, land that is subject of a VCA is exempted from land tax.
- Funding through such bodies and schemes as the National Heritage Trust, Endangered Species Program, Australian Institute of Aboriginal and Torres Strait Island Studies.

Under the *Income Tax Assessment Act 1997*, the deduction and capital gains tax (CGT) provisions have been amended in relation to entering into a perpetual conservation covenant. The amendments provide for two types of tax concession:

1. An income tax deduction for any decrease in land value as a result of entering into a conservation agreement (provided the landholder receives no payment for entering into it).
2. Where a conservation covenant is entered into, CGT provisions apply as if it were a sale or gift of the land

Public Positive Covenants

A Public Positive Covenant is a restriction placed on a property title (Section 88E instrument) in which the landholder (and successors) agree to undertake certain measures including preparation of a management plan for areas on a site that particular significance (viz flora/fauna, Aboriginal heritage sites).

Benefits of a Section 88E covenant include:

- Potential rate relief from Council rates.
- Possible tax benefits (similar to VCAs).

Awareness

There are two related issues related to community awareness:

- Raising awareness with regard to threatened species on individual landholdings.
- Raising awareness regarding Aboriginal heritage sites.

Any program that is aimed at raising landholder awareness should stress the unique values of the SIP and the need to take special care during development.

With the development of the SIP will come pressure to utilise areas of open space away from building complexes which could potentially impact on areas of significance. Achieving an acceptable balance between recreational uses of landscape and site preservation should be a consideration of any development.

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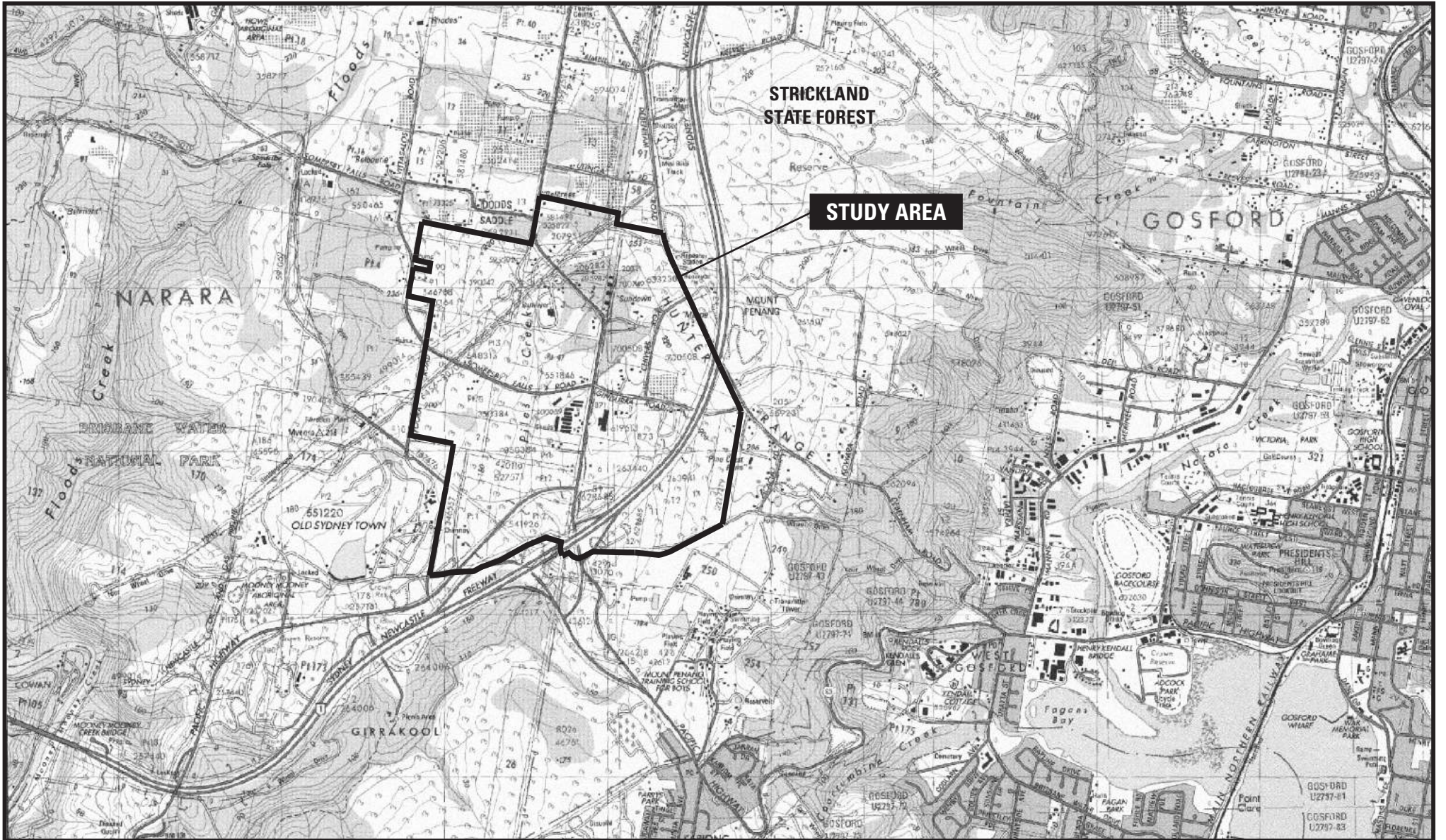
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Appendix A

Supplement Report to Somersby Industrial Park Flora/Fauna Report,

Appendix B

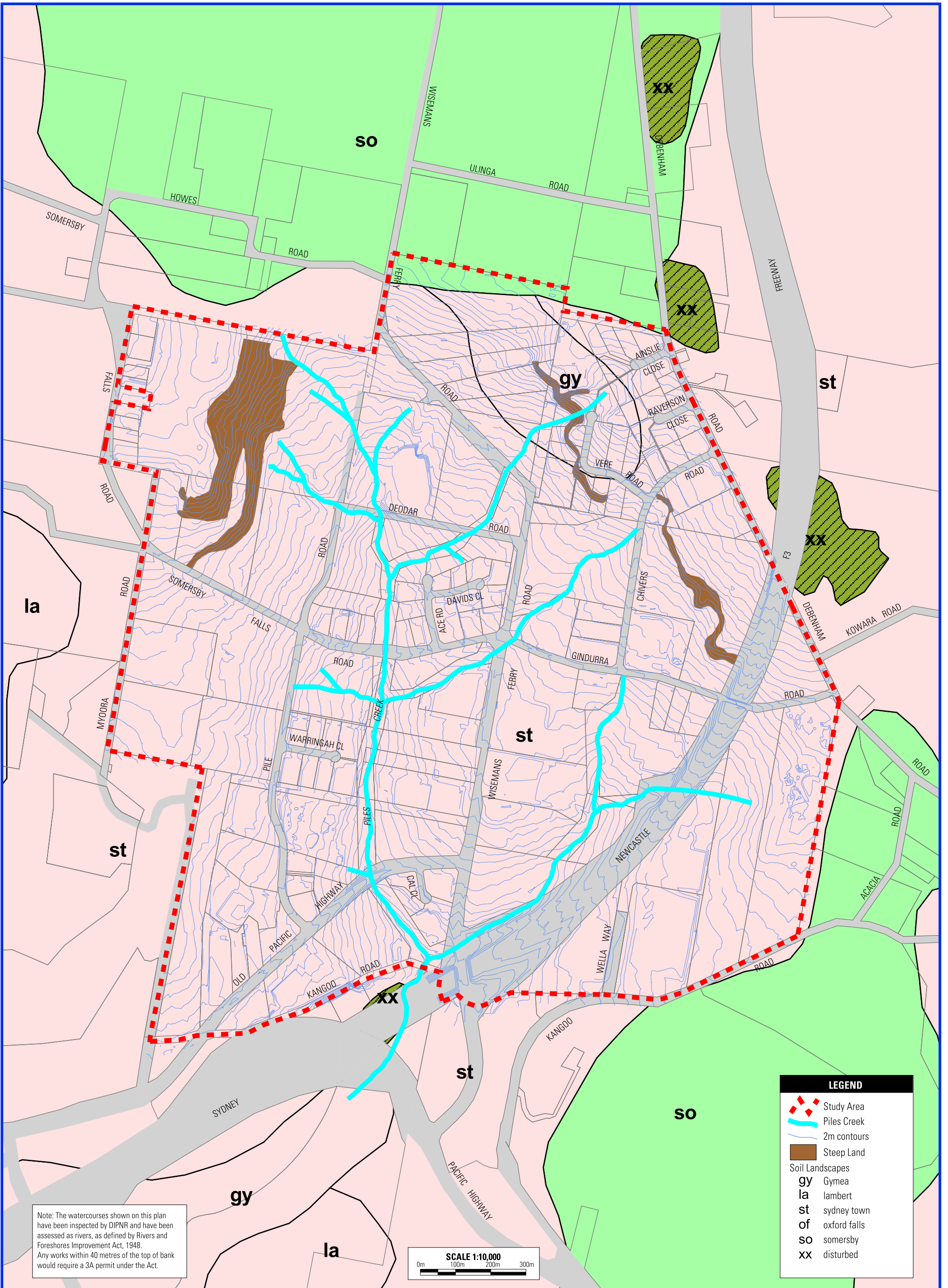
Information on Voluntary Conservation Agreements



SOMERSBY INDUSTRIAL PARK



FIGURE 2.1
LOCAL CONTEXT



Note: The watercourses shown on this plan have been inspected by DIPNR and have been assessed as rivers, as defined by Rivers and Foreshores Improvement Act, 1948. Any works within 40 metres of the top of bank would require a 3A permit under the Act.

SCALE 1:10,000
0m 100m 200m 300m

LEGEND	
	Study Area
	Piles Creek
	2m contours
	Steep Land
Soil Landscapes	
gy	Gymea
la	Lambert
st	Sydney town
of	Oxford falls
so	Somersby
xx	Disturbed



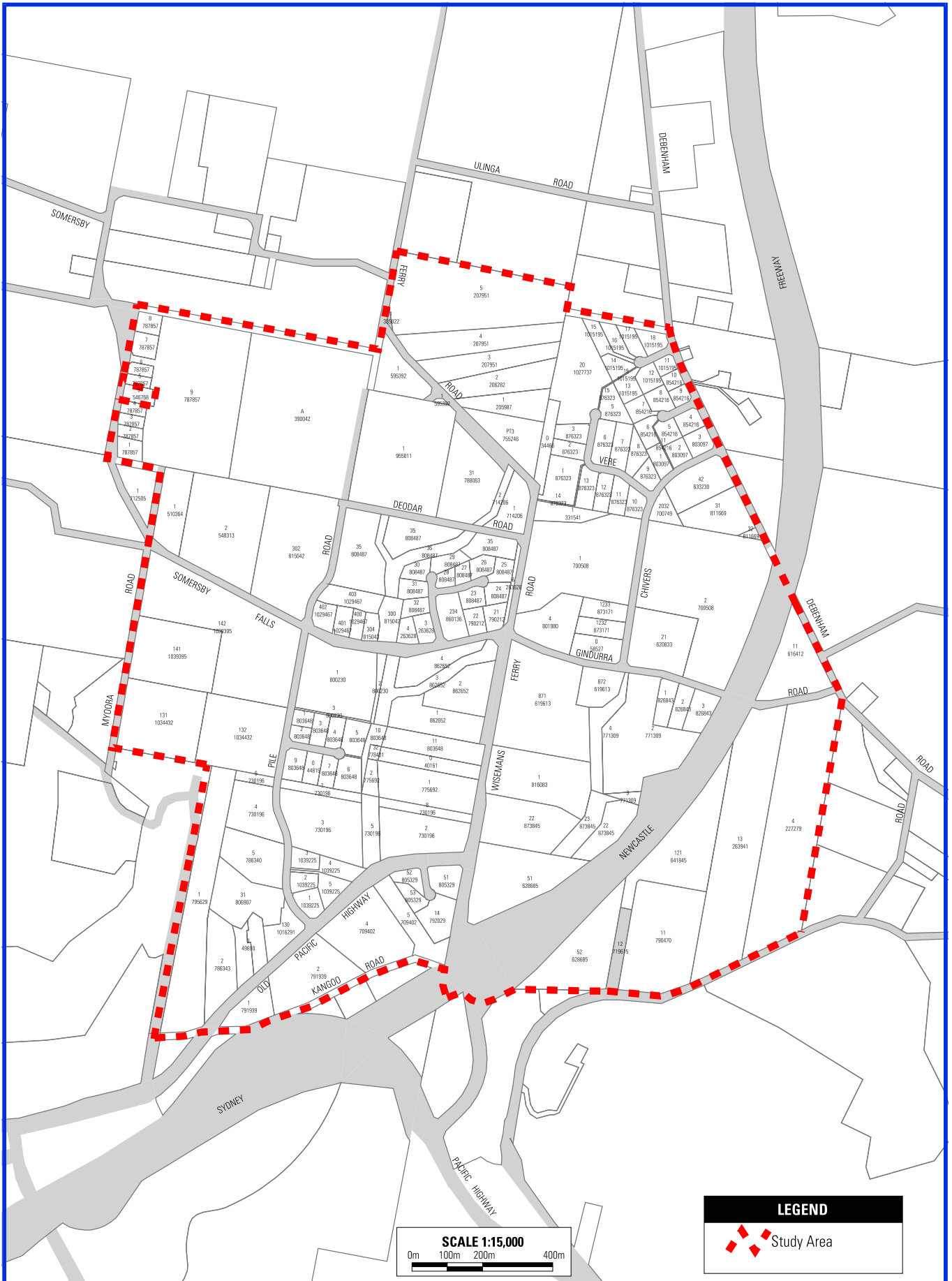
FIGURE 2.2
TOPOGRAPHY, SOIL LANDSCAPES
AND DRAINAGE



SOMERSBY INDUSTRIAL PARK
1144.01.GP



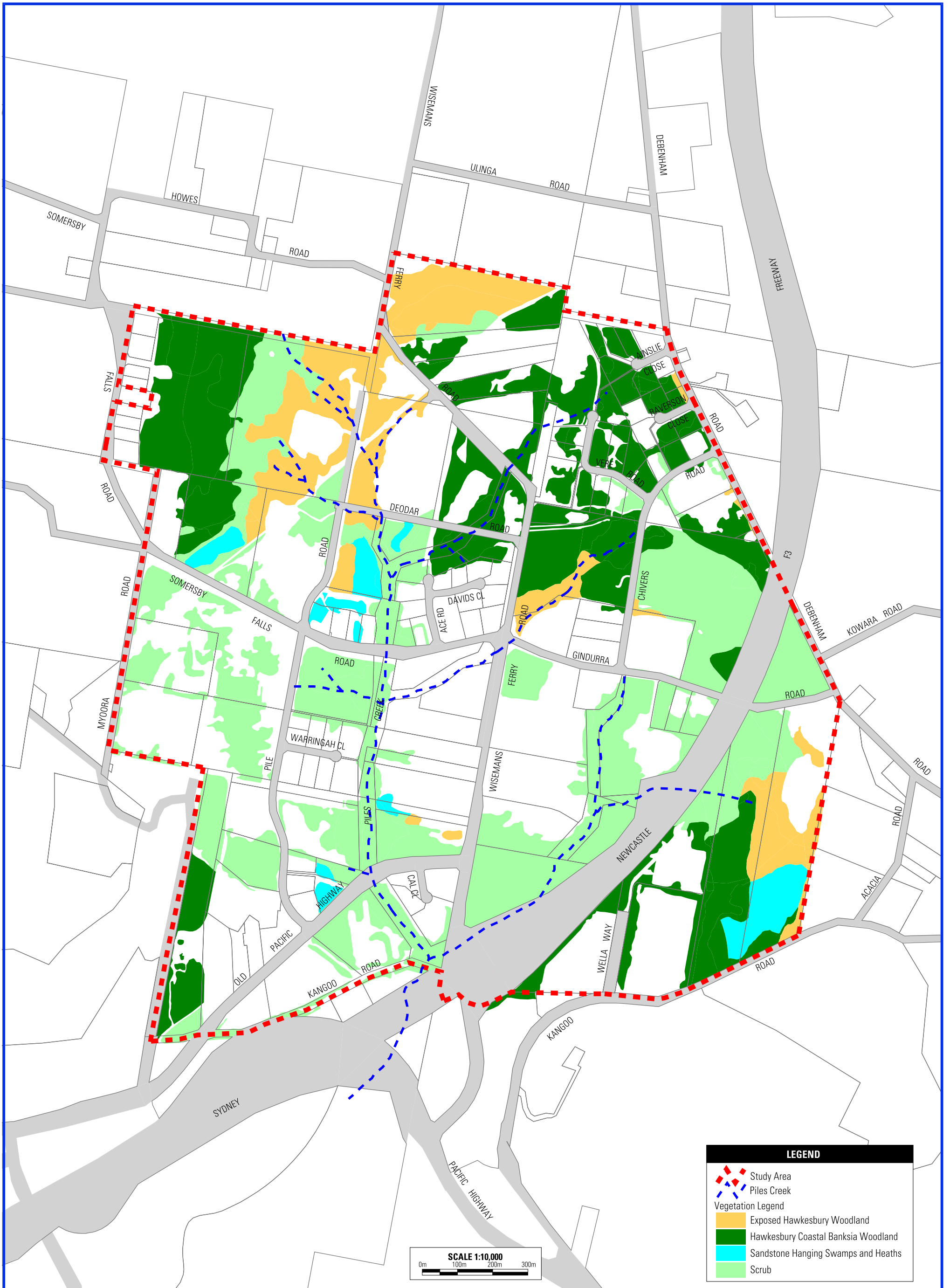
FIGURE 2.3
EXTENT OF DEVELOPMENT



SOMERSBY INDUSTRIAL PARK
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FIGURE 2.4
SIP SUBDIVISION PATTERN

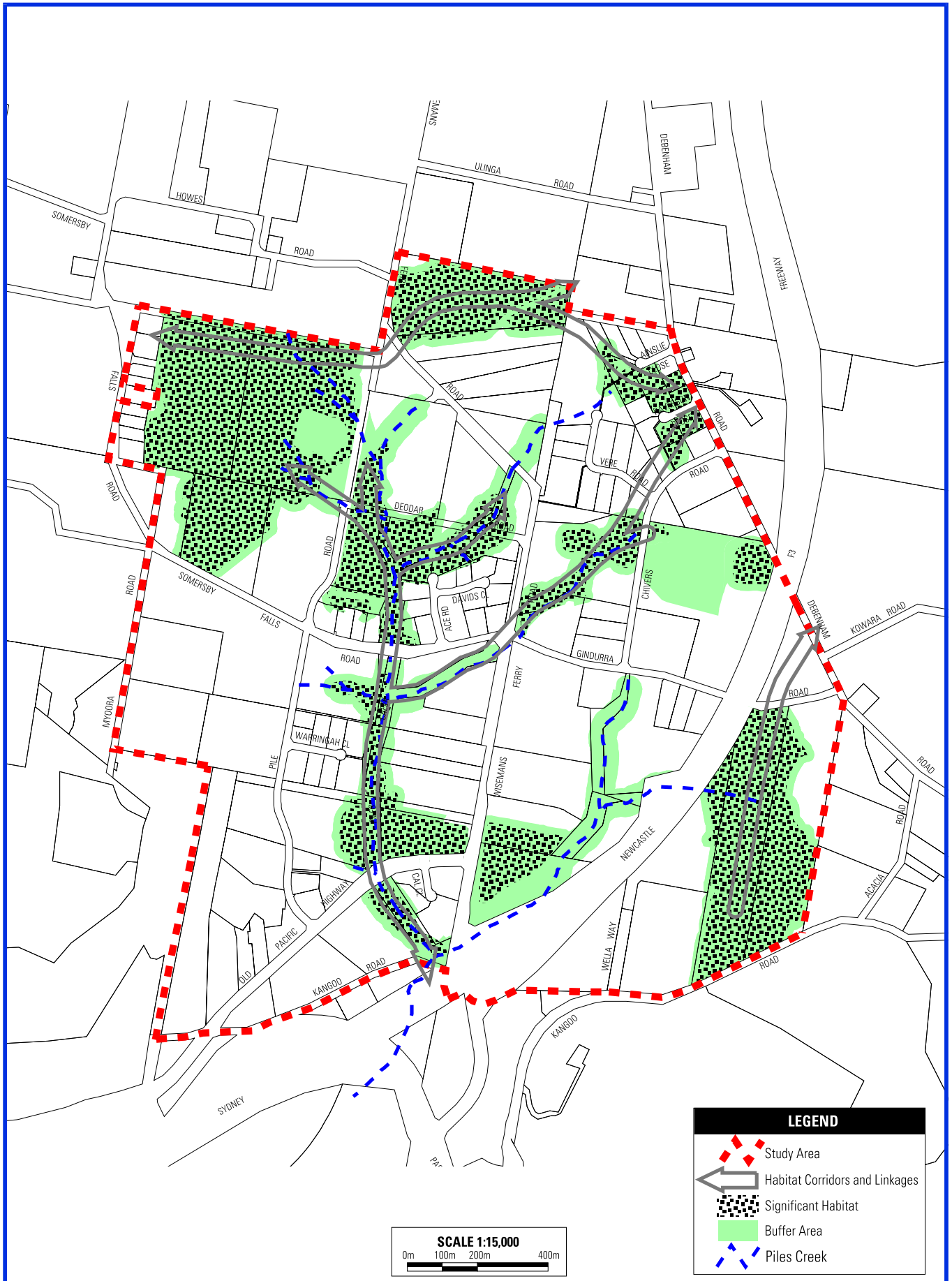


LEGEND

- Study Area
- Piles Creek
- Vegetation Legend
 - Exposed Hawkesbury Woodland
 - Hawkesbury Coastal Banksia Woodland
 - Sandstone Hanging Swamps and Heaths
 - Scrub

SCALE 1:10,000
0m 100m 200m 300m

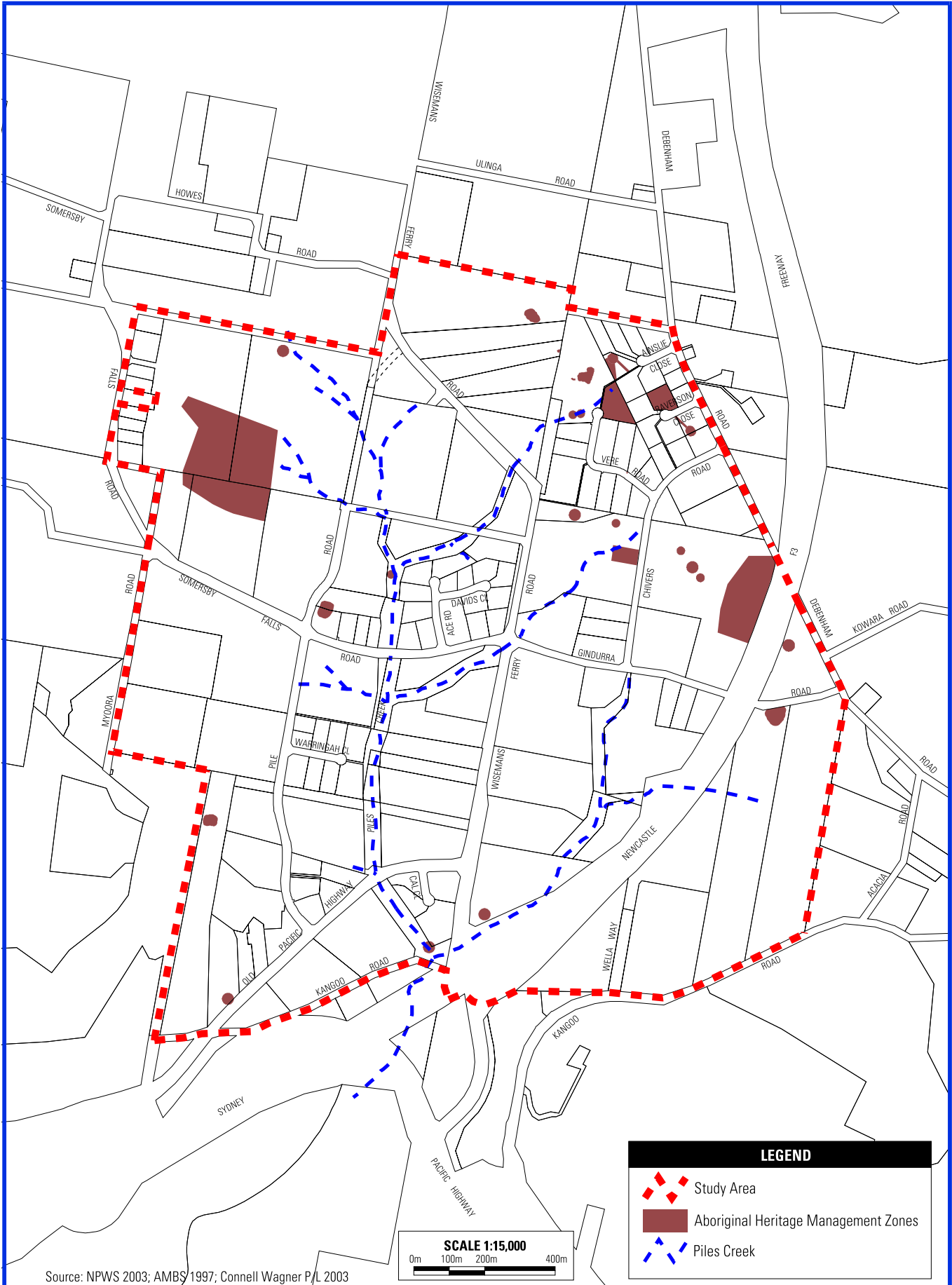




SOMERSBY INDUSTRIAL PARK
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FIGURE 2.6
COMBINED SIGNIFICANT HABITATS



Source: NPWS 2003; AMBS 1997; Connell Wagner P/L 2003

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FIGURE 2.7
ABORIGINAL HERITAGE CONSTRAINTS

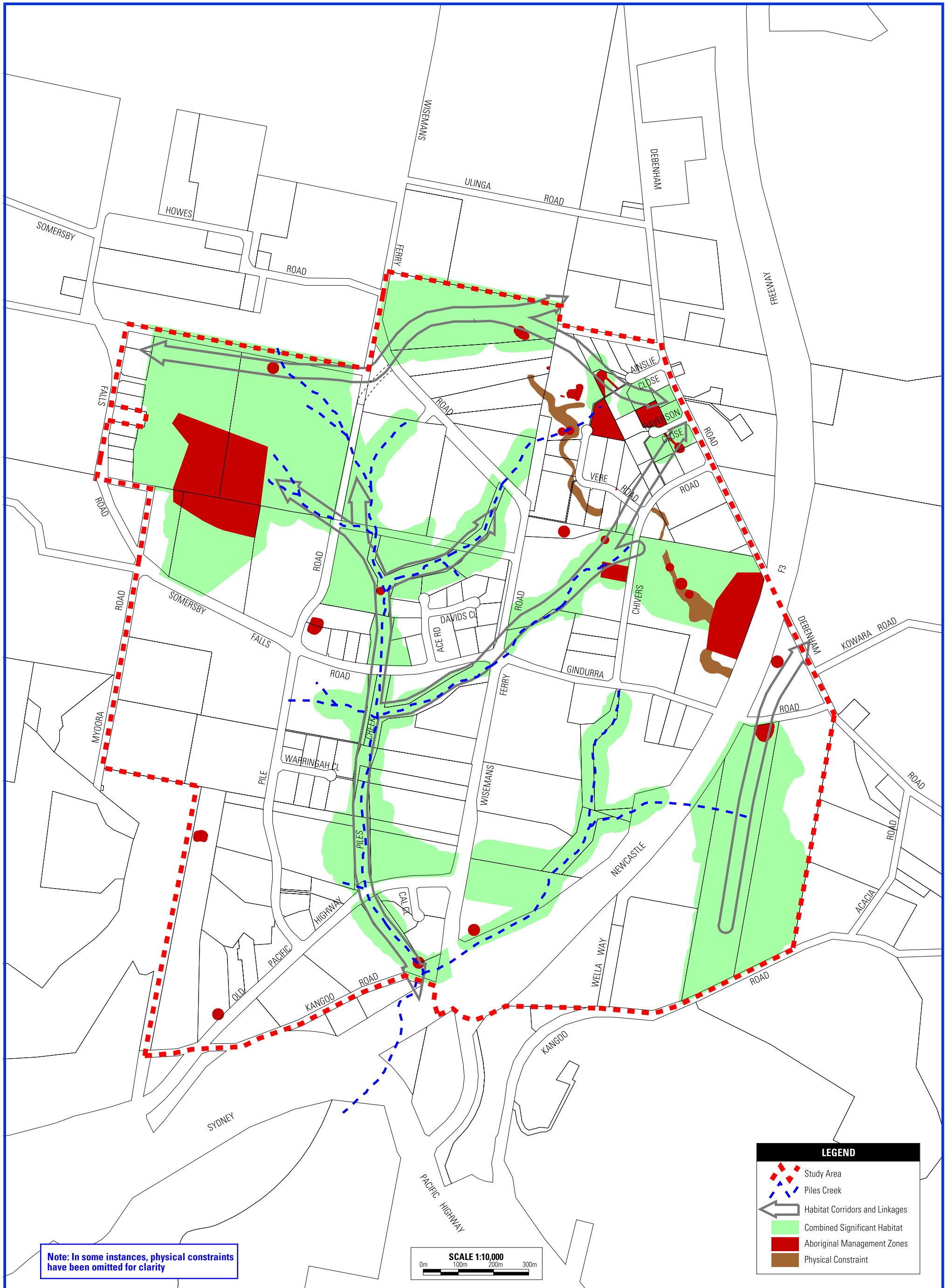
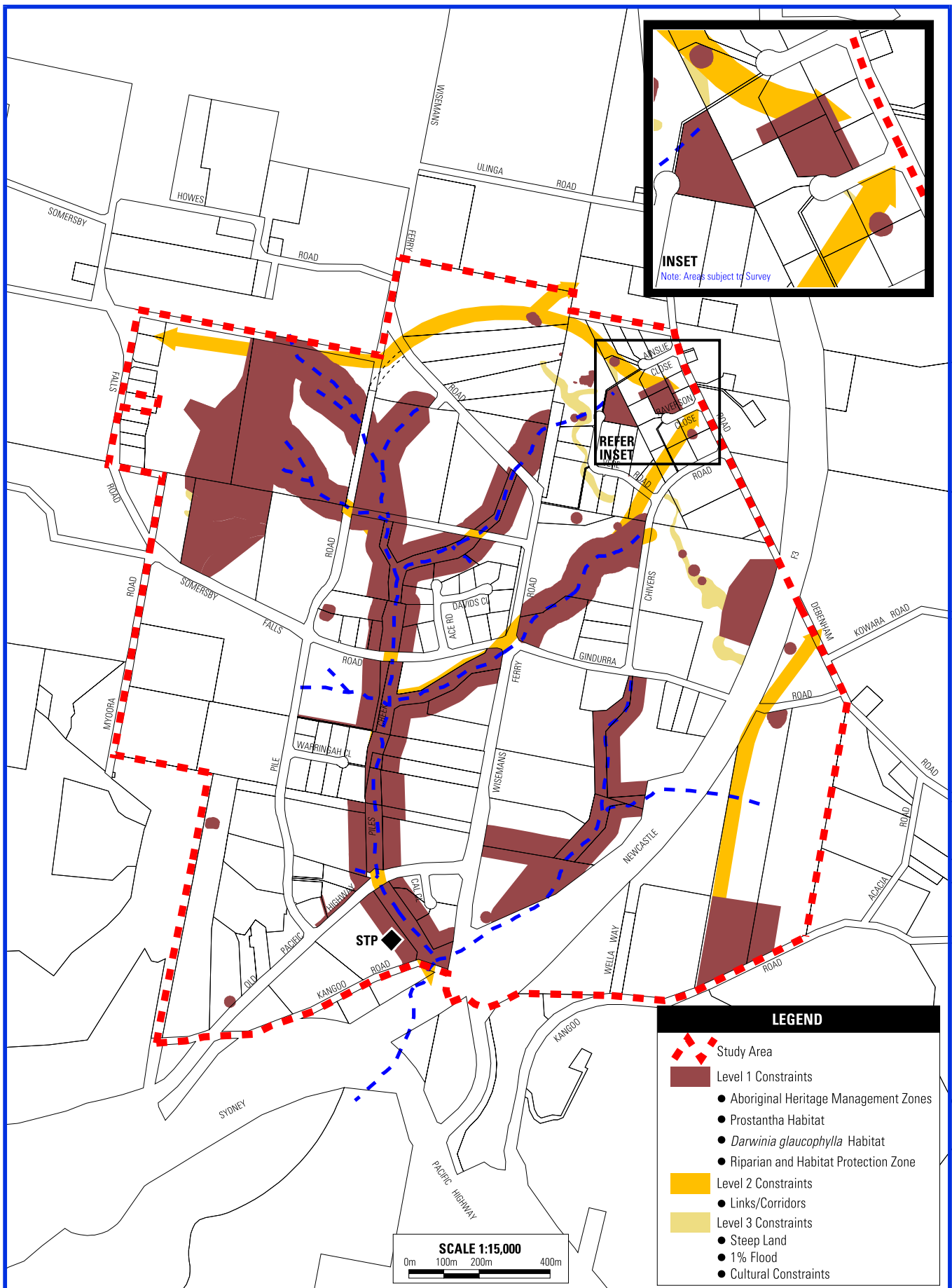
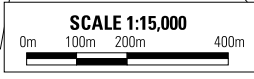


FIGURE 3.1
AREAS OF ENVIRONMENTAL
AND CULTURAL VALUE

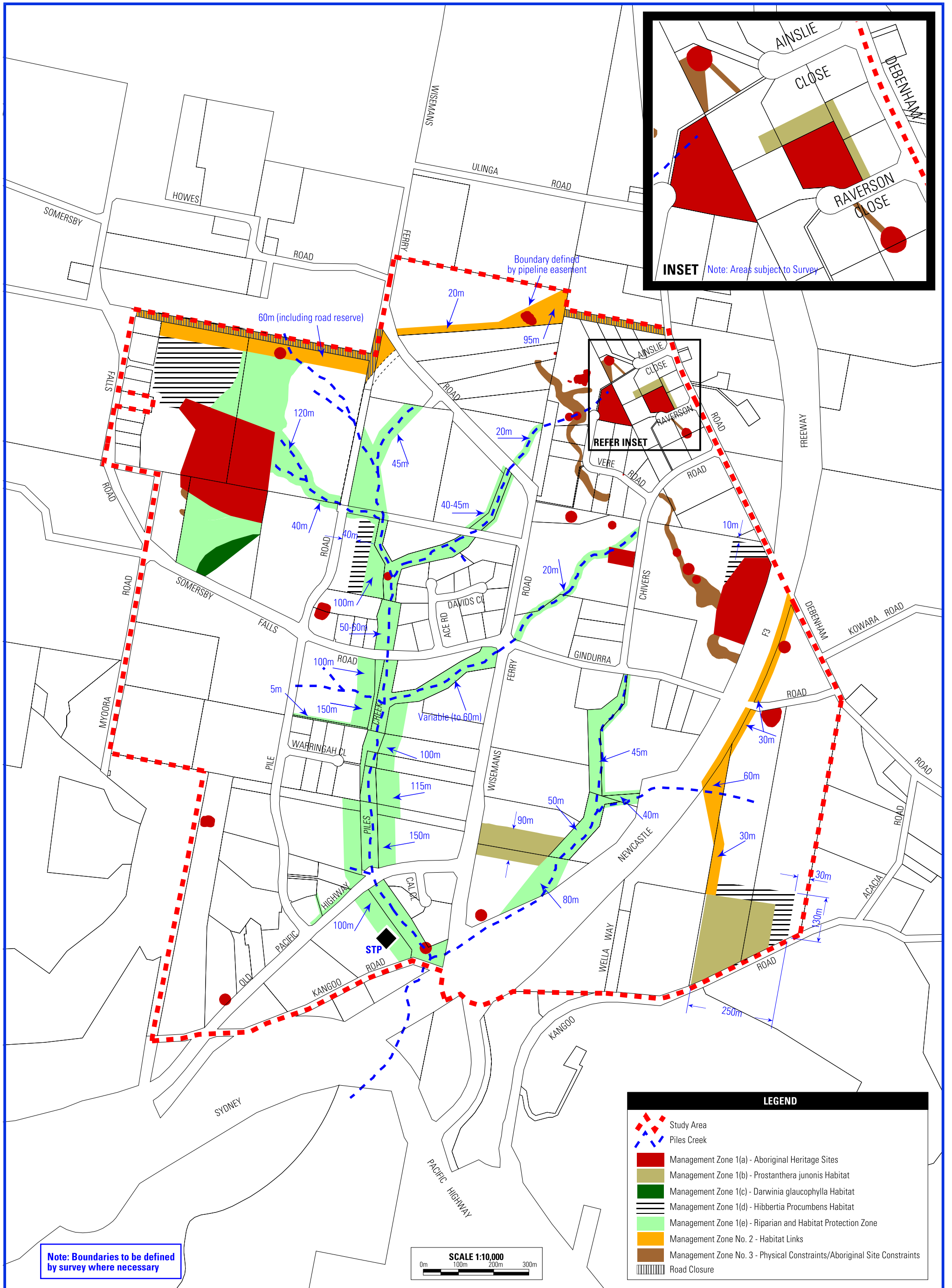


LEGEND

- Study Area
- Level 1 Constraints
 - Aboriginal Heritage Management Zones
 - Prostantha Habitat
 - *Darwinia glaucophylla* Habitat
 - Riparian and Habitat Protection Zone
- Level 2 Constraints
 - Links/Corridors
- Level 3 Constraints
 - Steep Land
 - 1% Flood
 - Cultural Constraints



**FIGURE 3.2
KEY CONSTRAINTS**



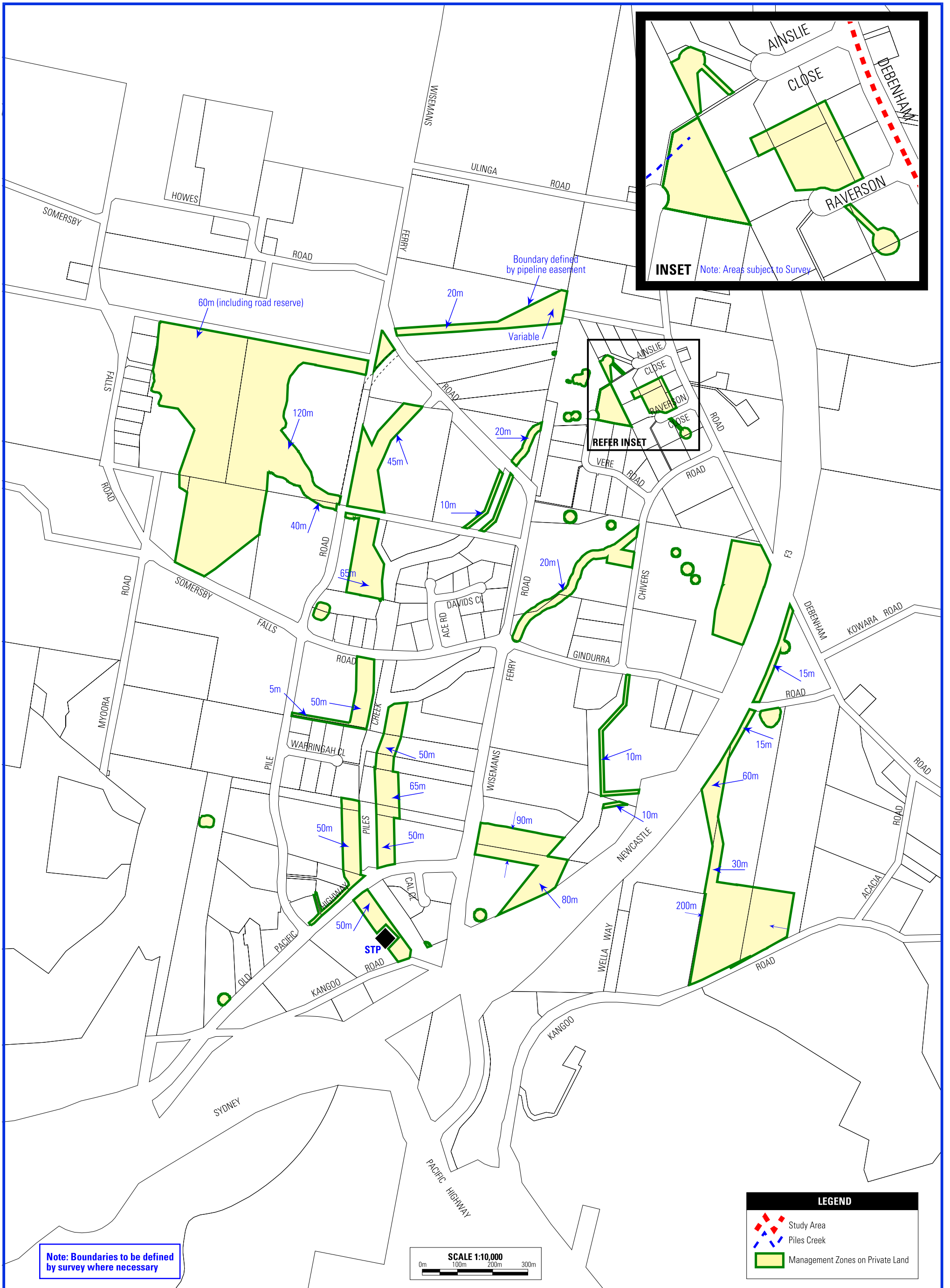
Note: Boundaries to be defined by survey where necessary

SCALE 1:10,000
0m 100m 200m 300m

LEGEND	
	Study Area
	Piles Creek
	Management Zone 1(a) - Aboriginal Heritage Sites
	Management Zone 1(b) - Prostanthera junonis Habitat
	Management Zone 1(c) - Darwinia glaucophylla Habitat
	Management Zone 1(e) - Riparian and Habitat Protection Zone
	Management Zone No. 2 - Habitat Links
	Management Zone No. 3 - Physical Constraints/Aboriginal Site Constraints
	Road Closure



FIGURE 4.1
PROPOSED MANAGEMENT ZONES



Note: Boundaries to be defined by survey where necessary

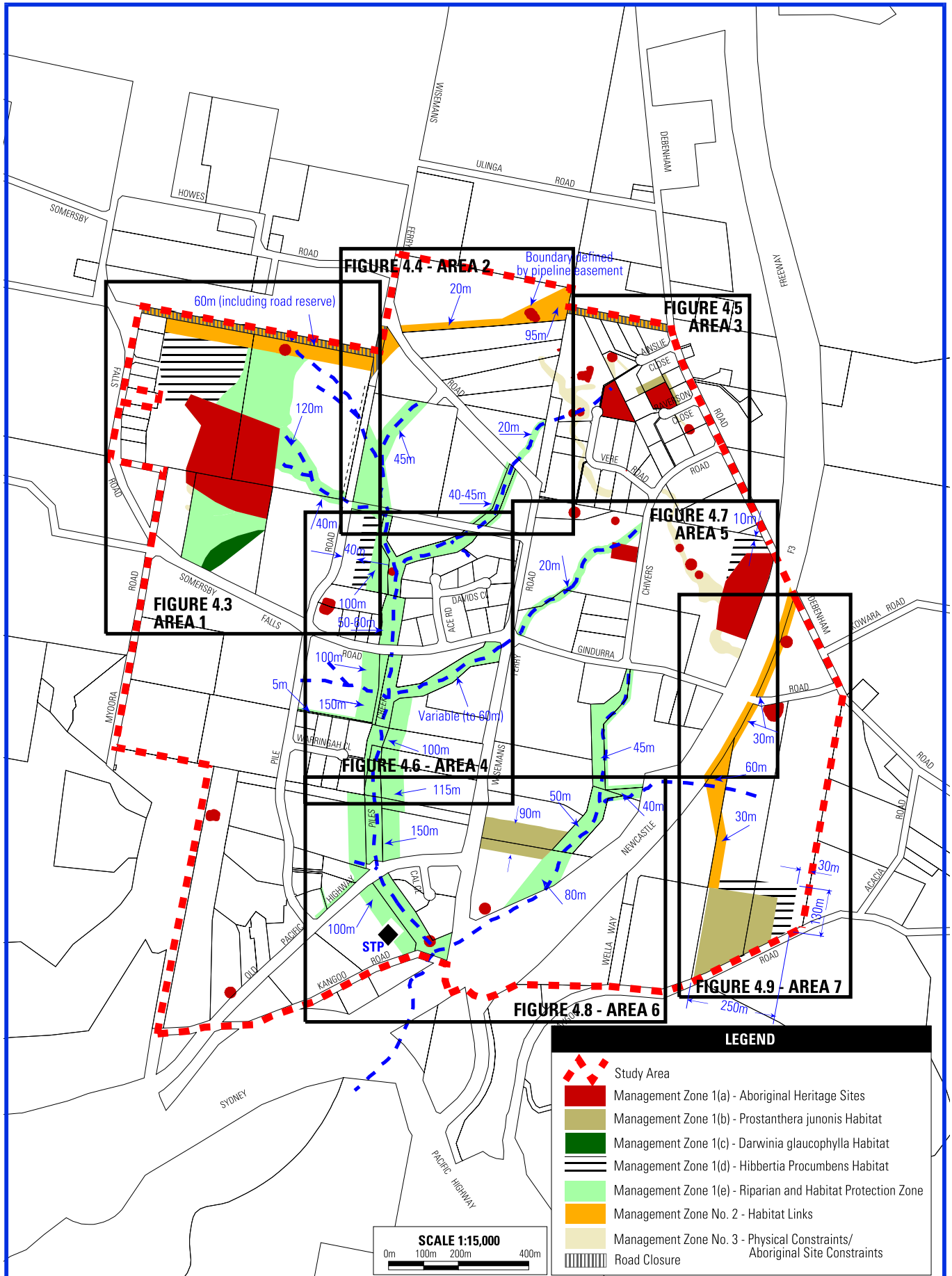
SCALE 1:10,000
0m 100m 200m 300m

LEGEND

- Study Area
- Piles Creek
- Management Zones on Private Land



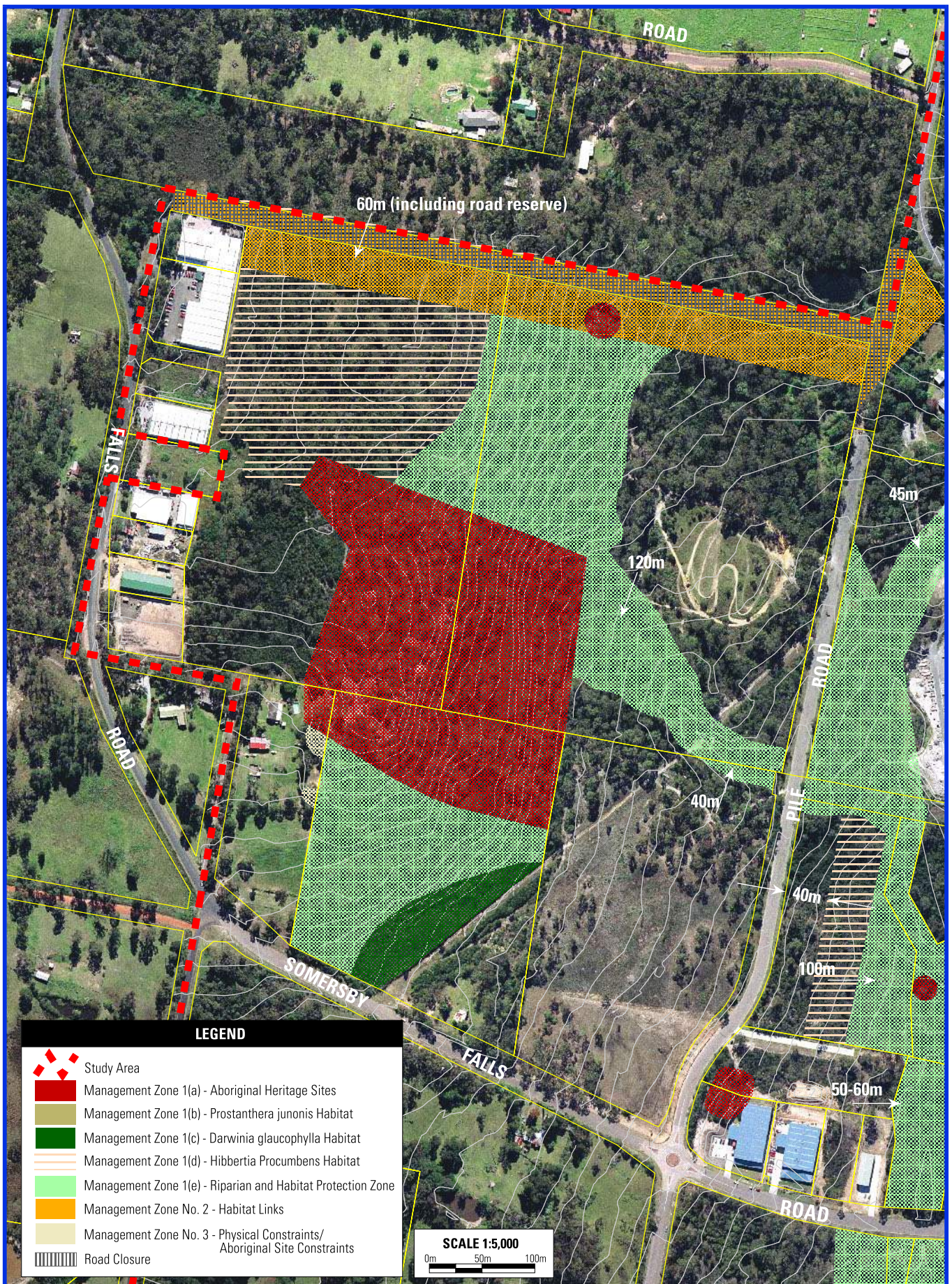
FIGURE 4.1a
MANAGEMENT ZONES
ON PRIVATE LAND



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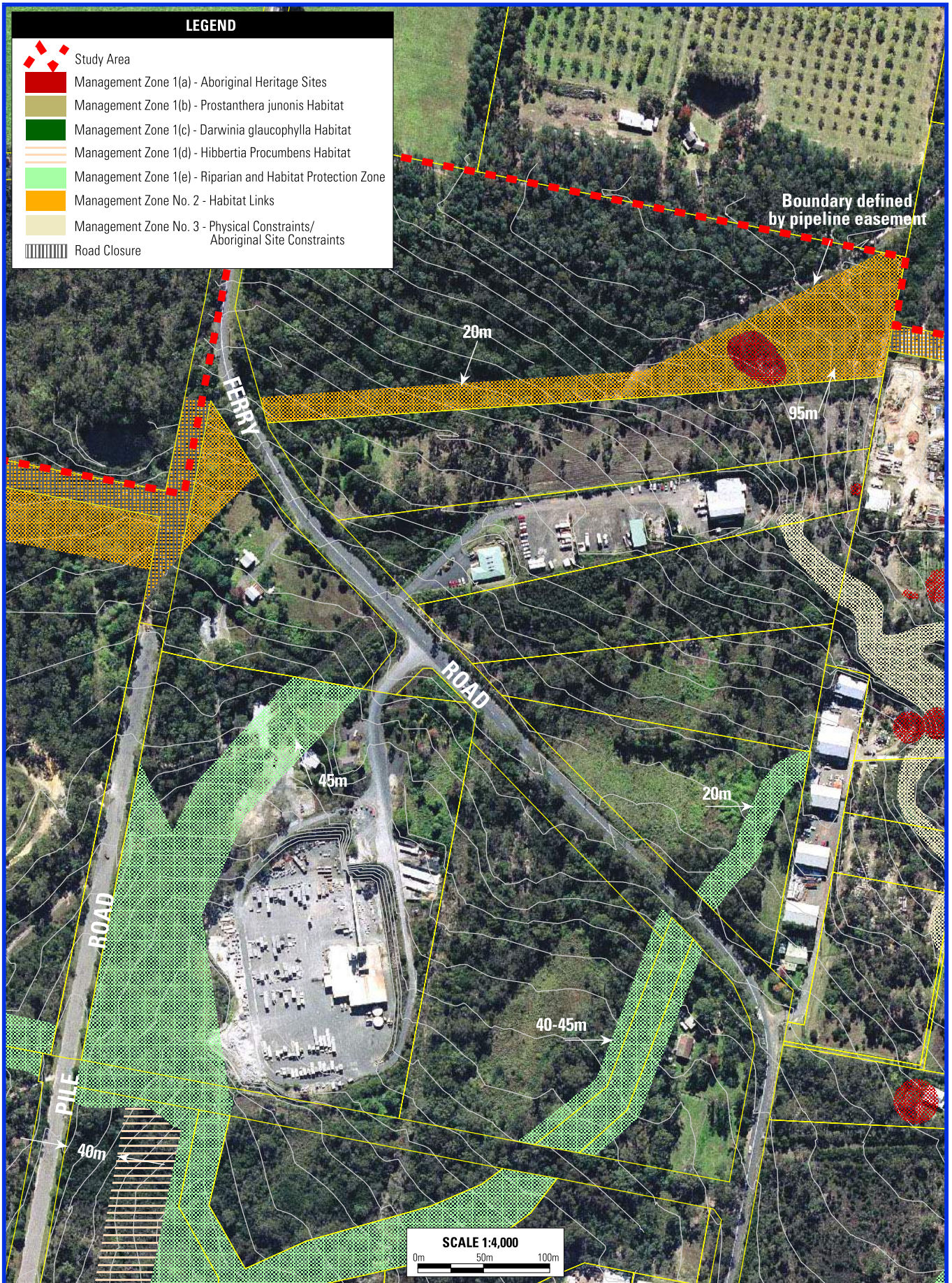
FIGURE 4.2
KEY MAP - MANAGEMENT ZONES



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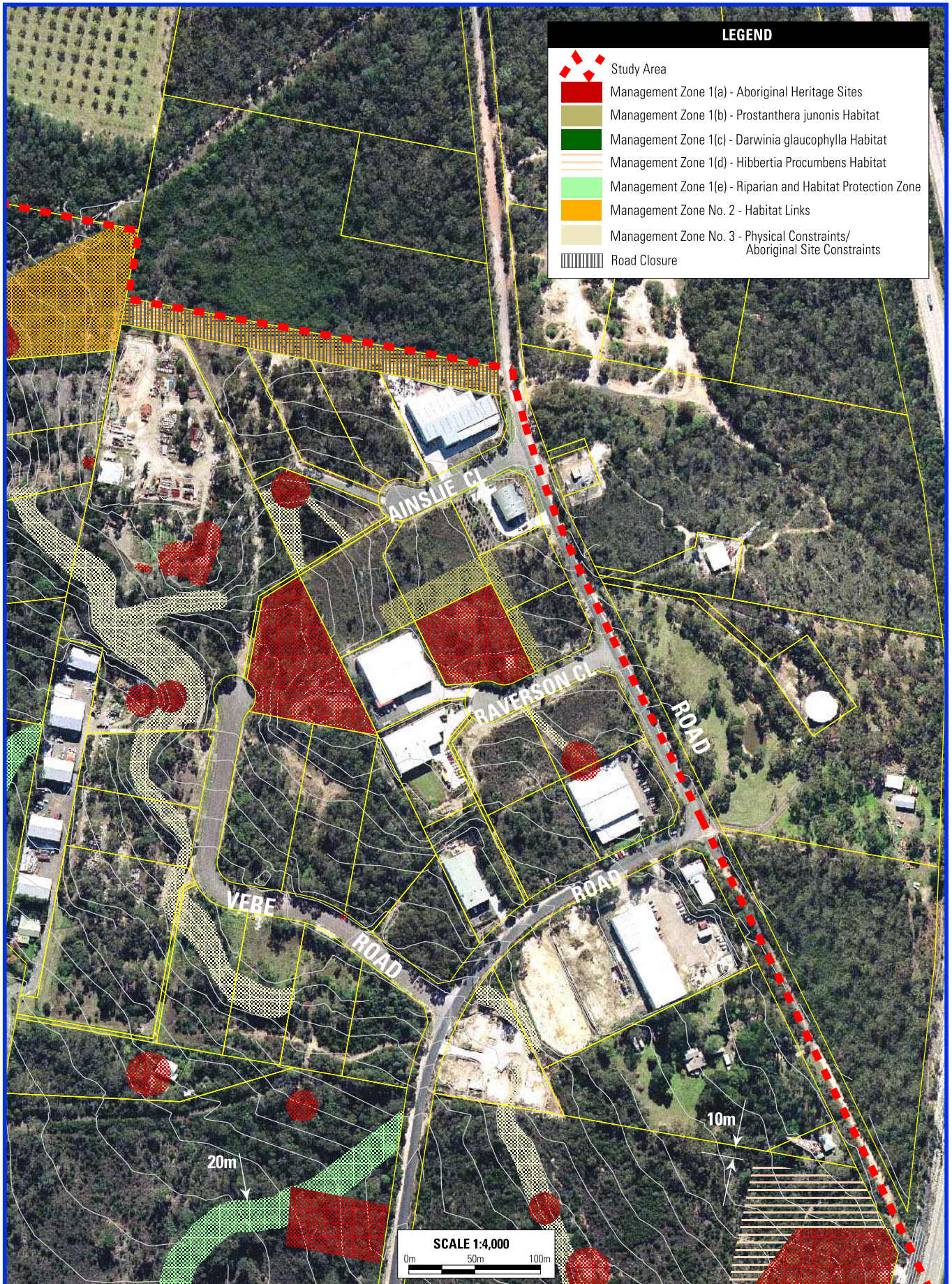
FIGURE 4.3
PROPOSED MANAGEMENT ZONES
(AREA 1)



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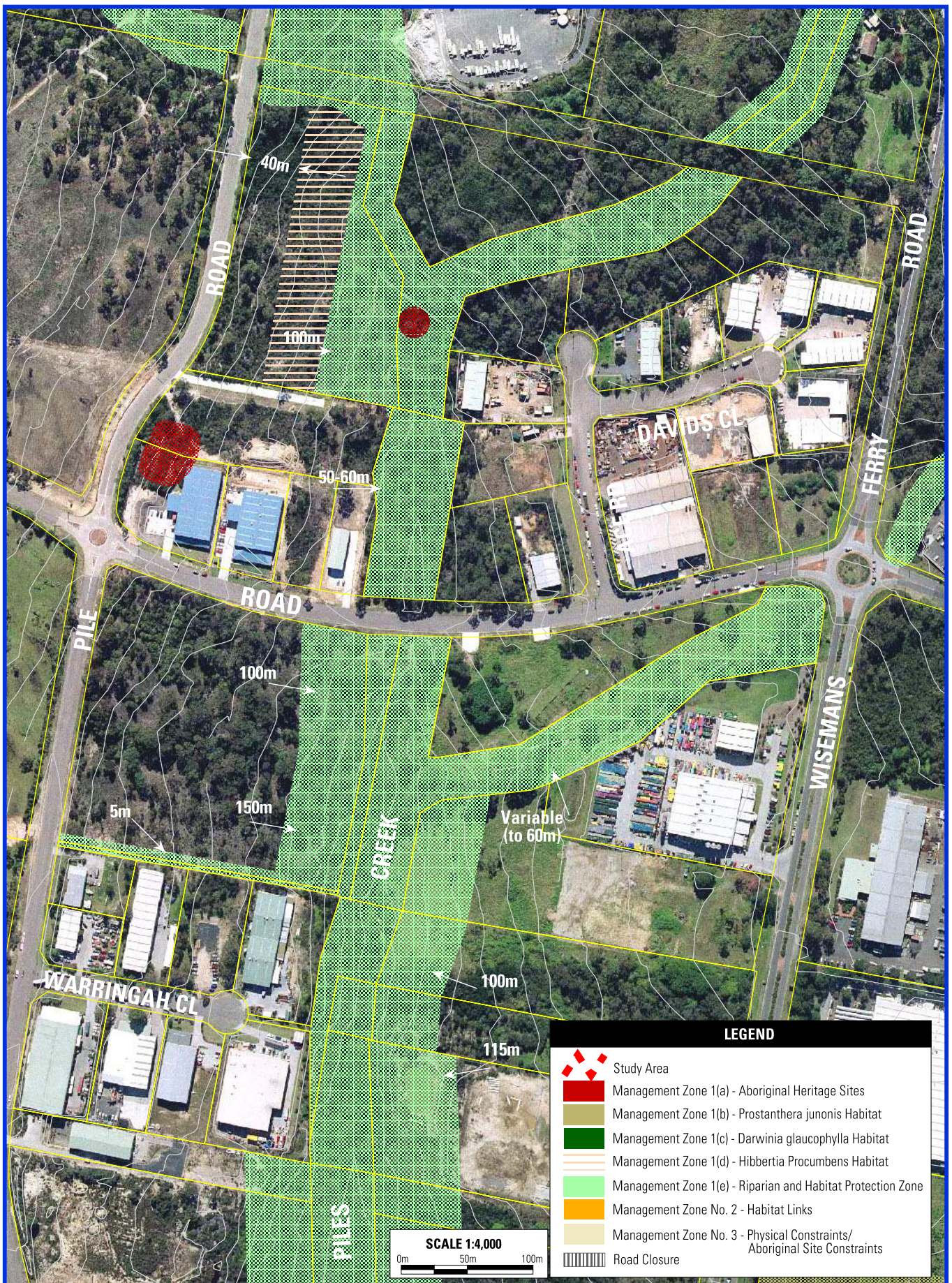
FIGURE 4.4
PROPOSED MANAGEMENT ZONES
(AREA 2)



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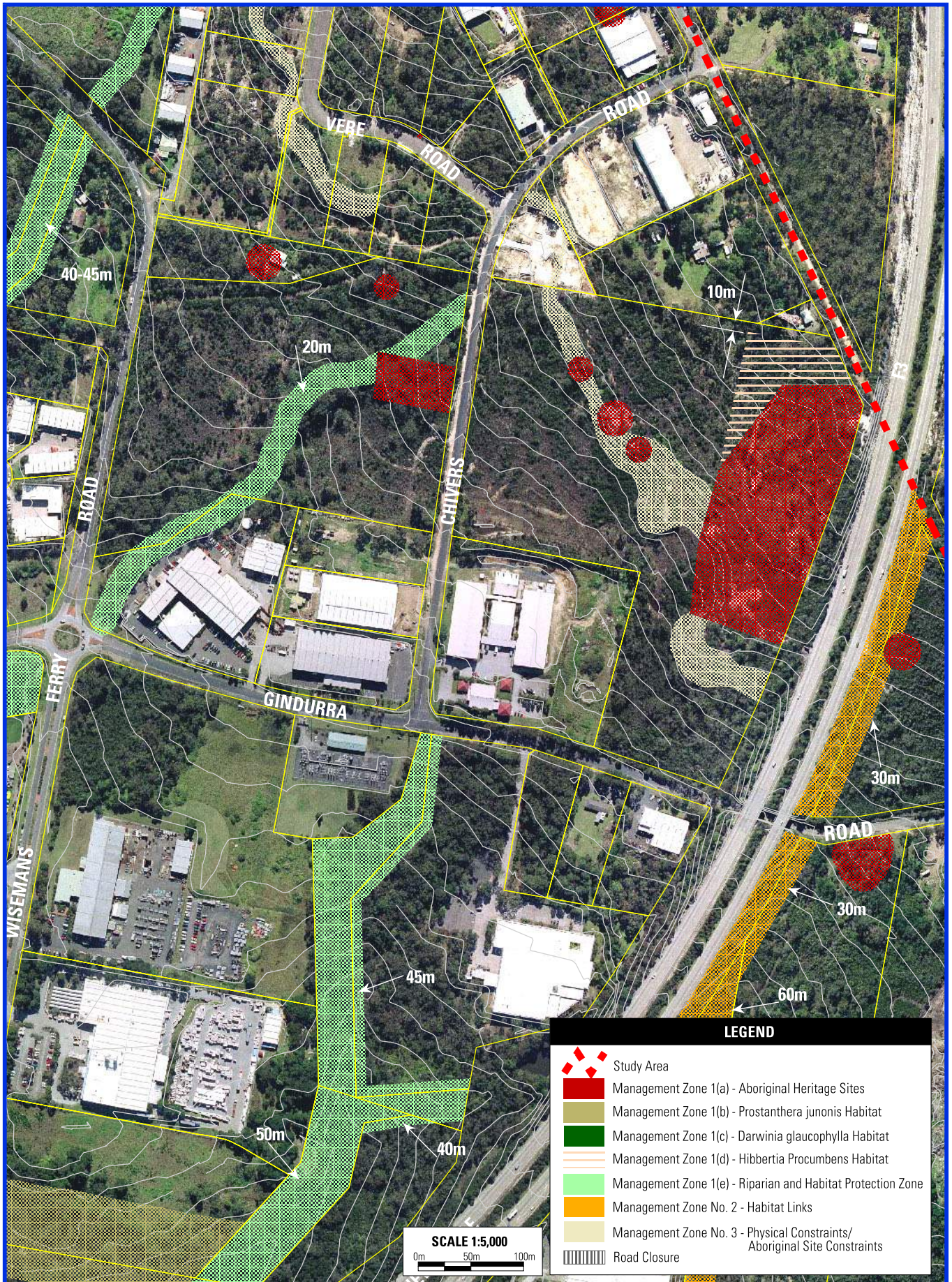
FIGURE 4.5
PROPOSED MANAGEMENT ZONES
(AREA 3)



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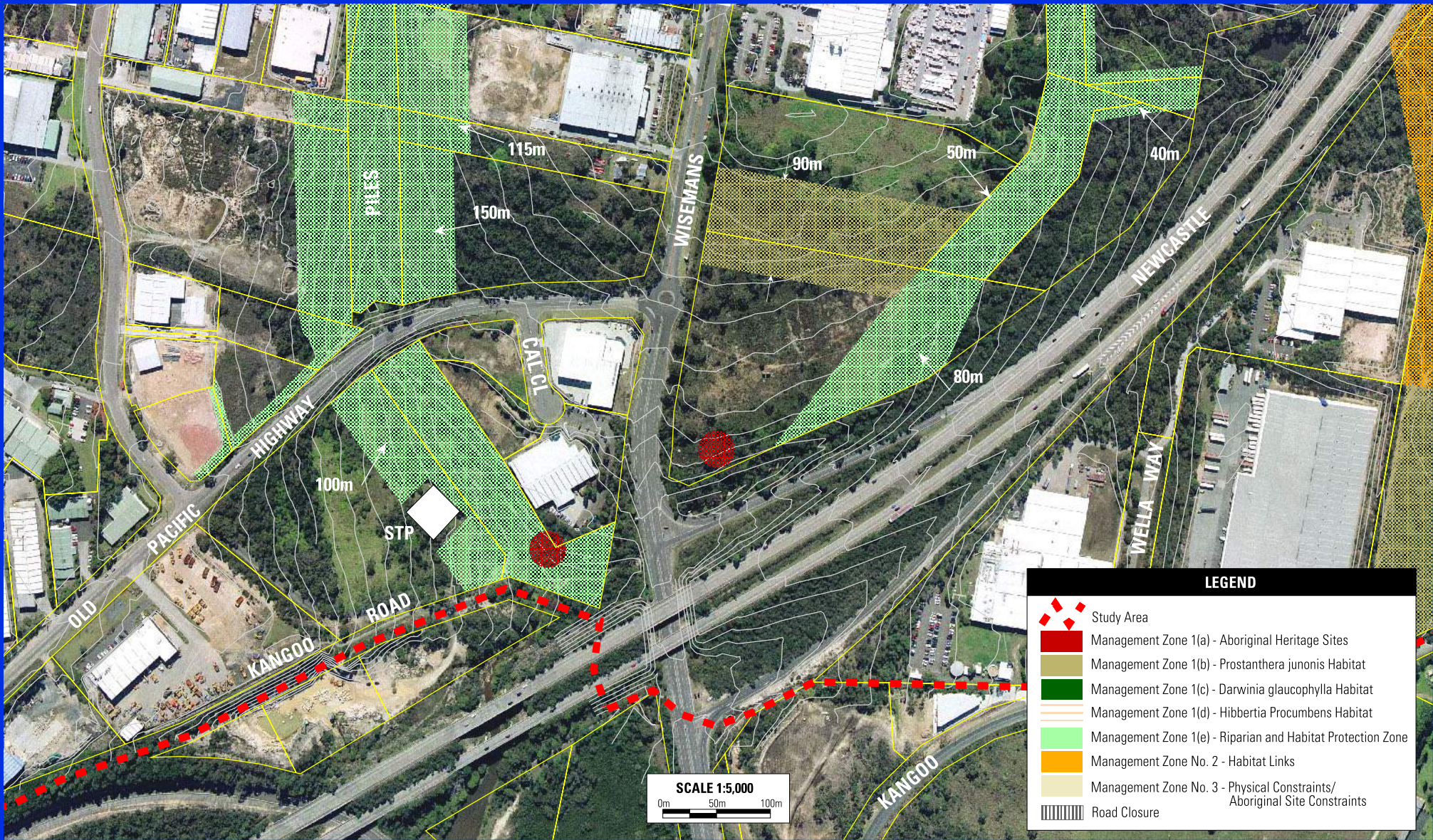
FIGURE 4.6
PROPOSED MANAGEMENT ZONES
(AREA 4)



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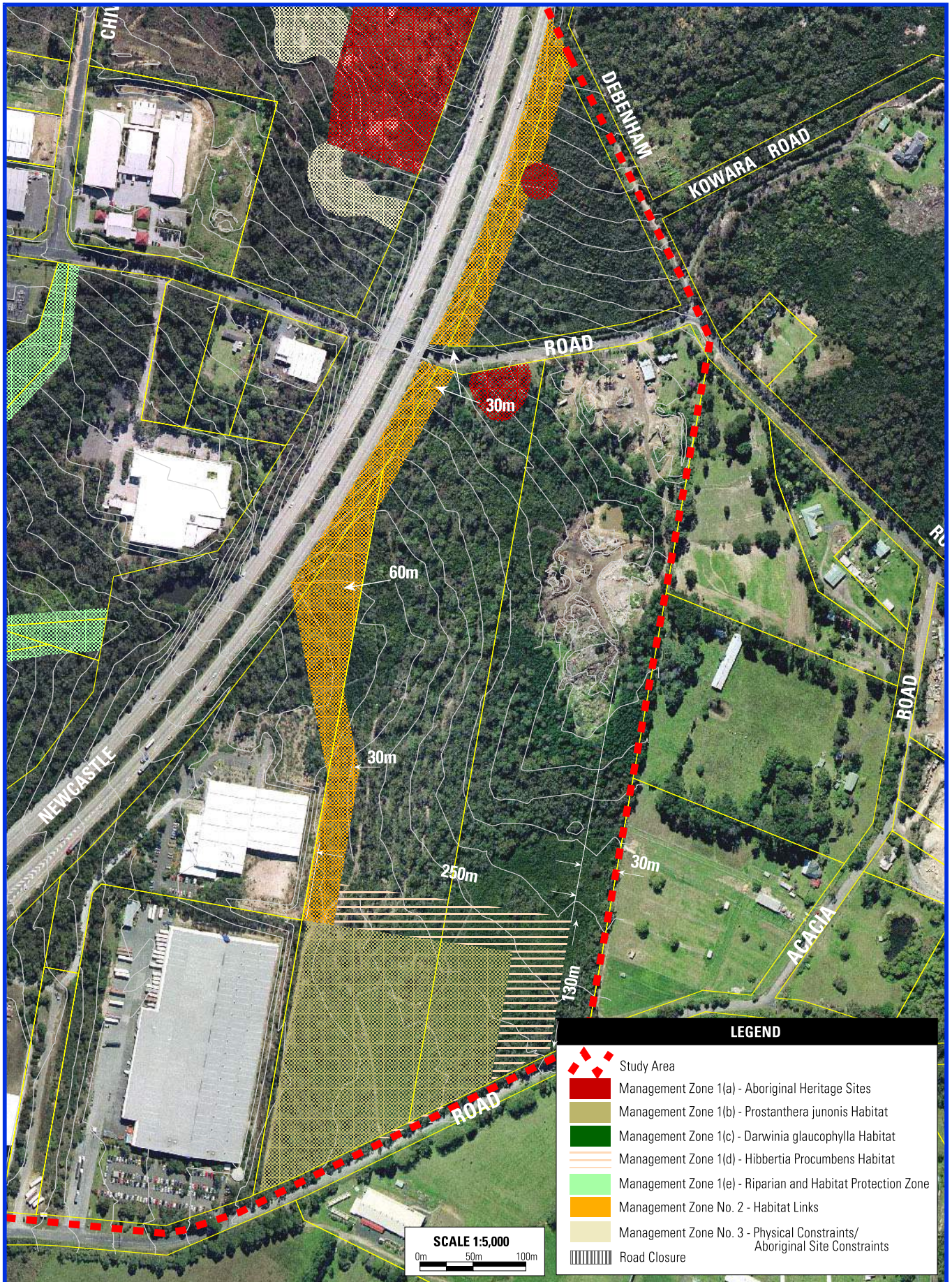
FIGURE 4.7
PROPOSED MANAGEMENT ZONES
(AREA 5)



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FIGURE 4.8
PROPOSED MANAGEMENT ZONES
(AREA 6)



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FIGURE 4.9
PROPOSED MANAGEMENT ZONES
(AREA 7)