

BUSHLAND MANAGEMENT PLAN

***Orica Australia Pty Ltd
2 Christina Road
Villawood, NSW***

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1.0 INTRODUCTION

1.1 Background Information

Orica Limited (hereafter referred to as Orica) is the current owner of property at 2 Christina Road, Villawood, in Bankstown Local Government Area.

The site has been listed in the Bankstown City Council Biodiversity Strategy, September 2002 as being environmentally significant privately owned land of highest value, see 7.2.3, a), v, p130 and of medium priority, Appendix 2, p238. The bushland is a thin strip along the western boundary and northwest corner of the site.

The bushland has been investigated by National Parks and Wildlife Service (NSW) and identified as "significant" at local, regional and state levels (James 1997 - referenced by Urban Bushland Management Consultants Pty Ltd 2000).

Urban Bushland Management Consultants Pty Ltd (UBMC) assessed the site in May 2000 and made the following recommendations:

- The full area of bushland (0.22ha) be permanently preserved and managed to conserve its conservation values;
- A Vegetation Management Plan (including management of fire hazard) be prepared and implemented for the bushland sector of the property;
- Any future remedial works on adjacent land be carried out to have no negative impact on the bushland remnant;
- No additional stormwater runoff or overland drainage be directed into the ditch adjoining the bushland, and that earthworks on the adjoining remediation land should be contoured to direct water away from the bushland;
- No fill soil or other material should be deposited or allowed to spill over into the bushland remnant;
- Noxious weed control should be undertaken within the remnant as a matter of urgency; and that
- The potential for establishing a Voluntary Conservation Agreement (VCA) with the NPWS should be investigated to allow the bushland to be preserved and effectively managed.

1.2 Report Purpose and Objective

The current report – *Bushland Management Plan*, has been prepared to ensure the biodiversity values of the remnant bushland are protected while the site is remediated.

It is anticipated that this report will assist in meeting the following objectives:

- Retain and protect the conservation values of the remnant bushland;
- Control the impact of noxious and environmental weeds;
- Protect and encourage wildlife;
- Assist Bankstown City Council to meet its statutory obligations regarding biodiversity protection;
- Comply with the requirements of current state and federal environmental legislation.

1.3 Legislative Framework

1.3.1 Local Planning Instruments

A number of local and regional policies and plans have relevance to the current and ongoing management of remnant bushland at the Orica site. The most relevant items are summarised below:

Bankstown Local Environment Plan 2001

This legislation was made in May 2002 under the *Environmental Planning and Assessment Act 1979* and updated January 2003 and aims to regulate development in accordance with the various principles including –“Remnant bushland, natural watercourse and threatened species should be protected”;

Tree Preservation Order – Development Control Order No 8

The Tree Preservation order aims to preserve the existing amenity served by trees and allow the removal or pruning of trees in accordance with this Development Control Plan. An application must be made to Council to remove any tree

- which has a height greater than 5 metres,
- which is more than 3 metres away from a building
- which is not on the list of exemptions

or to prune more than 10% of the foliage or remove deadwood;

Biodiversity Strategy – September 2002

This strategy was prepared to set the future management direction for the protection and enhancement of biodiversity within Bankstown. The strategy undertakes a detailed review of the natural environment of Bankstown and has assessed the ecological values within Bankstown. The report also considers threats to the existing biodiversity values, as well as the statutory and organizational context that are relevant to the management of biodiversity. The outcome is a list of some 60 separate strategies that in their totality provide a comprehensive blueprint for the management of biodiversity.

1.3.2 State Planning Controls

A number of state government acts and policies have relevance to current and on-going management of native vegetation (bushland) in Bankstown City. The most significant of these are:

Threatened Species Conservation Act, 1995 (TSC Act)

This requires that councils consider the impact on threatened species in fulfilling their statutory responsibilities under the *Environmental Planning & Assessment Act 1979*;

Local Government Act 1993

This Act has been amended and has now incorporated Environmentally Sustainable Development (ESD) considerations (including biodiversity conservation) as a key aspect of Council operations;

Environmental Planning and Assessment Act 1979.

The principle planning legislation for the state providing a framework for the overall environmental planning and assessment of development proposals. The Act provides for the preparation of a number of environmental planning instruments (including SEPPS, REPS etc);

Noxious Weeds Act 1993

Administered by the NSW Department of Agriculture, this Act identifies noxious weeds, control measures, public and private responsibilities and provides a framework for the management of noxious weeds across NSW.

1.3.3 Other Relevant Legislation

There are a number of other legal instruments which may have relevance to management of vegetation and other natural areas (wetlands, watercourses) on private and public lands.

A number of these apply to the management of the bushland in the study area. These are;

- State Environmental Planning Policies (SEPPs) – various
- Protection of the Environment operations Act, 1997.
- Rural Fires Act, 1997
- Catchment Management Act, 1989
- Native Vegetation Conservation Act, 1997
- Rural Fires Act, 1997
- Occupational Health and Safety Act, 2000
- Pesticides Act, 1999
- Poisons and Therapeutic Goods Act, 1966
- Public Health Act, 1991

2.0 THE STUDY AREA

2.1 Location and setting

The Orica property at 2 Christina Road comprises an area of approximately 12.7 ha located east of Woodville Road and South of Miowera Road, Villawood. The site was part of Leightonfield Munitions Complex in the 1940s and has been used for chemical manufacturing for nearly sixty years.

The bushland is a narrow strip measuring some 20m wide x 100m long on the western boundary of the property. The bushland strip is concurrent with a larger (2ha) patch of bushland on the Barloworld Coatings (Taubmans) property to the north, and forms part of a discontinuous fauna corridor through the Villawood area east of Woodville Road.

The northwest corner of the site has never been built on and since 1990 has been protected by a batter installed as part of the site stormwater containment system. The batter was constructed of fill material including lumps of concrete and pieces of metal pipes etc., and separates the bushland from a grassed area. A shallow ditch serves as a drainage channel paralleling the property fence. Weed invasion is generally concentrated on the embankment and in the bushland adjacent to the drainage channel.

2.2 Physical Environment

The site is gently undulating and the soil is clay over Wianamatta shale. The average rainfall is 900mm but the last three years have been a lot drier with only 470mm during 2002. The average maximum temperature is 26°C and average minimum temperature is 18°C and in 2002 temperatures ranged from 0.7°C to 42.7°C.

2.3 Biological Environment

2.3.1 Flora

The vegetation on the Orica site comprises two main units

- Bushland dominated by indigenous species
- Landscaped or garden areas

The species in the bushland affected by the proposed sub-division are listed in Appendix 1. The bushland has been classified as Cooks River Clay Plain Scrub by Bankstown City Council Biodiversity Strategy (see Appendix 2) and is considered to be a composite of Cumberland Plain Woodland, Shale/Gravel Transition Forest and Cooks River Clay Plain Scrub Forest by Urban Bushland Management Consultants Pty Ltd (Assessment of Remnant Bushland & Tree Survey for 2 Christina Road, Villawood, May 2000).

2.3.2 Fauna

The main groups of fauna sighted on the Orica site are insects, birds and reptiles and in the bushland area the following have been seen:

- ants – mainly on the western side
- paper wasps – nests have been sighted
- butterflies and caterpillars, various types
- skinks various (also Eastern Blue Tongue Lizard near Christina Road)
- frogs – *Crinia signifera* and *Limnodynastes peronii*.

In and around the bushland the following birds have been sighted;

- *Egretta (Ardea) novaehollandiae* - white faced heron
- *Malurus cyaneus* – superb fairy wren
- *Anthochaera carunculata* – red wattle bird
- *Artamus cyanopterus* – dusky wood swallow
- *Grallina cyanolueca* - peewee
- *Gymnorhina tibicen* - Australian magpie
- *Falco cenchroides* – nankeen (Australian) kestrel
- *Rhipidura leucophrys* - willy wagtail
- *Coracina novaehollandiae* – black-faced cuckoo-shrike
- *Columbia livia* – rock dove (feral pigeon)
- *Elophus (Cacatua) roseicapilla* – galah
- *Hirundo ariel* – fairy martin
- *Manorina melanocephala* – noisy miner
- *Acridotheres tristis* – common mynah
- *Tyto alba* – barn owl
- *Ocyphaps (Geophaps) lophores* - crested pigeon
- *Corvus coronoides* – Australian raven
- *Hirundo neoxena* – Welcome Swallow

There have been several cats, dogs and even foxes sighted in previous years. Cats have been trapped and collected by Bankstown City Council. The last sighting of a fox was in 2001 when a dead fox was found on the fenceline near Epic Place.

2.4 Socio-Cultural Environment

2.4.1 Site History

The Site was established as part of the Leightonfield Munitions Complex during World War II and was used to manufacture TNT. When the Commonwealth Government was able to purchase TNT from USA it sold approximately 30 hectares of land to Taubmans Industries. In June 1953 Taubmans Industries sold its subsidiary Taubmans Chemicals Pty Ltd to ICI Australia Ltd. In 1956 ICI Australia exercised an option to purchase from Taubmans 13 hectares of land and the buildings erected on it.

The site was used to manufacture a variety of products for both Agricultural and Pharmaceutical use for ICI Australia Ltd and over the 60 years as a chemical site handled over 600 different chemicals.

There were over 100 buildings and associated structures on the site but these were not in the northwest corner of the site and neither were roads constructed in that area. The aerial photo of the site from the 1940s does show an unsealed roadway along that boundary. The site was landscaped with a mixture of exotic and native (not necessarily of local provenance) plants, but mostly along the Christina Road edge and around the buildings and internal roads. This meant the vegetation in the northwest corner was mostly untouched amongst the trees and it is this area that has been classified as remnant vegetation.

Examination of aerial photographs from the 1940s through to 2000 show the site had various levels of vegetation at different times and the north west corner was sometimes quite clear of vegetation (1950s to 1970s – see Appendix 3). This would indicate the bushland is regrowth rather than remnant.

From the early 1990s the area was protected from casual intrusions by a batter constructed to contain stormwater and water from potential fires on the site for testing to reduce the risk of chemical contamination from the manufacturing area. All the stormwater to the east and south of the batter ran away from the bushland area. This batter meant rain falling on the actual area of bushland ran east to a ditch below the batter and flowed to a stormwater channel north of the site. As the general slope of the site is to the southwest water pools along this ditch during and after rain and only dries out during periods of low rainfall.

The area was further protected by landscaping planting done to the south and east of the area in the early to mid 1990s. This planted area contains mostly native plants but they are not indigenous natives and not of local provenance.

Manufacturing ceased on the site in 2000 and since then the site decommissioning has continued. At the present time Orica has submitted a development application (DA) to Bankstown City Council build a secure storage facility to store excavated soil that will be removed from the southeast corner of the site. A Remediation Action Plan (RAP) for the Pharmaceutical Plant has been prepared for Orica by CH2MHILL. Following the remediation it is proposed to sub-divide the Orica site so that the Pharmaceuticals area and approximately 2.5 hectares surrounding the building can be sold separately. A RAP will then be developed and implemented for the Crop Care Site. It is expected that this remediation work will commence in early 2004.

2.4.2 Land Tenure

The remnant bushland covers an estimated 2200 square metres of the 12.6 hectares owned by Orica Limited at 2 Christina Road, Villawood. The freehold site is identified as Lot 1 on Deposited Plan (DP) 634604 at Leightonfield in the City of Bankstown, Parish of Liberty Plains and County of Cumberland.

3. BASIS FOR MANAGEMENT

3.1 Bushland Definition

Bushland is defined in this report as vegetation that comprised scattered native tree cover with an understorey of two strata that was dominated by locally indigenous species, or which locally contained a high proportion of introduced species in one stratum, but was practicable to be restored to a predominantly natural condition.

3.2 Determining Bushland Condition

The bushland has been evaluated several times by NPWS, Urban Bushland Management Consultants Pty Ltd and Bankstown City Council.

The latest investigation was done by Judith Rawling and Karen Visman of Urban Bushland Management Consultants Pty Ltd on the 20th May 2003. Also attending were Diane Picone (Bushland Officer, Bankstown City Council), David Wilson (PSE) and Gwenda Lister (Orica).

It was agreed at this investigation the bushland does not include the planted area to the east and south of the regrowth bushland which had been included in the area of Cooks River Clay Plain Scrub Forest, *Eucalyptus fibrosa*, *Eucalyptus longifolia* and *Melaleuca decora*. See Appendix 2: Map A2-1: Vegetation Association at Taubmans and ICI/Orica ex Bankstown City Council Biodiversity Strategy p227 and Appendix 4:

Figure 1 -Vegetation Mapping ex Urban Bushland Management Consultants Pty Ltd: Field Visit Report 30 May 2003.

The bushland is marginal around the edges and the long narrow shape means there is a long perimeter. Most of the bushland is in fair condition. The density of woody weeds has been greatly reduced since the previous survey (UBMC 2000). Some of the *Melaleuca* trees have been affected by mistletoe and there are dead plants in the shrub layer from the drought.

While the bushland is small and has suffered from the dry conditions of the previous year it is still viable and can contribute to the biodiversity of the region. The Cumberland Plain is the area with the greatest loss of original vegetation in the Greater Sydney area so it is important to retain even small remnants.

3.3 Bushland Management Strategies

3.3.1 Bush regeneration

The principles of bush regeneration involve removing the causes of deterioration of the bushland and allowing the original vegetation to recover. Since July 2001 bush regeneration has been funded by Orica and done voluntarily by the author on a part time basis at the site with priority on removing the noxious weeds. Areas of the embankment have regenerated with climbers *Hardenbergia violacea* and *Kennedia rubicunda*, and shrubs, *Dodonea triquetra* and *Acacia falcata* and monocots, *Dianella revolute* and *Lomandra longifolia* following removal of weeds.

3.3.2 Weed Control

The bushland was heavily infested with weeds along the margins particularly on the eastern side where there were large quantities of *Chrysanthemoides monilifera* ssp *monilifera* (Boneseed) and *Lantana camara* (Lantana). *Rubus fruticosus* (Blackberry) was also prevalent on the northern boundary of the site with Taubmans. Reference UMBC Assessment of Renmant Bushland & Tree Survey for 2 Christina Road, Villawood, May 2000.

The majority of these were removed mechanically under the supervision of UMBC in 2000 and follow up control has been done by removing seedlings that have germinated and by gradually removing remaining plants within the bushland.

Control has been by hand removal with occasional cut and paint for larger specimens. Opportunities for easy control, e.g., before flowering, after rain, following germination etc., have been taken where possible.

3.3.3 Identifying Target Weeds

Weeds are targeted by their environmental impact and location. Where the bushland is healthy weeds are more easily shaded out and removal may damage the bushland more than leaving them to be controlled naturally. Noxious weeds are always removed as long as their removal does not create bigger problems. For example the *Lantana camara* has been slowly removed over three years because it provided habitat and cover for the small wrens in the area.

Other weeds have been targeted including *Olea europaea* subsp. *africana* (African Olive), *Ligustrum sinense*, (Narrow leaf Privet), *Ligustrum lucidum* (Broadleaf Privet), *Cotoneaster glaucophyllus* (Cotoneaster), *Pennisetum clandestinum* (Kikuyu) and *Myrsiphyllum asparagoides* (Bridal Creeper).

4. IMPLEMENTATION

4.1 Management Issues and Recommendations

4.1.1 Maintenance of Habitat

Although the bushland is small it provides habitat for several species of fauna. To ensure protection of smaller reptiles and amphibians using the concrete rubble and metal pipes, the batter should be retained especially as it also protects the vegetation. The understory also protects the smaller birds and the larger birds use the canopy. The bushland is fenced on the western side where most of the ant nests are found. Foxes have been sighted over the years and several feral cats have been trapped on the Orica site. Continued irregular use of cat traps should control this predation. Fencing across the southern side when the site is subdivided should be done to provide protection from traffic.

4.1.2 Weed Control

Pennisetum clandestinum (Kikuyu) and *Cynodon dactylon* (couch grass) from the mown area to the east of the bushland will be controlled by installing a rigid plastic barrier set into the top of the batter to a depth of 300mm below soil and a road base path above. On the southern side a hard surface from the road to the proposed fence following sub-division at the edge of the bushland will restrict weed invasion. Regular bush regeneration will continue during the remediation to remove noxious and invasive environmental weeds as they reappear will be needed to maintain the viability of the bushland. To reduce the risk of clearing large areas that may reduce habitat or cause erosion this will continue to be done in transects to allow regeneration before further clearing.

4.1.3 Buffer Zone Management

To protect the bushland a buffer zone along the eastern edge will be provided with a hard edge to prevent the encroachment of introduced grasses (eg *Pennisetum clandestinum* - Kikuyu, *Setaria gracilis* - Pigeon Grass and *Paspalum dilatatum* - Paspalum) down the slope below the exotic grassland. Along the northern boundary east of the bushland *Lomandra longifolia* is providing an effective barrier from the mown strip of exotic weeds maintained by Taumans and this will be monitored especially for *Cotoneaster glaucophyllus* (Cotoneaster), *Olea europaea subsp africana* (African Olive), *Lucidium ligustrum* (Broad leaf Privet) and *Myrisphyllum asparagoides* (Bridal Creeper) which, dispersed by birds, regularly germinate under the fence line.

4.1.4 Drainage and Run-off

All the stormwater from the Pharmaceutical Remediation will be directed south away from the bushland area. All the stormwater from the area to the east of the bushland is directed to the containment system.

The run-off from the bushland itself flows to the north to a stormwater drain at the boundaries of Orica and Taubmans (Barloworld Coatings (Aust) Pty Ltd. As the bushland is higher than the Woodlands property to the west there is some runoff down a gentle slope on the western side to a stormwater drain that runs north-south along the fenceline just inside their property, An earth bank to the south east corner of the bushland creates a barrier so some water pools in a ditch along the east side of the bushland below the batter.

It is not proposed to change the drainage within the bushland as any work to install drains would compromise the viability of the narrow vegetation. Monitoring of erosion along the western slope and northern boundary will continue and where necessary some transplanting may be done if weed control requires large areas of clearing.

4.1.5 Planting and Landscape

To maintain the integrity of the indigenous native plants no planting is planned within the bushland. Experience in the last two years has shown that regeneration occurs when the weeds are removed in staged and discrete parcels. *Acacia falcate*, *Dodonaea triquetra*, *Dianella revolute*, *Einadia hastate*, *Hardenbergia violacea* and *Kennedia rubicunda* have all regenerated after weed clearing.

After the remediation and sub-division of the Pharmaceutical area the purchaser will be encouraged to use indigenous native species for landscaping.

4.1.6 Management of Fire Hazard

Cooks River Clay Plain Scrub benefits by periodic fire but due to industrial surrounds including flammable storage areas it will not be used as a tool on the site. Selective hand clearing of the litter load will be done in prolonged dry periods. The grassed area to the east will be maintained by mowing.

4.1.7 Corridors and Linkages

The bushland is isolated except for a small stand on the Taubmans (Barloworld Coatings (Aust) Pty Ltd property to the north. This remnant is classified as a high priority site in the Bankstown City Council Biodiversity Strategy, page 225. A coordinated approach to weed control would assist in reducing the invasion of environmental weeds particularly those dispersed by birds and from the mown area along the fenceline between the two properties.

4.2 Management Zones

The management zones are indicated on the aerial photo in Appendix 4. They are:

- **B** - Bushland – the actual regrowth/remnant area running south from the northwest corner of the site.
- **BZ** - Buffer Zone – a strip along the eastern side of the bushland to be established to protect the bushland from the exotic grassland.
- **IP** - Ironbark Plantings – an area immediately south of the bushland where ironbarks (*Eucalyptus fibrosa*) were planted for landscaping. The planting has been confirmed by an ex-employee who is the current contractor for grounds maintenance and by aerial photos of the site from previous years. All these trees are in poor condition (dead timbers and mistletoe infestations) and several have fallen. Some indigenous natives also grow in this area but ground covers (herbs and flowering forbs) are sparse and the soil surface displays a discontinuous lichen crust.
- **MP** – Miscellaneous Plantings – two areas where small trees and shrubs were planted to the east and south of the bushland. Given their origin in other parts of Sydney and/or NSW, the even-aged structure of the trees in the stand and the planting arrangement it was agreed by all present at the field visit on 20 May 2003 that these plants do not comprise remnant/regrowth native bushland. The same contractor and aerial photos confirmed this (see previous point).
- **CP** – *Casaurina glauca* Plantings – an area between the boundary and an internal road that is quite steep and has been planted to provide a screen.

4.3 Establishing Work Priorities

The main priority for Orica is remediating the site and it is expected the Pharmaceutical area will be completed by the end of 2003. During this time the bushland will be monitored each day as part of boundary inspections.

The Site Manager will manage urgent weeding of noxious weeds during this period as required.

As the next stage of remediation is planned and implemented work will be done to install the buffer zone along the eastern edge of the bushland or installing a protective barrier depending on the results of current investigations.

Cooperative arrangements between Orica and the new owners after sub-division and with neighbours, especially Taubmans (Barloworld Coatings (Aust) Pty Ltd will be investigated to manage the bushland.

5. REFERENCES

Bankstown City Council (September 2002): Bankstown City Council Biodiversity Strategy

Urban Bushland Management Consultants Pty Ltd (May 2000) : Assessment of Remnant Bushland & Tree Survey for 2 Christina Road, Villawood.

Urban Bushland Management Consultants Pty Ltd (May 2003) : Orica Australia Pty Ltd - Field Visit Report 20 May 2003 .

Simpson and Day: Birds of Australia 5.0

CH2MHILL (July 2003) Pharmaceuticals Site, Christina Road, Villawood Remediation Action Plan

Barbara Campany (September 2003): Orica Australia Pty Ltd, Villawood Site Briefing Paper.

Commonwealth Bureau of Meteorology records.

Orica Australia Pty Ltd: Villawood Weather Station Data

Ryde TAFE (2001): Bush Regeneration Certificate II

6. APPENDICES

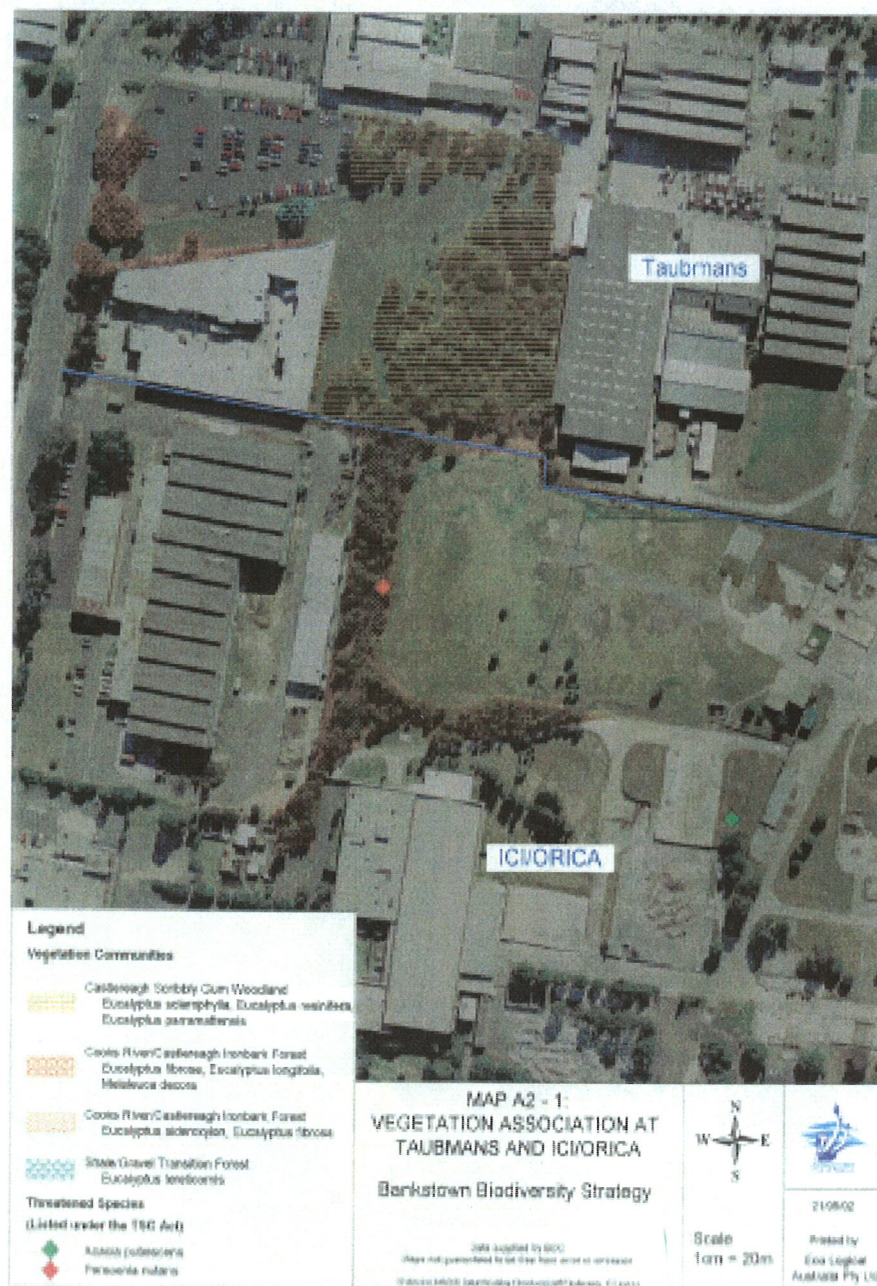
APPENDIX 1 PLANT SPECIES RECORDED IN SUB-DIVISION SECTION OF THE BUSHLAND (ex UBMC Field Report May 2003)

Botanical Name	Common Name	Number of Plants
<i>Acacia falcata</i>	Sickle-leaved Wattle	6
<i>Acacia parramattensis</i>	Parramatta Green Wattle	13
<i>Allocasuarina littoralis</i>	Black She-oak	2
<i>Bursaria spinosa</i>	Blackthorn	22
<i>Daviesia ulicifolia</i>		1
<i>Eucalyptus</i> sp.	Juvenile – not identified	1
<i>Kunzea ambigua</i>	White Tick Bush	3
<i>Melaleuca decora</i>	White Feather Honeymyrtle	9 (2 multi-stemmed clumps and 7 individuals)
<i>Melaleuca nodosa</i>	Ball Honeymyrtle	3
<i>Olearia microphylla</i>	Bridal Daisy Bush	1
<i>Ozothamnus diosmifolius</i>	White Dogwood	2
<i>Pittosporum undulatum</i>	Sweet Pittosporum	2

Australian native species local to the area, but believed to have been planted into the site, which are in the planted area adjacent to the subject site 1 (see APPENDIX 4 - Figure 1) include:

- *Casuarina glauca* (Swamp She-oak);
- ☐ *Melaleuca styphelioides*; (Prickly-leaved Paperbark); and
- *Eucalyptus fibrosa* (Broad-leaved Ironbark).

APPENDIX 2 VEGETATION ASSOCIATION ex BANKSTOWN CITY COUNCIL BIODIVERSITY STRATEGY

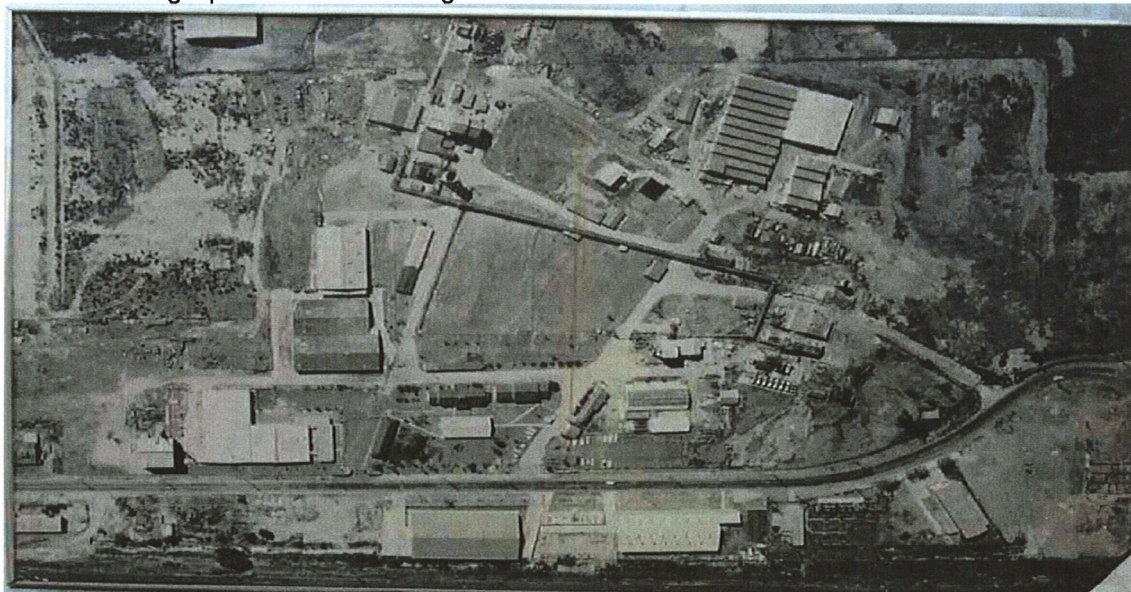


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APPENDIX 3- AERIAL PHOTOS ORICA, 2 CHRISTINA ROAD, VILLAWOOD



Aerial Photograph 1947 – showing road in bushland area



Aerial Photograph 1969 –cleared vegetation along boundary NW corner



Aerial Photograph 1978 – cleared vegetation along western boundary



Figure 1
Vegetation Mapping