CLIENTS | PEOPLE | PERFORMANCE

Mirvac Projects Pty Ltd

Former Hoxton Park Airport Development

Vegetation Management Plan

Proposed Northern Detention Basin 6

November 2010

INFRASTRUCTURE | MINING & INDUSTRY | DEFENCE | PROPERTY & BUILDINGS | ENVIRONMENT

Contents

Glossary of Terms iii

List of Abbreviations 1

Executive Summary 2

1. Introduction 3
   - 1.1 Project Description 3
   - 1.2 Objectives 3
   - 1.3 Relationship with existing reports 4

2. Site Description 5
   - 2.1 Site Location & Layout 5
   - 2.2 Geology, Soils and Topography 5
   - 2.3 Hydrology 5
   - 2.4 Vegetation 5

3. Description of Construction Impacts 8
   - 3.1 Vegetation Removal 8
   - 3.2 Terrestrial Habitats 8
   - 3.3 Aquatic Habitats 9

4. VMP Direction 10
   - 4.1 Site Opportunities and Constraints 10
   - 4.2 Project Tasks and Objectives 10

5. Restoration Program 11
   - 5.1 Restoration Zones 11
   - Legislative Requirements 14
   - 5.2 Site Preparation 14
   - 5.3 Weed Control 14
   - 5.4 Revegetation 14
   - 5.5 Maintenance Program 16
   - 5.6 Monitoring and Reporting 16

6. Program of Works, Cost Estimate and Funding 18
   - 6.1 Program of Works 18

6.2 Estimated Project Costs 18

7. References and Recommended Reading 19

Table Index

Table 1 Noxious weeds recorded in the study area 6
Table 2 Vegetation Removal for Construction of the Proposal 8
Table 3 Recommended Species for Zone 1 11
Table 4 Recommended Species for Zone 2 12
Table 5 Recommended Species for Zone 3 13
Table 6 Recommended Species for Zone 4 13
Table 7 Estimated Project Costs 18

Figure Index

Figure 1 Site Locality 22
Figure 2 Rehabilitation Plan 23

Appendices

A Figures
B Description of SPW
C Noxious Weeds in the LGA

Glossary of Terms

- **Regeneration:** Refers to natural regeneration of the vegetation community.
- **Bush regeneration:** Refers to techniques used to assist and promote natural regeneration without utilising plant material propagated in nurseries.
- **Revegetation:** Refers to the planting of tube stock or similar grown from local provenance seed to re-establish vegetation.
- **Restoration:** Refers to a combination of restoration activities and management techniques to restore native vegetation.
- **Practical completion:** Refers to the completion of installation of revegetation activities.
- **Establishment:** Refers to the minimum 36 month maintenance program applied to revegetation work to ensure plant establishment.
- **Final Completion:** Refers to the successful completion of the entire restoration program.

List of Abbreviations

CEEC	Critically Endangered Ecological Community
DECC	Department of Environment and Climate Change
DECCW	Department of Environment, Climate Change and Water
DEWHA	Commonwealth Department of Environment, Water, Heritage and the Arts
DoP	Department of Planning
EEC	Endangered Ecological Community
EP&A Act	Environmental Planning and Assessment Act
EPBC Act	Environmental Protection and Biodiversity Conservation Act
GANSW.	Greening Australia NSW
LEP	Local Environment Plan (Liverpool City Council)
LGA	Local Government Area (Liverpool City Council)
NOW	NSW Office of Water
SPW	Shale Plains Woodland
TSC Act	Threatened Species Conservation Act
VMP	Vegetation Management Plan

Executive Summary

GHD has been engaged by Mirvac Projects Pty Limited (‘Mirvac”) to prepare a Vegetation Management Plan (VMP) for the proposed construction of a detention basin, spillway and outlet (“Northern basin 6”) adjacent to the development at the former Hoxton Park Airport, in Hoxton Park, NSW (‘the Project’).

The VMP outlines the proposed restoration program for the area impacted by the project and includes details on plant species, planting techniques, revegetation methods and maintenance requirements for the proposed offset site.

The proposed revegetation activities will consist of appropriate mixes of canopy, mid-storey and groundcover species representative of the existing native vegetation communities identified on site, including Shale Plains Woodlands and Freshwater Wetlands, wherever possible. The density and diversity of plantings suggested for the revegetation works has taken into account the required functioning of the detention basin.

The proposed restoration program will be the subject of a three year maintenance program that will include watering, weed and feral animal control, bushfire management and supplementary planting where necessary.

Ongoing monitoring will be undertaken in order to evaluate the success of the restoration program against established performance criteria. Results of the annual monitoring program will be reported to DECCW and DoP.

1. Introduction

1.1 Project Description

GHD has prepared this Vegetation Management Plan (VMP) on behalf of Mirvac Projects Pty Ltd ("Mirvac") for the proposed construction of a detention basin, spillway and outlet ("Northern basin 6") adjacent to the development at the former Hoxton Park Airport, in Hoxton Park, NSW ('the Project'). The basin will be situated immediately northwest of the former Hoxton Park Airport development site. The spillway will run eastwards from the basin and links up with an existing open channel which discharges to Hinchinbrook Creek.

The northern basin is part of Liverpool City Council's (LCC) detention strategy for Hinchinbrook Creek. This strategy requires the development to have a permanent detention basin to capture and release the runoff from the western side of the M7 adjoining the former Hoxton Park Airport site. It will be a regional scale stormwater detention basin designed to significantly attenuate peak storm inflows and thereby reduce flooding in the Cabramatta Creek system downstream to the Georges River.

The northern basin will follow stormwater best management practices (BMPs) by providing general flood protection (such as a 100-year storm event) and protect downstream erosion by storing water for a limited period of a time and slowly releasing it into Hinchinbrook Creek via an existing open channel. The lag time from input to output will eliminate or minimise the effects of excess runoff generated by the newly-constructed impervious surfaces for the development, including roads, driveways, parking lots and rooftops.

Development of the site is to be assessed as a Section 75W Modification to existing Development Consents (DC 10_0007 and 10_0008) obtained under Part 3A of the *Environmental Planning & Assessment Act 1979* (EP&A Act). Part 3A provides the assessment and approvals process for major infrastructure projects.

This report has been prepared in accordance with the requirements of the Water Management Act (WMA) 2000 and associated guidelines for the preparation of VMP's. This VMP also has been prepared to provide a clear, concise and practical framework for the restoration of native vegetation impacted by the proposed detention basin, spillway and outlet.

See Appendix A for figures.

1.2 Objectives

The objectives of the VMP are:

- To determine the characteristics of the local vegetation communities.
- To describe the proposed revegetation activities for native vegetation on the impacted sections of Hinchinbrook Creek.
- Describe the maintenance program to ensure establishment.
- Provide an appropriate costing for the restoration work.

1.3 Relationship with existing reports

The VMP has considered the information contained in the following documentation:

- GHD *Vegetation Management Plan for Hoxton Park Airport Development,* November 2007.
- GHD *Offset Strategy for Hoxton Park Airport,* October 2007.
- GHD *Report for the former Hoxton Park Airport Ecology Assessment,* February 2010.
- GHD *Ecological Impact Assessment for proposed Northern Detention Basin 6,* May 2010.
- GHD *Vegetation Management Plan for proposed Access Road and Bridge,* September, 2010.
- Biosis Research *Flora and Fauna Assessment of the Stage 1 Subdivision, Hoxton Park Airport*, July 2006.
- NPWS *National Parks and Wildlife Service Vegetation of the Cumberland Plain*, 2002.

All work to be performed on site will be in accordance with the following guidelines:

- DEC *Recovering Bushland: Best Practice Guidelines for Vegetation Restoration on the Cumberland Plain*, 2005;
- Florabank *Seed Collection and Management Guidelines*, updated 2004;
- DIPNR's *Best Practice Guidelines for Bush Regeneration on the Cumberland Plain*, 2004; and
- Greening Australia NSW *Best Practice Revegetation Guidelines*, 1999.

2. Site Description

2.1 Site Location & Layout

The site for the proposal is located adjoining the Hoxton Park Industrial redevelopment at the former Hoxton Park Airport, in the southwest of Sydney, NSW. The site is situated between the M7 Westlink Freeway and Cowpasture Road and is entered via Cowpasture Road. The study area is located in the Liverpool Local Government Area (LGA), between the suburbs of Cecil Park, Cecil Hills, West Hoxton, Green Valley and Hinchinbrook.

For the purposes of this report 'the site' or 'the project' refers to the limit of works for the proposed northern basin, spillway and outlet. The basin will be constructed immediately north of the former Hoxton Park Airport Industrial development site. The spillway will run eastwards from the basin and link up with an existing open channel which discharges to Hinchinbrook Creek. Refer to Appendix A, Figure 1.

To the east of the site is Cowpasture Road and the suburb of Hinchinbrook which predominantly contains low density residential development. A future commercial/retail uses development is located adjoining the basin with a future 200 (approximately) dwellings which are planned for construction further north of the basin.

2.2 Geology, Soils and Topography

The Penrith 1:100 000 Geological Series Sheet 9030 indicates that the Hoxton Park airport is characterised by Wianamatta Shale, which supports shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

The Penrith 1:100 000 Soil Series Sheet 9030 indicates that the soil around the Hoxton Park Airport is characterised floodplains, valley flats and drainage depressions of the Cumberland Plain, with deep layered sediments over bedrock or relict soils.

2.3 Hydrology

Hinchinbrook Creek runs through the eastern portion of the study area, and forms part of the wider Georges River catchment. The Project will intersect with this feature.

An unnamed drainage line runs through the central portion of the northern basin area, from the M7 underpass in the west to a culvert and drain beneath the former airport runway and then eastwards to Hinchinbrook Creek. There are an additional two artificial ephemeral drainage lines and freshwater wetlands.

2.4 Vegetation

The vegetation on site has been modified by historic clearing and ongoing activities. There are however some relatively intact habitats have high conservation significance. The following description is taken from GHD's *Ecological Impact Assessment for proposed Northern Detention Basin 6,* October 2010.

Shale Plains Woodland

Shale Plains Woodland occurs within the footprint for the northern basin.

The community is dominated by community Spotted Gum (*Corymbia maculata*), Forest Red Gum (*Eucalyptus tereticornis*), Blackthorn (*Bursaria spinosa*) and *Daviesia* species (*Daviesia genistifolia; Daviesia ulicifolia*). The understorey is relatively sparse and moderately infested by environmental weeds. Native groundcover species include native tussock grasses. The community had good leaf litter but relatively little coarse woody debris. In many places the groundcover was disturbed by past grazing and drainage works.

Freshwater Wetlands

Drains, sediment detention ponds and depressions throughout the site support a variety of freshwater wetland vegetation species. Species composition and structure varies with inundation frequency, water depth and disturbance history. The deepest drains are in good condition and almost completely covered by native semi-aquatic plants. Shallower marshes are in moderate to poor condition, with localised degradation through grazing, trampling by livestock, and dumping of construction rubble.

Derived Tussock Grassland

There are areas of Derived Tussock Grassland at the site which are a product of historic removal of trees from areas that would probably have supported Shale Plains Woodland. Dominant species included a dense groundcover of tussock grasses such as Kangaroo Grass (*Themeda australis).* Native vegetation within this community is in good condition, with evidence of moderate grazing pressure and relatively minor weed invasion.

Exotic Grassland

The majority of the grassland within the spillway is heavily modified, regularly mown and dominated by exotic species. The most abundant species are the exotic pasture species and the weeds African Love Grass and Paspalum (*Paspalidium dilatum*). Overall vegetation cover is dominated by exotic pasture species and herbaceous environmental weeds such that the Exotic Grassland does not comprise a native vegetation community. This community has little conservation value and limited potential for regeneration of native plants.

2.4.1 Noxious Weeds

The *Noxious Weeds Act 1993* provides for the declaration of noxious weeds in local government areas. Landowners and occupiers must control noxious weeds according to the control category specified in the Act. Public authorities must control noxious weeds according to the control category to the extent necessary to prevent their spread to adjoining land.

The study area contains six species declared as noxious weeds in Liverpool LGA as shown in Table 1 below.

Table 1 Noxious weeds recorded in the study area

Common name	Scientific name	Control category
Green Cestrum	*Cestrum parqui*	3

Common name	Scientific name	Control category
African Box Thorn	*Lycium ferocissimum*	4
Small-leaved Privet	*Ligustrum sinense*	4
Large-leaved Privet	*Ligustrum lucidum*	4
Blackberry complex	*Rubus fruticosus* sp. agg.	4
Bridal Creeper	*Asparagus asparagoides*	5

For Category 4 weeds, 'the growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority'. For Category 5 weeds, 'the requirements in the *NW Act* for a notifiable weed must be complied with' and for Category 3 weeds, 'the plant must be fully and continuously suppressed and destroyed'.

3. Description of Construction Impacts

3.1 Vegetation Removal

Construction of the proposed infrastructure would require the clearing or permanent modification of native vegetation within the development footprint for the Northern Basin 6. It is assumed that no additional vegetation clearing would be required for the operation of the existing channel or for temporary construction features. It is also assumed that construction compounds, laydown areas and access roads would be located within infrastructure disturbance footprints or previously cleared and disturbed land.

The vegetation to be removed includes approximately 3.09 ha of Shale Plains Woodland that is consistent with a threatened ecological community listed under the EPBC Act and/or the TSC Act. The development footprint also contains a further 2.10 ha of Derived Tussock Grassland that is consistent with a form of CEEC in low condition in accordance with the TSC Act definition. The proposal will remove valuable fauna habitat in 0.20 ha of Freshwater Wetlands associated with existing open drains. The area and TSC/EPBC Act status of each vegetation type to be removed for construction of the proposal is summarised in Table 2 below.

Refer to GHD report (2010) *Ecological Impact Assessment for proposed Northern Basin 6,* October 2010, for more detail on the vegetation to be removed (Section 7).

The remainder of the development footprint is exotic grassland or disturbed cleared land with little conservation value.

Table 2 Vegetation Removal for Construction of the Proposal

Vegetation Type	TSC Act Status	EPBC Act Status	Area of Vegetation Removal (ha)
Shale Plains Woodland	CEEC	CEEC	3.09
Derived Tussock Grassland	CEEC (low condition)		2.1
Freshwater Wetlands			0.20
Total			**5.39**

3.2 Terrestrial Habitats

The Proposal would remove five habitat trees within the footprint of the proposed northern basin, including large, hollow-bearing *Corymbia maculata* and stags. These trees may provide roost sites for some species of native bird and microbats, Pre-clearing surveys should include additional stag-watching to try and identify the species of resident fauna.

The Proposal would not remove any known individuals or populations of threatened plants. Vegetation clearing for the Proposal would remove a number of mature native trees, as described above, which are a seed source. However, given the population of similar trees within

the locality and outside of the development footprint, it is unlikely that the development would threaten the persistence of local populations.

Construction of the northern basin will contribute to a barrier to movement of fauna in the locality by creating additional obstacles between the Hinchinbrook Creek riparian corridor and woodland to the west of the M7. The vegetation to be directly removed for the northern basin would have limited value as a fauna movement corridor as the habitat to be removed is a 'dead end' for many fauna species as fauna movement to the west is already limited by the M7 and to the south by industrial development.

Aerial habitat would not be affected and so migratory species are likely to traverse obstacles and gaps in habitat created by permanent project infrastructure. The project does not involve any structures that would pose a significant obstruction or hazard to birds or bats in the context.

3.3 Aquatic Habitats

Aquatic habitats within the northern basin development footprint are all artificial drainage features and have little conservation value. They are unlikely to support any threatened biota or be important to the maintenance of any local populations of aquatic biota.

4. VMP Direction

4.1 Site Opportunities and Constraints

The proposed Northern Basin 6, as described in this VMP, provides opportunities for natural area restoration. Opportunities embraced in the restoration program include:

- Revegetating an area degraded by weed infestation and grazing activities with native vegetation.
- Integrating ecological function and engineering design to encourage some natural riparian function while allowing for the construction of a stormwater detention area.

Constraints encountered during project design include:

- Presence of Shale Plains Woodlands, a listed EEC under current legislation;
- Presence of Derived Tussock Grassland, indicative of highly degraded and modified form of the CEEC CPW as listed under the TSC Act.
- Planning for intermittent inundation as befitting detention basin infrastructure.

4.2 Project Tasks and Objectives

This VMP has been prepared according to the current principles '*Guidelines for controlled activities - Vegetation Management Plans'*. This requires the VMP to address the following issues:

- Site assessment and summary of constraints (eg. flora and fauna, habitat and corridor values, hydrology, fire issues, services, drainage, topography, weeds, etc).
- Definition of project tasks (description of all tasks necessary to implement the plan).
- Preparation of a program of works.
- Preparation of a plant species lists, and maps and diagrams;
- Details on site preparation (protection of existing plants, erosion control, site works, weed control, soil amelioration, seed collection, etc);
- Description of planting program and methodology;
- Description of maintenance program;
- Description of monitoring and review process;
- Preparation of costing of restoration works.
- Liaison with other consultants, landscape architects, government agencies and local Bushcare groups, as required.
- Addressing other potential issues (signage, other relevant legislation, other site areas, public relations, community involvement, etc).

5. Restoration Program

The following information provides a detailed description of all activities required to implement the VMP. The required activities were determined using field investigations to assess the types and location of native vegetation and weeds on site, as well as to assess habitat, connectivity, soil types and stream bank conditions. This information was supplemented by desktop research of existing reports pertaining to the site and current vegetation maps. The preparation of this VMP also involved liaison with the following stakeholders and/ or review of their relevant documents pertaining to the proposed development:

- NOW and DECCW.
- GANSW.
- Liverpool City Council.
- Relevant landowners and their consultant teams.

5.1 Restoration Zones

The site has been divided into five zones for the purposes of vegetation rehabilitation, management, water detention and recreation. The zones are described below and their locations are shown on Figure 2, Appendix A. The restoration activities required in each zone are identified below and explained in detail in Sections 4.3 to 4.7.

5.1.1 Zone 1 – Low Flow Channel (Aquatic Habitats)

This zone incorporates the low flow channel transferring water from the western side of the M7 eastwards through the basin to a pipe culvert outlet. The proposed northern basin will discharge to an existing open channel in the east of the site and then eastwards to Hinchinbrook Creek via this existing channel.

The restoration activities required in this zone include:

- Channel earthworks to include installation of suitable aquatic habitats such as woody debris and boulders.
- Hydro-mulching with a sterile cover crop and a mix of the species from Table 3.
- Hand broadcast treated native grass seed;
- Maintain and monitor the restoration program for this zone.

Table 3 Recommended Species for Zone 1

Scientific Name	Common Name	Planting density
Juncus usitatus	Common rush	Hydromulch
Phragmites australis	Common reed	Hydromulch
Lomandra longifolia	Matrush	Hydromulch

Scientific Name	Common Name	Planting density
Dianella spp	Dianella	Hydromulch
Schoenoplectus mucronatus	Bog Bullrush	Hydromulch
Carex apressa	Tall Sedge	Hydromulch
	Native grasses	Hand broadcast

5.1.2 Zone 2 – Basin Floor (Intermittent inundation zone)

This zone incorporates the remainder of the spillway or "basin floor". Following construction works this zone will be planted with a mix of native grasses and limited trees for visual amenity and habitat connectivity. The trees will be planted at limited densities to avoid creating a continuous canopy.

The restoration activities required in this zone include:

- Hydro-mulching with sterile cover crop and hand broadcast treated native grass seed;
- Limited plantings of native plant species with a mix of the species from Table 4. The planting densities are deliberately limited in line with the role of the spillway for water detention.
- Maintain and monitor the restoration program for this zone.

Table 4 Recommended Species for Zone 2

Scientific Name	Common Name	Planting densities
Eucalyptus eugenoides	Thin-leaved Stringybark	1 per 30 m^2
Corymbia maculata	Spotted Gum	
Eucalyptus tereticornis	Forest Red Gum	
Melaleuca alternifolia	Thin-leaved Paperbark	
	Native grasses	Hand broadcast

5.1.3 Zone 3 – Southern Batter Slopes

This zone comprises the batter slopes that surround the southern side of the detention basin. Following construction works this zone will be planted with a mix of native grasses, trees and shrubs for visual amenity and habitat connectivity.

The restoration activities required in this zone include:

- Hydro-mulching with sterile cover crop and hand broadcast treated native grass seed;
- Limited plantings of native plant species with a mix of the species from Table 5.
- Maintain and monitor the restoration program for this zone.

Table 5 Recommended Species for Zone 3

Scientific Name	Common Name	Planting densities
Melaleuca alternifolia	Thin-leaved Paperbark	1 per 30 m^2
Eucalyptus eugenoides	Thin-leaved Stringybark	1 per 30 m^2
Eucalyptus tereticornis	Forest Red Gum	1 per 30 m^2
	Native grasses	Hand broadcast

5.1.4 Zone 4 – Full Structure Natural Area

This zone comprises a small triangle of land in the southwest corner. It presents an opportunity to restore a portion of the detention basin to high-quality, full structure native vegetation.

The restoration activities required in this zone include:

- Hydro-mulching with sterile cover crop and hand broadcast treated native grass seed;
- Plantings of native plant species with a mix of the species from Table 6 below.
- Primary bush regeneration tasks, including watering, weed control and follow-up maintenance.
- Monitor the restoration program for this zone.

Table 6 Recommended Species for Zone 4

Scientific Name	Common Name	Planting densities
Eucalyptus eugenoides	Thin-leaved Stringybark	1 per 10 m^2
Eucalyptus tereticornis	Forest Red Gum	1 per 10 m^2
Corymbia maculata	Spotted Gum	1 per 10 m^2
Eucalyptus moluccana	Grey Box	1 per 10 m^2
Melaleuca alternifolia	Thin-leaved Paperbark	1 per 5 m^2
Bursaria spinosa	Blackthorn	1 per 2 m^2
Acacia parramattensis	Parramatta Green Wattle	1 per 2 m^2
Acacia implexa	Hickory Wattle	1 per 2 m^2
Acacia floribunda	White Sallow Wattle	1 per 2 m^2
Daviesia genistifolia		1 per 2 m^2
Daviesia ulicifolia		1 per 2 m^2
Themeda australis grass	Kangaroo Grass	2 per m^2
Bursaria spinosa	Blackthorn	2 per m^2
Aristida ramosa	Purple Wiregrass	2 per m^2

5.1.5 Zone 5 – Active Recreation Area

This zone comprises the proposed oval and the batter slopes surrounding the northern side of the detention basin. Following earthworks this zone will be covered with an appropriate introduced grass (turf) that can cope with intermittent inundation.

Management this zone (proposed active recreational areas) will be the responsibility of other parties, rather than Mirvac.

Legislative Requirements

5.1.6 TSC Act, Section 132C Licence

This legislation states that if any revegetation or weed control works are undertaken in an EEC, a Section 132C licence is required under the provisions of the TSC Act. As the restoration of SPW is proposed for the development site, a Section 132C licence will be required. This licence is readily granted by DECCW if the Department is satisfied that the proponents undertaking the works comply with all of the requirements under the licence. Similarly, DECCW simply request an additional copy of the regular half yearly monitoring reports to be sent to them to keep them updated of the progress of the works.

5.2 Site Preparation

5.2.1 Site Protection

To ensure the success of the restoration program it will be necessary to control access to all the rehabilitation zones. Fencing will be limited to temporary fencing to delineate the restoration zones until completed.

Appropriate sediment fencing and other erosion control initiatives should be undertaken within the development site to ensure sediment runoff offsite is controlled.

5.3 Weed Control

GHD recommends noxious, several environmental and some large woody weeds be treated along the edge of the existing vegetation after clearing in a targeted weed control program prior to revegetation work commencing and that all remaining weeds be included in the bush regeneration program.

For a complete list of weeds to be treated, their classification and program for treatment refer to Appendix C. All weed control and bush regeneration activities are to be completed by suitably qualified and experienced contractors.

5.4 Revegetation

To implement the proposed VMP, GHD recommends the revegetation program be implemented immediately following the completion of the site preparation and weed control activities.

5.4.1 Seed Collection

To allow for enough lead-in time for the propagation of provenance species, seed collection should start as soon as the 123c licence approval from DECCW is granted. Experienced and qualified bush regeneration staff will perform seed collection activities. All seed collection, management, cleaning and storage will be in accordance with *Florabank Seed Collection Guidelines* (prepared by Greening Australia and now accepted as industry best practice). A copy can be provided if required.

All plant material to be used throughout the project will be of local provenance, collected from within a 5 km radius of the site. The species collected should be consistent with those of the CPW communities.

5.4.2 Hydro Mulching

To help protect against erosion and initiate revegetation works GHD recommends that the appropriate zones (refer Section 5.1) be hydro-mulched with a sterile cover crop and treated native seed as per the suggested lists. The sterile cover crop will act as a guard against erosion while providing a microclimate for the propagation of native species. Native species that have been proven to perform well in hydro-mulching include treated Acacia and other pea species (Family *Fabaceae*). These are often coloniser species that are well suited to restoration sites.

It is anticipated this activity would be completed as part of the construction works.

5.4.3 Plant Propagation

Plant propagation refers to the germinating of collected seed and the 'growing on' of plants in enviro cells, hiko cells or forestry tubes. This activity should be managed by a suitably qualified and experienced native plant production nursery.

5.4.4 Installation of Native Tube stock

The vegetation to be restored on site will consist of the appropriate species for each zone as listed in Section 4.1.

Selected species will be planted as hiko or enviro cells. All tree and shrub species will be suitably guarded to prevent herbivory and weed competition, and to encourage optimum growing conditions. Guards will comprise a plastic tree guard and three bamboo stakes.

In general, autumn is the best season for planting as summer temperatures can be too high for young plants to establish and frosts in winter impede survival rates.

5.4.5 Hand Broadcasting of Native Seed

To supplement the establishment of native trees, shrubs and lower storey species, GHD recommends native grass seed is hand broadcast throughout the maintenance period of the restoration program (excluding Zone 5). This will add further diversity to the site, particularly ground covers.

5.5 Maintenance Program

The completion of the revegetation (planting works) and target weed control activities will be considered the date of 'Practical Completion' for the restoration works and will signal the commencement of the 3 year plant maintenance program. The completion of the 3 year maintenance program will be considered as 'Final Completion' for the revegetation works. Activities will include such things as watering, herbicide spraying and general maintenance.

Eight general maintenance visits have been scheduled throughout the first two years of the maintenance period, three in the first two years and two in the third.

5.5.1 General Maintenance

General maintenance activities will include repairing damaged tree guards, monitoring survival rates, installing replacement plants as required, weeding inside the tree guards, collecting and broadcasting seed and continued follow-up spot spraying.

5.5.2 Watering

All plants will be 'watered in' on installation, with each plant receiving a minimum five litres. All plantings will then receive a further three applications of water during the first 2 months to assist establishment. Should weather conditions remain dry for an extended period of time follow-up watering may be required.

5.5.3 Maintenance Spraying

To ensure the success of the revegetation activities it is essential to control weed infestation. Weeds compete with the newly installed plants for nutrients, light and water thereby limiting their survival and growth rates.

Areas where revegetation activities are comprise hand planting will be sprayed with Roundup® Biactive herbicide using 'back packs' and preferably mixed with a surfactant. A qualified contractor should undertake the spraying of herbicides. Spraying should only occur on still days to avoid spray drift and should not occur whilst moisture from rainfall or morning dew is present on foliage.

5.6 Monitoring and Reporting

In order to accurately evaluate the success of the restoration works, GHD recommends an initial report be prepared at 'Practical Completion' and then a summary report be prepared at 'Final Completion'. These reports should be brief, approximately one page and be provided to the client and relevant approval authorities.

The monitoring and evaluation program should address the following issues:

- Average plant growth, percentage cover and survival rates;
- Plant losses through herbivory, disease, vandalism, storm damage or other factors;
- Weed regrowth and control measures;
- Plant replacement;

- Guard repair and weeding inside guards;
- Maintenance watering regime; and
- Stream bank erosion.

GHD recommends that the above issues be monitored and evaluated through the set-up of one representative quadrat, at the practical completion stage. It is also essential to keep an accurate photo-record of the progress of the restoration works by setting up an appropriate number of representative fixed photo-points across all restoration zones. Photos should be taken by digital camera and recorded in the project file by date and discrete photo-point number. Photo-point locations should be clearly marked on site and mapped by a surveyor or by GPS.

The monitoring reports should also contain recommendations by the restoration contractor to the client in regard to issues affecting the ongoing success, or otherwise, of the restoration works, and the possible need for additional activities that may be required outside the normal maintenance program.

6. Program of Works, Cost Estimate and Funding

6.1 Program of Works

It is envisaged that the site preparation works, which includes; installation of temporary fencing will begin as soon as the implementing contractor has been engaged and as soon as site conditions allow. This will be followed by the revegetation, bush regeneration, maintenance and monitoring works described above.

6.2 Estimated Project Costs

Table 7 provides a summary of the costs associated with the restoration program as recommended in this VMP.

Table 7 Estimated Project Costs

Task	Description	Approx. Cost
Seed Collection	Collection and Cleaning of Seed	$ 6,660
Site Preparation	Site Protection/Erosion Control	$ 1,500
Weed Control	Targeted Weed control	$ 2,700
Hydro mulching	Based on area 31,400 m2 (Zones 1,2,3 & 4)	$ 23,550
Revegetation	Planting of trees and shrubs. Area 2.98 ha (Zones 2,3 & 4)	$ 6,630
Bush Regeneration	Primary regeneration for 2 years – 4 sessions Secondary regeneration for 2 years – 4 sessions	$ 6,400
Maintenance	General Maintenance (6 visits team of 2)	$ 5,220
	Watering	$ 2,610
Hand Broadcasting	Broadcasting of native seed (Zones 1, 2, 3 & 4)	$ 2,040
On-ground Management	Overseeing on-ground works	$ 1,940
Monitoring/Reporting	Monitoring/Reporting	$ 4,950
Total		$64,200.00

Note: Works quoted above are for the 3-year maintenance period.

The cost estimates presented in this section are typically developed based on extrapolation of recent similar project pricing, budget quotes for some equipment items, industry unit rates and GHD experience. The accuracy of these estimates is not expected to be better than about ± 25% for the scope of work described in this report.

7. References and Recommended Reading

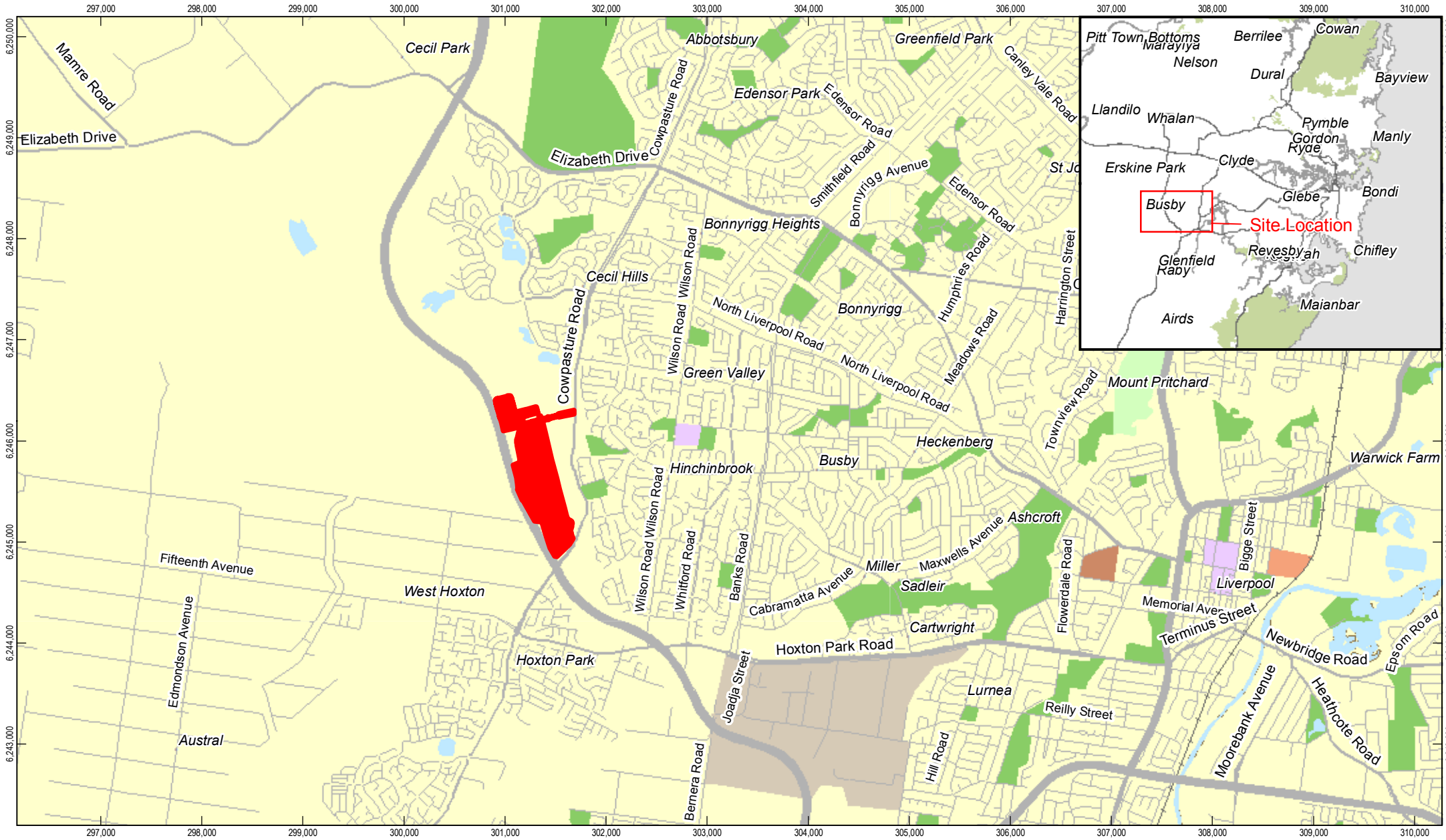
- Benson, D.H. and Howell, J. (1990) Taken for Granted: The Bushland of Sydney and Its Suburbs. Kangaroo Press, Sydney.
- Benson, D.H. and Howell, J. (2000) Sydney's Bushland — More than Meets the Eye, Royal Botanic Gardens, Sydney.
- Buchannon, R. A. (1989) Bush Regeneration: Recovering Australian Landscapes. TAFE Learning Publications. NSW.
- Costermans, L. (1992) Native Trees and Shrubs of South Eastern Australia. Weldon Publishing, NSW.
- Department of Infrastructure, Planning and Natural Resources (DIPNR), How to Prepare a Vegetation Management Plan Guidelines, Version 4, 2002.
- Department of Natural Resources 2007, Draft Guidelines *How to Prepare Vegetation Management Plan.*
- Florabank (1999). Guideline 5: Seed Collection from Woody Plants for Local Revegetation. Florabank, ACT.
- GHD Pty Ltd (2010). Ecological Impact Assessment for Proposed Northern Basin. October 2010.
- Greening Australia NSW (Inc), Management Principles to Guide the Restoration and Rehabilitation of Indigenous Vegetation, August 1999.
- Greening Australia NSW (Inc), Native Grass Identification – Workshop Notes, April 2002.
- Hunt, J.S. (1992) Urban Erosion and Sediment Control, Department of Conservation and Land Management NSW.
- National Trust of Australia (NSW) (1999) Bush Regeneration Handbook. National Trust, Sydney, NSW.
- New South Wales Government, Noxious Weeds Act 1993.
- New South Wales Government, Rivers and Foreshores Improvement Act 1948.
- New South Wales Government, Threatened Species Conservation Act 1995.
- NPWS (2002). Native Vegetation of the Cumberland Plain - Final Edition. NPWS, Sydney.
- NSW Scientific Committee (1997) Cumberland Plain woodland - Endangered ecological community determination - final. DEC (NSW), Sydney.
- Parsons, W.T. and Cuthbertson, E. G. (1992) Noxious Weeds of New South Wales, Inkata Press, Victoria.

Appendix A

Figures

Figure 1: Site Locality

Figure 2: Rehabilitation Plans



1:50,000 (at A4)

0 250 500 1,000 1,500 2,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56

N

LEGEND

Study Area

GHD

CLIENTS | PEOPLE | PERFORMANCE

Mirvac Group Pty Ltd
Hoxton Park Airport Development - VMP for Proposed Northern Basin and Spillway

Site Location

Job Number 22 - 14911
Revision B
Date 20 JUL 2010

Figure 1

G:\22\14911\GIS\ESRI\Map_Documents\22.14911.Z001_SiteLocation.mxd

Level 15, 133 Castlereagh Street Sydney NSW 2000 T 61 2 9239 7100 F 61 2 9239 7199 E sydmail@ghd.com.au W www.ghd.com.au

Data source: DCDB, NSW Dept of Lands; Street Map, Navigate. Created by: Cwilson, qjchung, bahambly

www.ghd.com

0 10 20 30 40 50m
SCALE 1:1000 AT ORIGINAL SIZE

MIRVAC FORMER HOXTON PARK AIRPORT REDEVELOPMENT

VEGETATION MANAGEMENT PLAN FOR PROPOSED NORTHERN BASIN 6

RESTORATION ZONES

date: NOVEMBER 2010
job no: 22-14911
drawing: FIG 02-RC

Appendix B

Description of SPW

Cumberland Plain Woodland (DEC 2005)

Grey Box *Eucalyptus moluccana* and Forest Red Gum *E. tereticornis* are the dominant canopy trees, with Narrow-leaved Ironbark *E. crebra*, Spotted Gum *Corymbia maculata* and Thin-leaved Stringybark *E. eugenioides* occurring less frequently. The shrub layer is dominated by Blackthorn *Bursaria spinosa*, and it is common to find abundant grasses such as Kangaroo Grass *Themeda australis* and Weeping Meadow Grass *Microlaena stipoides* var *stipoides*. Contains many more species and other references should be consulted to identify these.

Distribution

Before European settlement was extensive across the Cumberland Plain, western Sydney. Today, only 9 percent of the original extent remains intact, with the remnants scattered widely across the Cumberland Plain. Good examples can be seen at Scheyville National Park and Mulgoa Nature Reserve.

Habitat and ecology

- Occurs on soils derived from Wianamatta Shale, and throughout the driest part of the Sydney Basin.
- Well adapted to drought and fire, and the understorey plants often rely on underground tubers or profuse annual seed production to survive adverse conditions.

Threats

- The main threat is further clearing for urban or rural development, and the subsequent impacts from fragmentation.
- Grazing and mowing, which stops regrowth of the community.
- Inappropriate water run-off entering the site, which leads to increased nutrients and sedimentation.
- Weed invasion.
- Inappropriate fire regimes, which have altered the appropriate floristic and structural diversity.

What needs to be done to recover this species?

- Promote public involvement in restoration activities.
- Apply necessary fire regimes to maintain the community's appropriate floristic and structural diversity.
- Protect habitat by minimising further clearing of the community. This requires recognition of the values of all remnants of the community in the land use planning process, particularly development consents, rezonings and regional planning.
- Promote regeneration by avoiding mowing or prolonged or heavy grazing.
- Protect habitat by controlling run-off entering the site if it would change water, nutrient or sediment levels or cause erosion.
- Weed control.
- Undertake restoration including bush regeneration and revegetation.

Appendix C

Noxious Weeds in the LGA

Noxious weed declarations for Liverpool City Council

Weed	Class	Legal requirements
African feathergrass [Pennisetum macrourum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African olive [Olea europaea subspecies cuspidata]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed
African turnipweed [Sisymbrium runcinatum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
African turnipweed [Sisymbrium thellungii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Alligator weed [Alternanthera philoxeroides]	3	The plant must be fully and continuously suppressed and destroyed
Anchored water hyacinth [Eichhornia azurea]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Annual ragweed [Ambrosia artemisiifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Arrowhead [Sagittaria montevidensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Artichoke thistle [Cynara cardunculus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Athel pine [Tamarix aphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Bear-skin fescue [Festuca gautieri]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Bitou bush [Chrysanthemoides monilifera subspecies rotundata]	3	The plant must be fully and continuously suppressed and destroyed
Black knapweed [Centaurea nigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Blackberry [Rubus fruticosus aggregate species] except cultivars Black satin, Chehalem, Chester Thornless, Dirksen Thornless, Loch Ness, Murrindindi, Silvan, Smoothstem,	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration

Thornfree		
Boneseed [Chrysanthemoides monilifera subspecies monilifera]	3	The plant must be fully and continuously suppressed and destroyed
Bridal creeper [Asparagus asparagoides]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Broomrapes [Orobanche species] Includes all Orobanche species except the native O. cernua variety australiana and O. minor	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Burr ragweed [Ambrosia confertiflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Cabomba [Cabomba caroliniana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Castor oil plant [Ricinus communis]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority
Cayenne snakeweed [Stachytarpheta cayennensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Chilean needle grass [Nassella neesiana]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed
Chinese violet [Asystasia gangetica subspecies micrantha]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Clockweed [Gaura parviflora]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Corn sowthistle [Sonchus arvensis]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Dodder [Cuscuta species] Includes All Cuscuta species except the native species C. australis, C. tasmanica and C. victoriana	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
East Indian hygrophila [Hygrophila polysperma]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Espartillo [Achnatherum brachychaetum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Eurasian water milfoil [Myriophyllum	1	The plant must be eradicated from the land and the land must be

spicatum]		kept free of the plant This is an All of NSW declaration
Fine-bristled burr grass [Cenchrus brownii]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Fountain grass [Pennisetum setaceum]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Gallon's curse [Cenchrus biflorus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Glaucous starthistle [Carthamus glaucus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Golden thistle [Scolymus hispanicus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Green cestrum [Cestrum parqui]	3	The plant must be fully and continuously suppressed and destroyed
Harrisia cactus [Harrisia species]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Hawkweed [Hieracium species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Horsetail [Equisetum species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Hygrophila [Hygrophila costata]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Hymenachne [Hymenachne amplexicaulis]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Karoo thorn [Acacia karroo]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Kochia [Bassia scoparia] except Bassia scoparia subspecies trichophylla	1	except B.scoparia subspecies trichophylla The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lagarosiphon [Lagarosiphon major]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Lantana [Lantana species]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority
Lantana [Lantana species]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable

		weed must be complied with This is an All of NSW declaration
Leafy elodea [Egeria densa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Lippia [Phyla canescens]	4	The plant must not be sold, propagated or knowingly distributed by any person other than a person involved in hay or lucerne production. The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority. This is an All of NSW declaration
Long-leaf willow primrose [Ludwigia longifolia]	3	The plant must be fully and continuously suppressed and destroyed
Long-leaf willow primrose [Ludwigia longifolia]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Ludwigia [Ludwigia peruviana]	3	The plant must be fully and continuously suppressed and destroyed
Mexican feather grass [Nassella tenuissima]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mexican poppy [Argemone mexicana]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Miconia [Miconia species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mimosa [Mimosa pigra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Mossman River grass [Cenchrus echinatus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Onion grass [Romulea species] Includes all Romulea species and varieties except R. rosea var. australis	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Oxalis [Oxalis species and varieties] Includes all Oxalis species and varieties except the native species O. chnoodes, O. exilis, O. perennans, O. radicosa, O. rubens, and O. thompsoniae	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Pampas grass [Cortaderia species]	3	The plant must be fully and continuously suppressed and destroyed
Parthenium weed [Parthenium hysterophorus]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Pellitory [Parietaria judaica]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the

		local control authority
Pond apple [Annona glabra]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly acacia [Acacia nilotica]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Prickly pear [Cylindropuntia species]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Prickly pear [Opuntia species except O. ficus-indica]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed This is an All of NSW declaration
Red rice [Oryza rufipogon]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Rhus tree [Toxicodendron succedaneum]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority This is an All of NSW declaration
Rubbervine [Cryptostegia grandiflora]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Sagittaria [Sagittaria platyphylla]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Salvinia [Salvinia molesta]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Sand oat [Avena strigosa]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Senegal tea plant [Gymnocoronis spilanthoides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Serrated tussock [Nassella trichotoma]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority and the plant may not be sold, propagated or knowingly distributed
Siam weed [Chromolaena odorata]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Smooth-stemmed turnip [Brassica barrelieri subspecies oxyrrhina]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Soldier thistle [Picnomon acarna]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable

		weed must be complied with This is an All of NSW declaration
Spotted knapweed [Centaurea maculosa]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
St. John's wort [Hypericum perforatum]	4	The growth and spread of the plant must be controlled according to the measures specified in a management plan published by the local control authority
Texas blueweed [Helianthus ciliaris]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Water caltrop [Trapa species]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water hyacinth [Eichhornia crassipes]	2	The plant must be eradicated from the land and the land must be kept free of the plant
Water lettuce [Pistia stratiotes]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Water soldier [Stratiotes aloides]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Willows [Salix species] Includes all Salix species except S. babylonica, S. x reichardtii, S. x calodendron	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration
Witchweed [Striga species] Includes all Striga species except native species and Striga parviflora	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow burrhead [Limnocharis flava]	1	The plant must be eradicated from the land and the land must be kept free of the plant This is an All of NSW declaration
Yellow nutgrass [Cyperus esculentus]	5	The requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with This is an All of NSW declaration

GHD

PO Box 2875 Port Macquarie NSW 2444
T: (02) 6586 8700 F: (02) 6586 8701 E: pqqmail@ghd.com.au

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0.	L. Gallagher	A. Fletcher	On file	For client review		
1	L. Gallagher	A. Fletcher	On file	Dan Williams		03/11