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McWilliam's Wines

Report for Environmental Assessment for proposed winery expansion

Ecological assessment

June 2010

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

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Report Definitions

The following definitions are utilised throughout this report and should be referred to when interpreting the results in this document:

direct impacts - are those that directly affect the habitat and individuals. They include, but are not limited to, death through predation, trampling, poisoning of the animal/plant itself and the removal of suitable habitat (DEC 2004).

indirect impacts - occur when project-related activities affect species, populations or ecological communities in a manner other than direct loss. Indirect impacts can include loss of individuals through starvation, exposure, predation by domestic and/or feral animals, loss of breeding opportunities, loss of shade/shelter, deleterious hydrological changes, increased soil salinity, erosion, inhibition of nitrogen fixation, weed invasion, fertiliser drift, or increased human activity within or directly adjacent to sensitive habitat areas (DEC 2004).

life cycle - Is the series or stages of reproduction, growth, development and aging and death of an organism (DEC 2004).

likely - taken to be a real chance or possibility (NPWS 1996).

locality - means the area within a 10 kilometre radius of the subject site.

local population: the population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions.

- The *local population* of a threatened *plant* species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.
- The *local population* of *resident fauna* species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.
- The *local population* of *migratory or nomadic fauna* species comprises those individuals that are likely to occur in the study area from time to time.

In cases where multiple populations occur in the study area, each population should be assessed separately.

proposed activity – the action proposed to be undertaken. In this case the proposed expansion of the McWilliams' Hanwood winery, including waste-water treatment plant and associated eight kilometre pipeline to vineyards west of the winery.

region – means a biogeographical region that has been recognised and documented such as the Interim Biogeographical Regions of Australia (IBRA). The study area is located within the Riverina Bioregion, near the border of the South West Slopes Bioregion, and Cobar Peneplain Bioregion.

subject site – the area to be directly affected by the proposed activity (DEC 2004). The subject site includes the proposed winery expansion area and the route of the eight kilometre waste water pipeline, which would have an impact width of up to six metres along the pipeline alignment, within which any vegetation would be removed.

study area – means the subject site and any additional areas which are likely to be affected by the proposal, either directly or indirectly. The study area should extend as far as is necessary to take all potential impacts into account (DEC 2004). The study area incorporates the land within a 50 metre radius of the subject site.

threatened biota - those threatened species, populations or ecological communities listed under the TSC Act or the EPBC Act which are known or likely to occur in the study area.

threatened species – a species specified in Schedule 1 Part 1 (endangered species), Part 4 (presumed extinct) and Schedule 2 (vulnerable species) of the TSC Act or listed under the EPBC Act.

viable - the capacity to successfully complete each stage of the life cycle under normal conditions.

1. Introduction

McWilliam's Wines Pty Ltd (McWilliam's) proposes to expand its Hanwood winery to meet future forecasted production requirements. GHD has been engaged by McWilliam's to undertake an assessment of the potential ecological impacts of the proposed expansion.

The proposal is classified as a Major Project and is to be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). An Environmental Assessment (EA) is therefore required to assess the likely environmental impacts of the proposal.

This ecological impact assessment has been prepared as a technical document to support the EA, and addresses the Environmental Assessment Requirements, which state that the EA must satisfy the requirements for flora and fauna impact assessment in accordance with the *Draft Guidelines for Threatened Species Assessment* (DEC/DPI 2005) under s.75f of the EP&A Act.

This ecological assessment aims to:

- Identify potential ecological constraints and opportunities, including in particular the presence or likely presence of species, populations and ecological communities and their habitats listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- Identify the potential relevance of any matters of National Environmental Significance (NES) listed under the EPBC Act;
- Identify the potential impacts of the proposal on threatened biota and their habitats and advise on potential development design options and specific mitigation/management actions to avoid or minimise impacts on the biodiversity values;
- Assess the significance of impacts on threatened biota and matters of NES and identify the likely requirement or otherwise for further approvals under the EP&A or EPBC Acts; and
- Recommend mitigation and environmental management measures to avoid, minimise or offset adverse impacts on threatened biota and biodiversity values, as appropriate to facilitate the relevant planning approvals process.

1.1 The proposed activity

McWilliam's proposes to undertake the following:

- Construction of a bottling and packaging plant to be commissioned within the next three to five years. The facility would at first process approximately 25 megalitres of wine per annum or 75 percent of the Company's production. The Hanwood packaging facility would ultimately have a bottling capability of 72 megalitres of wine or 100,000 tonnes equivalent;
- Construction of a waste water treatment plant to process waste water from the winery and packaging plant;
- Installation of an eight kilometre pipeline to transport treated water between the winery and vineyards to the west where the water would be used for irrigation; and

- Construction of a 45 ML irrigation earthen water storage at the vineyards on the McWilliam's property to the west where irrigation would occur.

The development would enable McWilliams to increase the Hanwood grape crush capacity from 34,000 tonnes to 65,000 tonnes over an estimated period of approximately 15 years.

The layout of the proposed development at the winery site is presented in Figure 1. The Hanwood Winery property, route of the proposed pipeline and property where the water storage would be constructed are shown in Figure 2.

The construction of the bottling and packaging plant and waste water treatment plant including holding lagoons would take place on previously cleared land and within the existing vineyard at the Hanwood Winery industrial site. The development would not require the removal of any native vegetation.

The construction of the pipeline would require a 450 mm – 600 mm wide excavation for the laying of the 100 mm pipe, and an associated six metre easement for the operation of machinery. As much as possible, the pipeline would be laid within existing table drains adjacent to roadways, which would be cleared of native and introduced ground cover vegetation for construction, and which would be periodically maintained after installation to control the regrowth of trees and shrubs. Between the Kidman Way and McWilliam's Hanwood winery the pipeline would be laid on private property. This section of pipeline is within existing vineyards and would not require the removal of any native vegetation. Where the proposed pipeline crosses Kidman Way, it would be under-bored and placed within a 250 mm sleeve, with leak detection points on both sides of the road.

The 45 ML irrigation water storage constructed at the vineyards to the west would have a turkey nest design and would be bunded to capture any overflow. The construction of the water storage would not require the removal of any native vegetation.

It is not expected that the proposed development would require the removal of any trees.

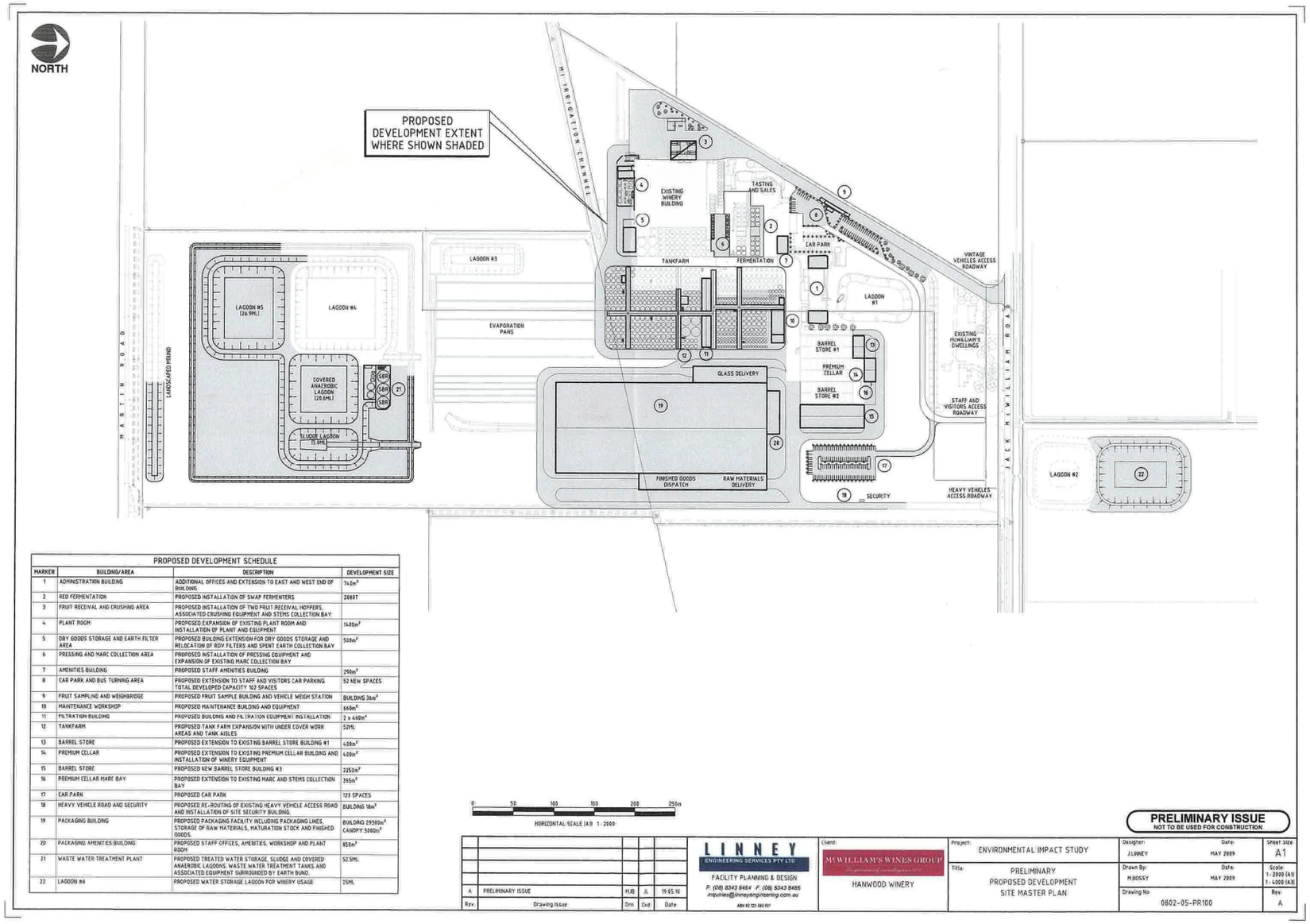
1.2 Subject site and existing environment

The Hanwood winery is located approximately one kilometre south of the township of Hanwood, and six kilometres south of Griffith in regional NSW. The study area is located near the eastern boundary of the Riverina Bioregion, near the border of the South West Slopes Bioregion, and Cobar Peneplain Bioregion.

The subject site includes:

- The existing Hanwood winery property where the bottling and packaging plant and waste water treatment plant would be constructed. The site of the development currently contains a vineyard;
- The road easements along which the eight kilometre pipeline would be installed; and
- The property where the water storage would be constructed for holding the treated effluent, and where irrigation would occur.

The subject site and study area are located in cleared agricultural land consisting primarily of vineyards. The study area is flat, with irrigation channels located adjacent to much of the proposed pipeline route. Much of the study area is cleared of native canopy and understorey vegetation, however patches of native vegetation comprising trees, shrubs and native ground covers exist along Joncondon Road, Murrumbidgee Avenue and Ben Martin Road. Plantings of native trees also exist near Ben Martin Road and Murrumbidgee Avenue.



PROPOSED DEVELOPMENT SCHEDULE

MARKER	BUILDING/AREA	DESCRIPTION	DEVELOPMENT SIZE
1	ADMINISTRATION BUILDING	ADDITIONAL OFFICES AND EXTENSION TO EAST AND WEST END OF BUILDING.	740m²
2	RED FERMENTATION	PROPOSED INSTALLATION OF SWAP FERMENTERS	20807
3	FRUIT RECEIVAL AND CRUSHING AREA	PROPOSED INSTALLATION OF TWO FRUIT RECEIVAL HOPPERS, ASSOCIATED CRUSHING EQUIPMENT AND STEMS COLLECTION BAY.	
4	PLANT ROOM	PROPOSED EXPANSION OF EXISTING PLANT ROOM AND INSTALLATION OF PLANT AND EQUIPMENT	1400m²
5	DRY GOODS STORAGE AND EARTH FILTER AREA	PROPOSED BUILDING EXTENSION FOR DRY GOODS STORAGE AND RELOCATION OF ROV FILTERS AND SPENT EARTH COLLECTION BAY	500m²
6	PRESSING AND MARC COLLECTION AREA	PROPOSED INSTALLATION OF PRESSING EQUIPMENT AND EXPANSION OF EXISTING MARC COLLECTION BAY	
7	AMENITIES BUILDING	PROPOSED STAFF AMENITIES BUILDING	290m²
8	CAR PARK AND BUS TURNING AREA	PROPOSED EXTENSION TO STAFF AND VISITORS CAR PARKING TOTAL DEVELOPED CAPACITY 102 SPACES	52 NEW SPACES
9	FRUIT SAMPLING AND WEIGHBRIDGE	PROPOSED FRUIT SAMPLE BUILDING AND VEHICLE WEIGH STATION	BUILDING 36m²
10	MAINTENANCE WORKSHOP	PROPOSED MAINTENANCE BUILDING AND EQUIPMENT	660m²
11	FILTRATION BUILDING	PROPOSED BUILDING AND FILTRATION EQUIPMENT INSTALLATION	2 x 660m²
12	TANKFARM	PROPOSED TANK FARM EXPANSION WITH UNDER COVER WORK AREAS AND TANK AISLES	52ML
13	BARREL STORE	PROPOSED EXTENSION TO EXISTING BARREL STORE BUILDING #1	400m²
14	PREMIUM CELLAR	PROPOSED EXTENSION TO EXISTING PREMIUM CELLAR BUILDING AND INSTALLATION OF WINERY EQUIPMENT	400m²
15	BARREL STORE	PROPOSED NEW BARREL STORE BUILDING #3	2250m²
16	PREMIUM CELLAR MARC BAY	PROPOSED EXTENSION TO EXISTING MARC AND STEMS COLLECTION BAY	395m²
17	CAR PARK	PROPOSED CAR PARK	123 SPACES
18	HEAVY VEHICLE ROAD AND SECURITY	PROPOSED RE-ROUTING OF EXISTING HEAVY VEHICLE ACCESS ROAD AND INSTALLATION OF SITE SECURITY BUILDING	BUILDING 18m²
19	PACKAGING BUILDING	PROPOSED PACKAGING FACILITY INCLUDING PACKAGING LINES, STORAGE OF RAW MATERIALS, MATURATION STOCK AND FINISHED GOODS.	BUILDING 29300m² CANOPY 5400m²
20	PACKAGING AMENITIES BUILDING	PROPOSED STAFF OFFICES, AMENITIES, WORKSHOP AND PLANT ROOM	850m²
21	WASTE WATER TREATMENT PLANT	PROPOSED TREATED WATER STORAGE, SLUDGE AND COVERED ANAEROBIC LAGOONS. WASTE WATER TREATMENT TANKS AND ASSOCIATED EQUIPMENT SURROUNDED BY EARTH BUND.	52.5ML
22	LAGOON #6	PROPOSED WATER STORAGE LAGOON FOR WINERY USAGE	75ML

Figure 1: Layout of existing winery and proposed expansion (proposed expansion extent shaded).

Prepared by McWilliam's

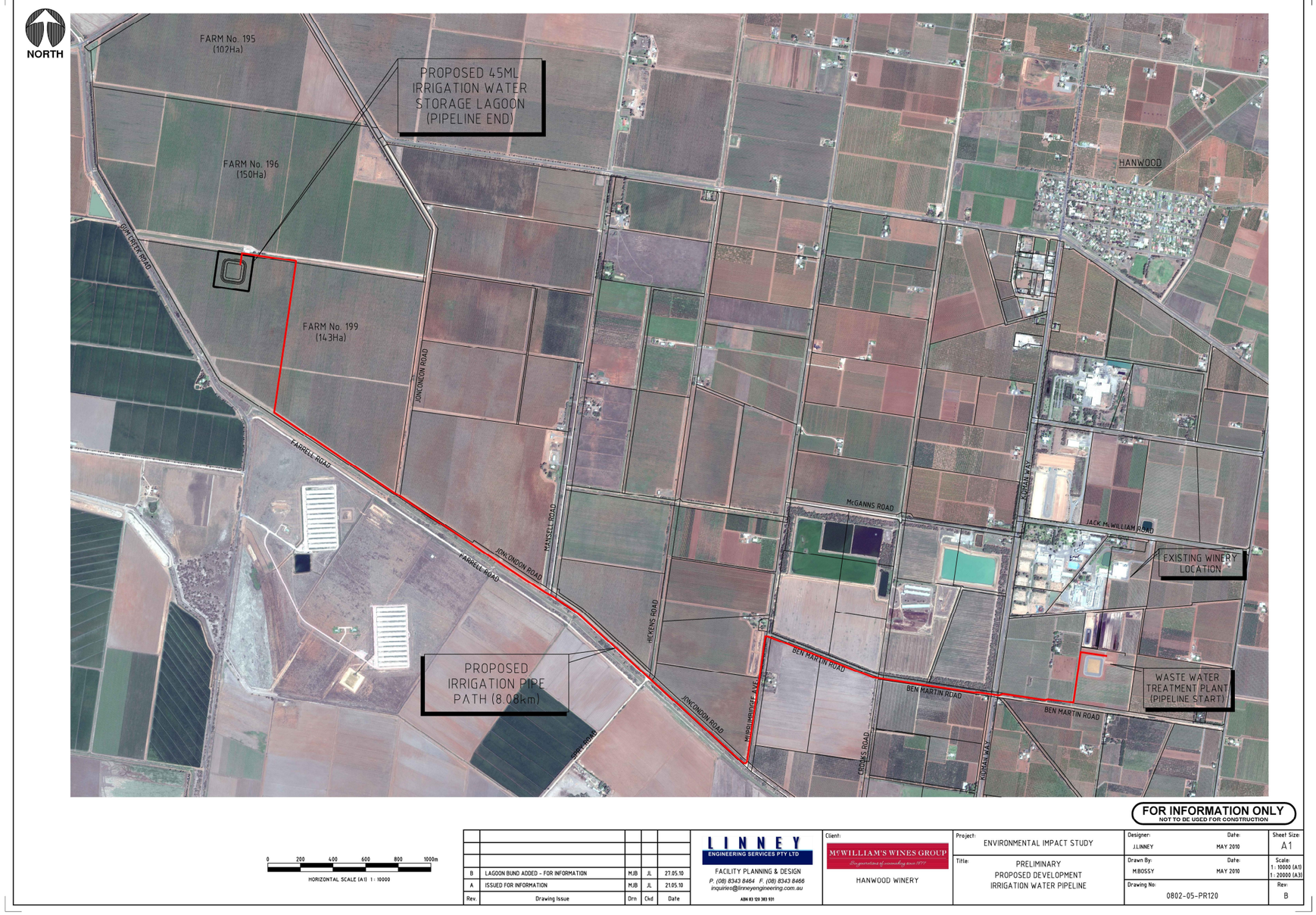


Figure 2: Proposed waste water pipeline route.

Prepared by McWilliam's

2. Methods

2.1 Desktop study

2.1.1 Literature review and database search

A search of relevant databases was conducted to obtain records of threatened and migratory species, populations and ecological communities within the region. The search included all species, populations and ecological communities listed under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) with the potential to occur in the locality and wider area. Database searches included:

- NSW National Parks and Wildlife Service (NPWS) Wildlife Database Atlas – public access version (http://wildlifeatlas.nationalparks.nsw.gov.au/wildlifeatlas/watlas.jsp) search of all TSC Act listed threatened species of flora and fauna within the Griffith LGA;
- Department of the Environment, Water, Heritage and the Arts (DEWHA) Protected Matters Search Tool – for matters of National Environmental Significance (NES) within an area of 10 km radius around the subject site; and
- NSW Industry and Investment – Primary Industries noxious weed declarations website (http://www.dpi.nsw.gov.au/agriculture/pests-weeds/weeds/noxweed) – Griffith City Council Control Area.

A literature review and database search assists in overcoming some of the limitations associated with a short survey period, survey timing and the types of survey methods employed. In the south and central western slopes of NSW it has been found that surveys conducted in late summer, autumn and early winter usually record less than 50 percent of plant species present (Burrows 2004), hence the need for complementary data.

2.2 Field survey

Flora and fauna field surveys were conducted in the study area on 3 and 4 June 2010. Field surveys were conducted with reference to *Draft Guidelines for Threatened Species Assessment* (DEC/DPI 2005) under s.75f of the EP&A Act.

The primary objectives of the field surveys were to:

- Determine the presence and/or potential for threatened flora and fauna species, populations, ecological communities, listed under the NSW TSC Act and Commonwealth EPBC Act, and their habitats to occur in the study area;
- Determine the value of the habitat in the study area for flora and fauna species, particularly for threatened and migratory species; and

- Describe the flora and fauna species, habitat, populations and ecological communities in the study area in relation to their occurrence and quality in the locality. This included reference to aerial photographs and vegetation mapping.

Targeted flora and bird surveys were undertaken during field surveys (Figure 3) with opportunistic sightings of fauna also recorded.

Table 1: Flora and fauna survey effort in the study area

Survey Method	Effort
Diurnal birds – target surveys & opportunistic observations	3 sites, 2 person-hours total. All species observed at other times during field surveys were recorded.
Floristic survey – 20m x 20m quadrats (nested within 50m x 20m quadrat)	5 quadrats
Flora – random meander transects – recording incidental species in the subject site	5 transects

1:30,000 (at A4)

0 250 500 1,000

Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 55

N

LEGEND

- Bird survey
- Flora quadrat
- Myall woodland
- Flora transect
- Proposed pipeline
- Road

McWilliam's property

- Irrigation
- Winery

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McWilliam's Wines
Hanwood winery expansion and construction of pipeline

Job Number 23-13597
Revision 0
Date 02 AUG 2010

Ecological surveys completed in study area

Figure 3

G:\23\13597\GIS\mcwilliams_figure3.mxd

Suite 3, Level 1, 161-169 Baylis Street Wagga Wagga NSW 2650 **T** 61 2 6923 7400 **F** 61 2 6971 9565 **E** wgamail@ghd.com.au **W** www.ghd.com.au

Data Source: NSW Department of Lands: Roads & localities - 2005; Google Earth: Satellite imagery - 2009. Created by: rtrobinson

2.2.1 Flora

Flora surveys were conducted within the subject site using quadrat and transect methods (Figure 3). Quadrat and transect locations were selected based on a stratification approach, such that they were located within units of differing habitat characteristics to enable assessment of the likely impacts of the proposal throughout the pipeline route and development areas. Characteristics used to select sample locations included:

- Vegetation community;
- Existing condition; and
- Disturbance.

Five quadrats of dimensions 20m × 50m were surveyed within the subject site. Within each 20m × 50m plot, the vegetative and habitat characteristics of the plot were recorded, including:

- Disturbance;
- Description of native vegetation;
- Dominant vegetation type (canopy, understorey and groundcover);
- Age structure;
- Ground characteristics (such as leaf litter and woody debris); and
- Tree habitat characteristics (hollows etc).

Within the 20m × 50m quadrat, a floristic survey was conducted for a nested 20m × 20m quadrat. All species occurring in the 20m × 20m quadrat were recorded, and percent cover was estimated according to a modified version of the Braun-Blanquet (1932) cover classes (Appendix A).

All species occurring in the 20m × 50m quadrat were also recorded, but percent cover was not estimated for those species occurring outside the nested 20m × 20m quadrat. In some instances the study area did not allow for a 20m wide quadrat, in which case the length of the quadrat was increased accordingly to compensate.

Five transects were used to search for species within a range of habitats throughout the study area. These transects were walked within and around the subject site to search likely habitat for species and record species presence. The 'Random Meander' technique (Cropper 1993) was employed. As rare plants often exist in discrete populations in specific areas, a random search can increase the probability of finding rare plant populations. A random search effort also encompasses a greater portion of the landscape, as the search is not limited to specific areas (only the stratification unit), and is useful in surveying difficult terrain and irregular shaped search areas.

Where necessary, plants were sampled and kept for later identification.

Characteristics of the study area were recorded during the surveys to assist in determining if the study area may provide habitat for any threatened flora species not present or flowering at the time of the survey.

Vegetation types within the proposed pipeline easement and the surrounding study area were identified according to the vegetation classes of Keith (2004) and Benson (2008), and condition classes assigned according to the Biometric (Gibbons *et al.* 2008) definition of low condition vegetation:

- Native woody vegetation with an overstorey percent foliage cover <25 per cent of the lower value of the over storey percent foliage cover benchmark for that vegetation type;
- Native woody vegetation where <50 per cent of vegetation in the ground layer is indigenous species; and
- Native woody vegetation or grassland is >90 per cent is ploughed or fallowed.

2.2.2 Ecological communities

Surveys of vegetation communities across the site were undertaken to characterise vegetation formation, class, structure and condition. Plant community composition is especially important in relation to those areas which have the potential to be a threatened ecological community.

The completion of flora surveys enabled determination of the ecological communities potentially occurring in the study area. Quadrat and transect surveys were undertaken to identify all communities present, assess condition and determine whether the native vegetation in the study area constitutes threatened ecological communities according to NSW and Commonwealth classification guidelines.

Vegetation communities with the potential to be a threatened ecological community were verified through characterisation of all vegetation within a quadrat (20 m x 20 m quadrat nested within a 50 m x 20 m quadrat) placed randomly within the vegetation communities.

2.2.3 Fauna

Fauna surveys included habitat assessment for all fauna groups, targeted bird surveys, observation of fauna signs, and opportunistic searches.

Fauna habitat resources were assessed to identify areas of potential habitat within the study area. Opportunistic searches for specific resources such as shelter, basking, roosting, nesting and foraging sites for birds, bats, arboreal mammals, ground-dwelling mammals and reptiles were undertaken. In addition, opportunistic searches for any indirect evidence of fauna (i.e. scats, feathers, fur, tracks, dens, nests, scratches, chew marks and owl wash) were also undertaken.

Habitat details recorded included:

- Presence/absence of:
  - Hollow-bearing trees (arboreal mammals, hollow-nesting birds and microchiropteran bats);
  - Feed trees (e.g. *Allocasuarina* spp. and mistletoe);
  - Roost sites (hollow-bearing trees or caves/rocky outcrops for bats);
  - Waterbodies (amphibians);
  - Nests (birds);
  - Rocky outcrops and ground debris (reptiles); and
  - Other features likely to provide potential habitat for threatened fauna;
- Tree characteristics, including:
  - Species;
  - Number of hollows;
  - Size of hollows; and

- Presence of mistletoe;

- Vegetation type (including dominant canopy, shrub and ground cover species);
- Topography; and
- GPS coordinates of key features.

Birds

Bird surveys were conducted at three sites throughout the study area in the early morning and late afternoon. Bird surveys were conducted by walking through areas of potential bird habitat, combined with stationary surveys. Birds were identified by direct observation and call identification.

In addition to the dedicated bird surveys, any additional species observed at other times (such as during flora surveys) were recorded as opportunistic observations.

Mammals

Surveys utilising mammal trapping, sand tray bait stations and remotely triggered cameras were not deemed appropriate as there was no suitable habitat for threatened terrestrial or arboreal mammals in the study area.

Microchiropteran bats

Although bats may utilise the study area for foraging, harp trapping was not undertaken due to the lack of suitable roosting and breeding habitat. It is unlikely that the proposed development would impact critical foraging, roosting or breeding habitat.

Reptiles

The survey was not undertaken during the optimal survey period for reptile species.

Amphibians

Opportunistic diurnal searches were undertaken in the vegetation around irrigation channels.

2.2.4 Survey time frame and potential limitations

Surveys were not undertaken during the optimal survey period for most species. The surveys were undertaken in early June when many plant species cannot be detected. For threatened flora species that were not detectable at the time of the survey, but which had the potential to occur at the site, an assessment was made of the suitability of the habitat for the species and their likelihood of occurrence.

Some fauna species are mobile and transient in their use of resources. Consequently, it is likely that not all species either resident or transitory to the site would have been recorded during the site inspections. The disadvantage of this limitation was reduced by undertaking database searches, and by assessing the habitat value of the study area for threatened and migratory species known to occur in the wider area to determine their likelihood of occurrence.

This survey was not designed to enable all species, either resident or transitory to the study area, to be detected. Instead it was aimed at providing an overall assessment of the ecological values of the study area with particular emphasis on threatened and migratory species to allow an assessment of the potential impacts of the proposed activity. For those species of conservation significance that were not detected but with the potential to occur in the study area, an assessment of the likelihood of their

occurrence was made based on known habitat requirements. Further assessment of impact would be conducted for those threatened species that may depend on the habitat resources in the study area.

2.3 Habitat assessment

The literature review and database search identified a number of threatened and migratory species that may occur in the study area (Appendix F). A habitat assessment was completed to review the likelihood of threatened and migratory species or ecological communities occurring within the study area, and the possibility of an impact on each species or ecological community. The results of the habitat assessments are presented in Appendix C. Threatened and migratory flora, fauna and ecological communities listed under the TSC Act and EPBC Act are included in the table. The dates and sources of observation records were reviewed in order to assess the accuracy and relevance of each record.

Profiles were reviewed for each of the threatened biota using the information from the DECCW threatened species profiles, the DEWHA Species Profile and Threats Database and other sources where information was available. These profiles provide information on ecological requirements and other characteristics including; statewide, regional and local abundance and distribution; and habitat requirements, including home range, feeding, roosting and breeding requirements.

In assessing which of these species, populations and ecological communities are 'likely' to occur within the study area the following factors were taken into consideration:

- The presence of potential habitat within the study area;
- Condition and approximate extent of potential habitat within the study area; and
- Species occurrence within the locality and wider area (including results of surveys and results of database searches and literature review).

3. Results

3.1 Landscape context

The study area occurs within the Mitchell landscape, Murrumbidgee Depression Plains. Twenty-six percent of the Murrumbidgee Depression Plains landscape has been cleared within the Murrumbidgee CMA area, and it is therefore not considered to be an over-cleared landscape (i.e. >70% cleared) (DEC 2005).

The Murrumbidgee Depression Plains landscape consists of quaternary alluvial plains with numerous circular depressions interpreted as high floodplains or low terraces beyond the reach of average floodwaters with relief to ten metres. It has grey to brown clays and clay loams with linear patterns of sandy prior streams. The landscape typically now comprises extensive grasslands of White-top (*Austrodanthonia caespitosa*), Windmill Grass (*Chloris truncata*), Sand Brome (*Bromus arenarius*), and spear grasses (*Austrostipa* spp.), is heavily grazed and invaded by introduced species. It is reported to have originally been Boree (*Acacia pendula*), Old Man Saltbush (*Atriplex nummularia*) and Bladder Saltbush (*Atriplex vesicaria*) (Mitchell 2003).

A brief landscape analysis was conducted in order to gauge the landscape value of the vegetation in the study area. The landscape assessment has taken into account the spatial configuration of vegetation, vegetation cover, connectivity and adjacency of nearest native vegetation.

Vegetation within a two kilometre radius of the subject site was viewed using satellite imagery. This analysis is strictly limited to an analysis of the overstorey vegetation. The class and quality of overstorey were not comprehensively assessed for vegetation in the surrounding landscape. Appendix 3 of Gibbons *et. al*. (2008) was used as a guide to indicate the percentage cover of native vegetation at the landscape scale.

Table 2: Assessment of landscape value of vegetation in the study area

Landscape value	McWilliam's Winery Expansion
Size/Shape	Remnant vegetation is limited to a thin corridor of Boree in the road reserve of Joncondon Road and Murrumbidgee Avenue, with a width of approximately five metres for a stretch of approximately two kilometres. This vegetation is fragmented. Mature plantings of *Eucalyptus* and *Allocasuarina* species exist along Murrumbidgee Avenue and Ben Martin Road.
Location in landscape	The study area occurs amongst cleared agricultural land. The Murrumbidgee River, the closest major tributary, exists approximately 23 kms to the south.
% cover native vegetation within 2 km radius of site*	0-10% cover
Connectivity value**	Nil – the woodland within two kilometres: ◗ Is not in low condition (Overstorey percent foliage cover is >25 per cent of lower benchmark for vegetation type, woodland has >50 per cent native ground layer species, woodland is <90 per cent

Landscape value	McWilliam's Winery Expansion
	ploughed or fallowed); ◗ Does not have an average width >100m; and ◗ Does not link to surrounding native vegetation on more than one compass quarter of the proposal.
Next nearest remnants, distance, size and connectivity	The nearest sizeable patch of remnant vegetation is along Mirrool Creek approximately four km to the south. The vegetation along the creek is reasonably well connected, but due to the highly developed nature of the land around it, it has little connectivity with other remnant vegetation.
Distance to nearest large remnant > 1000 ha	A large remnant of > 1,000 ha is located approximately 23 km to the south along the Murrumbidgee River riparian corridor. Cocoparra National Park with connected nature reserves and state forest is located approximately 20kms to the north-east. There is no connectivity between these remnants and the study area.

Key: * Based upon Biometric Tool p18 and 39. ** An estimate based upon Biometric Tool (Gibbons *et. al.* 2008)

3.2 Flora

The flora survey listed 69 flora species in the study area. Of these species, 29 were native and 40 were introduced (Appendix A).

The majority of the study area occurs in road reserves, drainage reserves and private property, and is heavily disturbed due to it's proximity to agricultural activity and road easements. The study area is surrounded by cleared agricultural land, dominated by irrigated vineyards, orchards and cropping.

The proposed area of plant expansion at the Hanwood Winery industrial site is highly disturbed and dominated by introduced annual species such as Caltrop (*Tribulus terrestris*), Small-flowered Mallow (*Malva parviflora*), and Paddy Melon (*Cucumis myriocarpus* subsp. *leptodermis*). Vineyards are also present here, with introduced species such as Small-flowered Mallow, Wireweed (*Polygonum aviculare*), and introduced grasses dominating ground covers between rows. No tree or shrub species exist within the subject site at this location (Figure 4).

The proposed pipeline alignment commences at the site of the proposed waste water treatment plant, and continues south to Ben Martin Road through the existing vineyard.

Figure 4: Proposed area of plant expansion at Hanwood Winery industrial site, looking south-east from existing Lagoon #4.

The eastern extent of the proposed pipeline, adjacent to Ben Martin Road, would run through private property. Flora surveys were not undertaken on this private property within the subject site. A flora transect was undertaken in the road reserve adjacent to the proposed pipeline alignment. Cooba (*Acacia salicina*) dominated the upper-storey, with introduced annuals such as Paterson's Curse (*Echium plantagineum*), introduced grasses, and Common Sowthistle (*Sonchus oleraceus*) dominating the understorey. Native forbs and chenopod shrubs such as Climbing Saltbush (*Einadia nutans*) and Ruby Saltbush (*Enchylaena tomentosa*) were also present in the understorey. An irrigation channel exists within the study area adjacent to the proposed pipeline, with aquatic flora such as Cumbungi (*Typha* sp).

On the north side of Ben Martin Road, west of Kidman Way, tree plantings exist on private property adjacent to the study area. A patch of mature *Allocasuarina* sp. trees connect with a patch of mature mixed Eucalypts and provide habitat for bird species including Whistling Kite (*Haliastur sphenurus*), which was observed on consecutive days in this patch. Scattered *Melaleuca* sp. shrubs also exist throughout the Eucalypt planting. The plantings would not be impacted by the proposal.

The proposed pipeline alignment between Kidman Way and Crooks Road continues on the north side of Ben Martin Road adjacent to an irrigation channel. The subject site here is heavily disturbed and dominated by introduced annuals such as Wild Oats (*Avena fatua*), Paterson's Curse, and Silver-leaved Nightshade (*Solanum elaeagnifolium*) (Figure 5).

Figure 5: Proposed pipeline alignment on Ben Martin Road between Kidman Way and Crooks Road.

The proposed pipeline alignment between Crooks Road and Murrumbidgee Avenue is located in the middle of Ben Martin Road. Small amounts of introduced-dominant vegetation would be disturbed, including Paterson's Curse, Wild Oats, and White Horehound (*Marrubium vulgare*). Native chenopod shrubs such as Black Rolypoly (*Sclerolaena muricata*) and Creeping Saltbush (*Atriplex semibaccata*) are present in small numbers on either side of the road, but would not be significantly impacted.

The proposed pipeline would then follow Murrumbidgee Avenue between Ben Martin Road and Joncondon Road. A patch of planted Eucalypts exist to the east of Murrumbidgee Avenue adjacent to the study area and provide habitat for native and introduced bird species. This planting would not be impacted by the proposed activity. A flora survey in a small patch of Boree in the western road reserve identified mixed introduced and native understorey species. Introduced grasses such as Stinkgrass (*Eragrostis cilianensis*) dominated the more disturbed areas, while native species such as Climbing Saltbush and Creeping Saltbush dominated less disturbed areas. A single River Red Gum (*Eucalyptus camaldulensis*) tree exists within this patch. Outside of this patch, scattered Boree exists on both sides of Murrumbidgee Road with groundcovers dominated by introduced species such as Stinkgrass and Khaki Weed (*Alternanthera pungens*).

Along Joncondon Road it is proposed that the pipeline would be constructed under the table drain on the northern side of the road. The subject site for the length of Joncondon Road is dominated by Silver-leaved Nightshade and introduced grasses. Some juvenile Boree trees (less than 50cm in height) exist within the subject site at the western extent of Joncondon Road, and would be removed by the proposed activity. Scattered patches of Boree exist along the majority of Joncondon Road, within three to four metres of the table drain and proposed pipeline. Boree patches along Joncondon Road are typically approximately five metres wide with *Senna* form taxon *'filifolia'* present in the midstorey, and chenopods such as Creeping Saltbush, Climbing Saltbush and Ruby Saltbush dominating the ground layer (Figure

6). These Boree patches are likely to be classified as 'Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions' under the TSC Act. In areas where Boree trees are not present, ground layer species are dominated by introduced species such as Paterson's Curse and *Chloris virgata*.

Figure 6: Boree (*Acacia pendula*) on the north side of Joncondon Road, looking east.

At the western end of the proposed pipeline, the subject site includes part of the McWilliam's property which is planted to vineyard. The subject site runs adjacent to a tree planting of *Eucalyptus* sp., *Acacia* sp., and chenopod shrubs), before following an existing vehicle track north between vine rows. The tree planting would not be impacted by the proposed activity. Ground covers on the McWilliams property are dominated by introduced species such as Silver-leaved Nightshade, Paddy Melon, Camel Melon (*Citrullus lanatus*), Paterson's Curse, and introduced grasses. The vegetation here is highly disturbed, with the proposed activity having no impact on any native species.

The proposed 45 ML irrigation water storage at the pipeline's conclusion exists in vineyard dominated by introduced groundcovers such as Chicory (*Cichorium intybus*), Flatweed (*Hypochaeris radicata*), and Paspalum (*Paspalum dilatatum*), (Figure 7). Large areas of vineyard would be removed, although this is unlikely to have an impact on the ecological value of the subject area.

Figure 7: Proposed site of 45ML irrigation water storage lagoon, looking south-west from existing shed on-site

Areas adjacent to irrigation channels in the study area were commonly dominated by introduced annual species including Paspalum, Wild Oats, Paterson's Curse and Prickly Lettuce (*Lactuca serriola*). Irrigation channels are present along the north side of Ben Martin Road, the east side of Murrumbidgee Avenue, and the north side of Joncondon Road between Murrumbidgee Avenue and Hickens Road.

3.2.1 Noxious weeds

Six plants listed as noxious for the Griffith City Council Local Government Area (NSW I&I 2010) were detected during field surveys:

- African Boxthorn (*Lycium ferocissimum*) – Class 4
- Bathurst Burr (*Xanthium spinosum*) – Class 4
- White Horehound (*Marrubium vulgare*) – Class 4
- Khaki Weed (*Alternanthera pungens*) – Class 4
- Silver-leaved Nightshade (*Solanum elaeagnifolium*) – Class 4
- Bridal Creeper (*Asparagus asparagoides*) – Class 5

Class 4 noxious weeds are plants that pose a threat to primary production, the environment or human health, are widely distributed in an area to which the order applies and are likely to spread in the area or to another area (*Noxious Weeds Act 1993*). The growth and spread of Class 4 noxious weeds must be controlled according to the measures specified in a management plan published by the local control authority (NSW I&I 2010).

Class 5 noxious weeds are plants that are likely, by their sale or the sale of their seeds or movement within the State or an area of the State, to spread in the State or outside the State. The Class 5 noxious weed listed above (Bridal Creeper) is an All of NSW declaration and the requirements in the Noxious Weeds Act 1993 for a notifiable weed must be complied with (NSW I&I 2010).

3.3 Ecological communities

The study area consists primarily of modified road reserve and existing vineyards, and is surrounded by agricultural activities including vineyards, orchards, and cropping. There are very few areas where the pre-existing ecological communities of the locality are still present.

Patches of Boree woodland exist along the proposed pipeline route on Joncondon Road, and Murrumbidgee Avenue. These patches typically have an understorey dominated by native shrubs and forbs.

On the north side of Ben Martin Road, west of Kidman Way, tree plantings exist on private property adjacent to the study area. A patch of mature *Allocasuarina* sp. adjoins a patch of mature mixed Eucalypt trees with *Melaleuca* sp. shrubs scattered throughout the Eucalypts. A Eucalypt planting exists east of Murrumbidgee Avenue. The plantings provide wildlife corridors and habitat for native and introduced birds. The plantings exist outside the study area and would not be impacted by the proposed activity.

The woodland areas in the study area are likely to classify as Riverine Plain Woodlands (Keith 2004), and Weeping Myall open woodland of the Riverina and NSW South-western Slopes Bioregions (Benson Class 26) (Benson 2008).

3.4 Fauna

The fauna survey identified 31 species, including four introduced species.

Twenty-nine bird species were identified during targeted bird surveys and by opportunistic observations. Birds that were common in the study area included Magpie Lark (*Grallina cyanoleuca*), Zebra Finch (*Taeniopygia guttata*), and Crested Pigeon (*Ocyphaps lophotes*).

There is limited habitat for fauna species in the highly modified agricultural landscape of the study area. Tree plantings and vineyards provide habitat for common agricultural bird species. Roadside vegetation including patches of Boree trees provide fragmented habitat corridors for small birds.

Evaporation pans at the McWilliam's Hanwood Winery provide temporary habitat for a small number of bird species including the Black-fronted Dotterel (*Elseyornis melanops*), Welcome Swallow (*Hirundo neoxena*), and Magpie Lark.

Two mammal species were observed in the study area including the Eastern Grey Kangaroo (*Macropus giganteus*), and the introduced European Brown Hare (*Lepus capensis*). Both were observed within vineyards.

No reptile species were observed.

No hollow-bearing trees, rocky outcrops, woody debris, or roost sites that could potentially be important habitat for threatened fauna species were identified in the study area. The majority of the study area is cleared agricultural land, and provides minimal fauna habitat. Patches of planted and remnant trees within the study area are likely to provide habitat for a number of bird species. This habitat would not be affected by the proposed activity.

The irrigation channel would be likely to provide habitat for frogs and water birds when water is present.

4. Likelihood of threatened biota occurring in the study area and possibility of impact

4.1 Observations of threatened biota

One threatened ecological community was observed within the study area along Joncondon Road, and scattered along Murrumbidgee Avenue. The woodland patch is likely to qualify as the ecological community 'Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions', listed as Endangered under the TSC Act. This ecological community continues to be threatened by clearing and fragmentation associated with cropping, overgrazing by feral and domestic animals, pest outbreaks and weed invasion (DECCW 2008).

The woodland patch includes Boree (*Acacia pendula*) as the dominant tree species present, with scattered Cooba (*Acacia salicina*) also present. The understorey includes an open layer of chenopods such as Creeping Saltbush, Climbing Saltbush, and Ruby Saltbush, which are species characteristic of the community as described in the NSW Scientific Committee – final determination (DECCW 2008). The understorey also includes introduced grasses and forbs such as Paterson's Curse, and Feathertop Rhodes Grass. The ground cover vegetation however is typically dominated by native species.

Prior to recent clearing at the western extent of Joncondon Road, the patch may have qualified as 'Weeping Myall Woodland' under the EPBC Act, which states that Weeping Myall patches greater than 0.5 ha, greater than 5 per cent canopy cover, and two layers of regenerating Weeping Myall, would be regarded as a threatened community (DECCW 2008). The community is now unlikely to qualify as 'Weeping Myall Woodland' listed as Endangered under the EPBC Act, due to the reduction of the patch to its small size and fragmented nature.

The ecological community could potentially be impacted by the proposed activity, and mitigation measures prescribed in Section 6 should be implemented to minimise impacts.

4.2 Threatened biota habitat assessment

The literature review and database search identified a number of threatened and migratory species that may occur in the study area, including: four threatened ecological communities; 39 bird species; one amphibian species; four mammal species; two fish species; and three plant species (Appendix C).

The following classifications are assigned to the likelihood of whether threatened biota may occur in the study area:

- Unlikely: Species, population or community is not likely to occur.
- Likely: Species, population or community could occur and study area is likely to provide suitable habitat.
- Present: Species, population or community was recorded during the field investigations.

In addition, an assessment was made of the possibility of an impact by the proposed development on threatened biota, and therefore whether an EP&A Act impact assessment (according to the *Draft Guidelines for Threatened Species Assessment* (DEC/DPI 2005) under s.75f of the EP&A Act.) and/or

EPBC Act significance assessment are required to assess the significance of the impact. This assessment was assigned as follows:

- Unlikely: The proposal would be unlikely to impact this species, population or community or its habitats. No EP&A Act impact assessment or EPBC Act significance assessment is necessary for this species, population or community.
- Likely: The proposal could impact this species, population or community or its habitats. An EP&A Act impact assessment and/or EPBC Act significance assessment is required for this species, population or community.

The review of habitat requirements and historical records for each of the threatened biota (listed as threatened under the TSC Act, and the EPBC Act) concluded that one ecological community could potentially be impacted by the proposed development (Appendix C). It is unlikely that any threatened flora or fauna species would be impacted by the proposal.

4.2.1 Biota listed as threatened under the NSW TSC Act

The habitat assessment found that the proposed activity could potentially impact the Endangered Ecological Community 'Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions'.
The community is located within the study area immediately adjacent to the proposed pipeline route, with potential for tree damage through root disturbance and lopping of branches during construction. An assessment of the likely impacts to the community is undertaken in Appendix D.

The habitat assessment found that the proposed development would be unlikely to have an impact on any species or population listed as threatened under the TSC Act.

4.2.2 Biota listed under the Commonwealth EPBC Act

The habitat assessment found that the proposed development would be unlikely to have an impact on any species, population, or community listed as threatened, migratory or marine under the EPBC Act.

5. Potential impacts of the proposed development

The following developments are proposed:

- Construction of a bottling and packaging plant;
- Construction of a waste water treatment plant including holding lagoons;
- Construction of an eight kilometre pipeline between the Hanwood Winery and an irrigation water storage to the west; and
- Construction of a 45 ML irrigation water storage within vineyards on the McWilliam's property to the west.

5.1 Direct impacts

The construction of the bottling and packaging plant, waste water treatment plant, and irrigation water storage, is unlikely to have any significant direct impacts on the ecology of the study area. These proposed expansions would take place in existing vineyards and cleared land dominated by introduced groundcovers of little ecological value. The potential modification of evaporation pans in the subject site may impact upon foraging habitat for some bird species, but this is unlikely to be preferred habitat for these species within the locality.

The direct impacts described in this section relate to the potential impacts of the construction of the proposed pipeline from McWilliam's Hanwood Winery to the proposed irrigation water storage on the McWilliam's property to the west.

5.1.1 Vegetation removal

The proposal is likely to require the removal of up to 10 juvenile (<50cm in height) Boree trees from within the subject site at the western extent of Joncondon Road. These juvenile trees exist within the table drain where the proposed pipeline would be laid. Due to the age and size of the trees within the table drain, they are unlikely to be providing significant habitat for fauna species in the study area, and are unlikely to represent a critical component of the Myall woodland community. Removal of these small trees would not contribute to a loss of ecological connectivity, or viability of native vegetation in the study area. The mature Boree adjacent to the subject site would provide preferred habitat for fauna species and for future regeneration of Boree trees from the mature trees.

The proposed activity may require the lopping of some mature Boree limbs that overhang the subject site, for access of construction machinery. Boree can respond well to lopping, however excessive lopping, i.e. more than 30% of the canopy, can lead to tree stress that can later be invaded by wood boring insects (DPI 2000; YRSC 2010). A single Cooba (*Acacia salicina*) may require removal from the north-east corner of the intersection of Kidman Way and Ben Martin Road. This tree is isolated, and its removal is unlikely to have a significant impact on the fauna utilising the area. A patch of Cooba exists within 100m of this individual and would provide preferred habitat for fauna in the area.

Groundcover species likely to be removed by the proposed activity would be primarily introduced species, with little ecological value to the subject area. Silver-leaved Nightshade, and introduced grass species such as Wild Oats and Paspalum are dominant along much of the proposed pipeline route.

Some chenopod species exist within the subject site and would be impacted by the proposed activity; however this would represent only a small proportion of the chenopod vegetation within the study area.

5.1.2 Tree root disturbance

There is potential for Boree trees to be impacted along Joncondon Road and Murrumbidgee Avenue through root damage sustained during the proposed pipeline trench excavation. Boree has a moderate tolerance to root disturbance, and there is evidence that the species can recover from root damage, and will coppice and produce suckers from damaged roots (DPI 2000 & YRSC 2010).

5.2 Indirect impacts

5.2.1 Soil surface and drainage disturbance

Soil disturbance and vegetation removal may cause soil erosion during the proposed construction activities. This would have the potential to contribute to sedimentation of the drainage lines in the study area. As the majority of the proposed activity would take place within existing table drains and flat vineyard areas, indirect impacts are likely to be minimal.

5.2.2 Noxious weeds

Six weed species listed as noxious for the Griffith City Council, were identified in the study area. The movement of traffic across the site and soil disturbance associated with construction have the potential to facilitate the spread of weeds throughout the study area. The use of heavy machinery on site and an increase of traffic may also facilitate the introduction of weeds to the site.

5.2.3 Fauna

The current use of the study area for agricultural activity would provide regular disturbance to fauna species. The proposed activity has the potential to temporarily affect the use of the study area by fauna as a result of increased disturbance through heavy vehicle movement and operation during construction. The use of heavy vehicles and machinery during construction may deter some fauna species from utilising potential habitat within the study area, however this would only be for the duration of the proposed activity.

5.3 Cumulative impacts

Previous clearing undertaken on private property near the eastern extent of Joncondon Road has significantly reduced a patch of Boree at the site. Satellite imagery estimates of the former extent of the patch are approximately 1.3 ha. Following recent clearing the patch is now approximately 0.4 ha, estimated from ground observations. Prior to clearing this patch would have classified as 'Weeping Myall Woodland' under the EPBC Act.

While the proposed activity would not remove any mature trees, care must be taken to minimise impacts upon the remainder of the Myall woodland existing within the study area, which is still likely to classify as the Endangered Ecological Community listed under the TSC Act.

5.4 Significance of potential impacts

5.4.1 NSW Legislation

Under Part 3A of the EP&A Act an assessment of the impact of a proposal must be carried out with reference to the *Draft Guidelines for Threatened Species Assessment* (DEC/DPI 2005), under s.75f of the EP&A Act. If a species of flora or fauna listed in Schedule 1 or 2 of the TSC Act, or the *Fisheries Management Act 1994 (*FM Act) is identified, a review must be undertaken of the factors set out to establish if there is likely to be a significant effect on that species, population, ecological community or habitat.

Species listed as threatened under the NSW TSC Act

The habitat assessment found that the proposed activity could potentially impact upon:

- Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions (Endangered Ecological Community).

An assessment of the significance according to the *Draft Guidelines for Threatened Species Assessment* (DEC/DPI 2005) under s.75f of the EP&A Act was completed for this ecological community, and concluded that the proposed activity is unlikely to have a significant impact provided that the mitigation measures described in Section 6 are implemented.

Relevant Key Threatening Processes in NSW

The NSW TSC Act has listed a number of Key Threatening Processes (KTP) which contribute to loss of species, populations and communities. The following KTP is relevant to the proposal:

- Clearing of native vegetation.

The proposed activity would not significantly increase the occurrence of this key threatening process due to the small number of juvenile Boree trees that would be removed. Further, considering that these juvenile trees exist in the table drain at the subject site, it is likely that they would be removed as part of routine road maintenance in future. The removal of the highly degraded groundcover vegetation within the subject site would not be considered the clearing of native vegetation.

5.4.2 Commonwealth legislation

The EPBC Act provides a mechanism for assessing the environmental impact of activities and developments, where matters of National Environmental Significance (NES) may be affected by the proposed activities. Ultimately the environmental assessment and approval process required by the Commonwealth Government will be delegated to individual states through the development of bilateral agreements. If the proposed activity is likely to have a significant impact on a matter of NES it must be referred to the Commonwealth Minister for the Environment, Heritage and the Arts. After the Referral is completed and assessed, the Commonwealth Minister can then refer the proposed activity back to NSW in accordance with the bilateral agreement.

Matters of NES include:

- World heritage properties;
- Migratory species protected under international agreements;

- National heritage properties;
- Nuclear actions;
- Ramsar wetlands of international importance;
- Listed threatened species and communities; and
- The Commonwealth marine environment.

The EPBC Act Policy Statement *Matters of National Environmental Significance: Significant impact guidelines 1.1* (DEWHA 2009) was reviewed when determining if a significant impact is likely on matters of NES.

Species listed under the Commonwealth EPBC Act

The habitat assessment found that the proposed activity would not impact any species, populations or communities listed under the EPBC Act.

6. Proposed mitigation measures

Mitigation measures to avoid and minimise ecological impacts, including impacts to the Myall woodland ecological community are outlined in Table 3.The proposed activity is unlikely to cause a significant impact on the native fauna, flora or ecological communities of the study area, provided that the mitigation measures in are implemented.

The mitigation measures listed should be incorporated into an Environmental Management Plan (EMP) to be developed by the proponent, and should be implemented before, during and after construction.

Table 3: Proposed mitigation measures

Potential Impact	Suitable Measures to Reduce Impacts
Direct loss of areas of native ecological communities	◗ The pipeline route should avoid areas of native vegetation as much as possible; ◗ Minimise the proposed pipeline impact zone as much as feasibly possible; ◗ Position the proposed pipeline alignment within existing table-drains to avoid disturbance to native vegetation communities; ◗ Where the proposed pipeline alignment cannot be within existing table drains, position as far from existing native ecological communities as possible, particularly Myall woodland ecological communities (see Figure 3); ◗ Where the proposed pipeline alignment is yet to be decided, planning should consider avoidance of native ecological communities; ◗ Put control measures in place to prevent construction traffic moving off formed roads and tracks and proposed works footprints, into native vegetation areas; ◗ Clearly designate set down areas. Set down areas for construction materials should be located in areas that support predominantly introduced or previously cleared vegetation; ◗ Identify appropriate sites for disposal of spoil (i.e. areas not supporting native vegetation); and ◗ Any limbs to be removed from trees adjacent to the proposed pipeline alignment should be placed into the adjoining vegetation communities as habitat. The woody debris should not be placed in heaps but spread in a fashion which replicates the natural environment.
Direct loss of mature indigenous trees	◗ Avoid removal of mature trees; ◗ Minimise the proposed pipeline impact zone as much as feasibly possible; ◗ Position the proposed pipeline as far from existing trees as feasibly possible; ◗ Where the proposed pipeline route is yet to be decided, planning should take into consideration and avoid mature indigenous trees; and ◗ Lopping should be avoided where feasible and only undertaken when necessary, in order to avoid removal of trees.
Indirect damage to indigenous trees through damage to their roots	◗ Minimise the proposed pipeline impact zone as much as feasibly possible; ◗ Position the proposed pipeline as far from existing trees as feasibly possible to avoid root disturbance; ◗ Where the proposed pipeline route is yet to be decided, planning should take into consideration and avoid mature indigenous trees; and ◗ Avoid placing stockpiles of soils and other materials below the drip-zones of remnant indigenous trees during the construction

Potential Impact	Suitable Measures to Reduce Impacts
	phase.
Indirect environmental impacts during construction[1]	◗ An EMP must be developed by the proponent prior to construction that appropriately provides measures to minimise and avoid potential impacts, and provides contingency measures should they occur. This EMP must be implemented during the construction phase. Measures could include, but not be limited to, sediment controls, emergency clean-up equipment, threatened species management etc.
Weed spread and establishment	◗ A weed management plan should be developed prior to the commencement of construction (as part of the proponent's EMP). Measures should be implemented before, during and after construction to prevent the establishment and/or spread of weeds within and beyond the study area; ◗ Declared noxious weeds in NSW are to be managed according to requirements under the *Noxious Weeds Act 1993*; and ◗ Management options in the contractor's plan should include appropriate wash-down areas to avoid the spread of weed seeds.

1 Indirect environment impacts includes impacts to the physical environment such as erosion, sedimentation, chemical spills

7. Conclusion

The study area incorporates the existing McWilliam's Hanwood Winery, road easements, and private property, and is surrounded by cleared agricultural land predominantly comprising vineyards.

The proposal would involve the removal of a small number of juvenile Boree trees (<50cm in height), however no mature trees would be removed. There is potential for root disturbance to mature Boree trees present in the road reserves adjacent to the pipeline alignment, and this should be minimised as much as possible. The patches of Boree trees are likely to form the endangered ecological community 'Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions'.

Given the limited disturbance of the project to the natural environment and the mitigation measures to be applied during construction, the proposed activity is unlikely to significantly impact any threatened or migratory species, population or ecological community in the study area, provided that the mitigation measures recommended are implemented.

Therefore, the proposed activity is unlikely to have a significant impact on any threatened or migratory species, population or ecological community listed under NSW or Commonwealth legislation. There is no requirement for a Species Impact Statement (NSW) or for a Referral to the Minister for the Environment, Heritage and the Arts (Commonwealth).

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Appendix A

Flora survey results

Modified Braun-Blanquet (1932) cover classes for quadrats:

r	*<1% cover, one individual*	3	*5-25% cover*
+	*<1% cover, few individuals*	4	*25-50% cover*
1	*<1% cover, numerous individuals*	5	*50-75% cover*
2	*1-5% cover*	6	*75-100% cover*

✓ Recorded in transect survey

*Introduced species

Scientific name	**Common name**	Q1	Q2	T1	T2	T3	T4	Q3	T5	Q4	Q5
Acacia pendula	Boree				✓	✓					4
Acacia salicina	Cooba				✓	✓					
*Alternanthera pungens**	Khaki Weed					✓					
*Arctotheca calendula**	Capeweed					✓					+
*Asparagus asparagoides**	Bridal Creeper					✓					
Atriplex semibaccata	Creeping Saltbush	1	1	✓	✓		✓				3
Austrodanthonia sp.									✓		
*Avena fatua**					✓	✓	✓	6			
*Bidens pilosa**	Cobblers Pegs										+
Brachychiton populneus	Kurrajong					✓					
*Capsella bursa-pastoris**	Shepherd's Purse		1								
*Carthamus lanatus**	Saffron Thistle								✓		
Chloris truncata	Windmill Grass	2			✓						
*Chloris virgata**	Feathertop Rhodes Grass										1
*Chondrilla juncea**	Skeleton Weed	+				✓		1			
*Cichorium intybus**	Chicory	2					✓				
*Cirsium vulgare**	Spear Thistle	1		✓	✓	✓					
*Citrullus lanatus**	Camel Melon		2								

Scientific name	Common name	Q1	Q2	T1	T2	T3	T4	Q3	T5	Q4	Q5
Convolvulus recurvatus subsp. *recurvatus*									✓		
*Conyza sumatrensis**	Tall Fleabane	1									
Cucumis myriocarpus subsp. *leptodermis**	Paddy Melon		2	✓						2	
Cynodon dactylon	Couch			✓	✓			1			
*Cyperus eragrostis**		r							✓		
*Echinochloa crus-galli**	Barnyard Grass			✓	✓					1	+
*Echium plantagineum**	Patterson's Curse		2	✓	✓	✓	✓	1		2	2
Einadia nutans	Climbing Saltbush				✓	✓			✓		2
Einadia hastata	Berry Saltbush					✓					
Enchylaena tomentosa	Ruby Saltbush		1	✓	✓	✓			✓		3
*Eragrostis cilianensis**	Stinkgrass					✓					
Eucalyptus camaldulensis						✓					
Euphorbia drummondii	Caustic Weed		1								+
*Foeniculum vulgare**	Fennel		1			✓			✓		
*Helminthotheca echioides**	Ox Tongue	+									
Hibiscus trionum	Flower-of-an-Hour		+								+
*Hypochaeris radicata**	Flatweed	2									+
*Lactuca serriola**	Prickly Lettuce	1	2	✓	✓	✓		1	✓	1	
Lepidium sp.											+
Liliaceae		+			✓	✓			✓		
*Lycium ferocissimum**	African Boxthorn					✓					1
Maireana decalvans	Black Cotton Bush			✓		✓	✓	1			1
*Malva parviflora**	Small-flowered									2	

Scientific name	Common name	Q1	Q2	T1	T2	T3	T4	Q3	T5	Q4	Q5
	Mallow										
*Marrubium vulgare**	White Horehound					✓	✓		✓		+
*Melilotus albus**	Bokhara				✓	✓					
*Olea europaea**	Common Olive								✓		
Oxalis perennans					✓						
Panicum effusum	Hairy Panic		1								1
*Paspalum dilatatum**	Paspalum	2			✓	✓			✓	+	
Persicaria sp.									✓		
*Poaceae**					✓				✓		
*Polygonum aviculare**	Wireweed		1	✓	✓					1	
Rumex sp.					✓			1			
Salsola kali				✓	✓	✓				2	2
Sclerolaena muricata	Black Rolypoly				✓	✓	✓				
Senna form taxon *'filifolia'*	Punty Bush				✓	✓					2
Sida corrugata	Corrugated Sida		1								1
*Solanum elaeagnifolium**	Silver-leaved Nightshade		2	✓	✓	✓	✓	1			2
*Solanum nigrum**	Black-berry Nightshade		1								
*Sonchus oleraceus**	Common Sowthistle	1	2	✓	✓		✓		✓	1	+
Sporobolus caroli	Fairy Grass										+
*Sisymbrium irio**	London Rocket					✓					
Swainsona galegifolia	Smooth Darling Pea	r									
*Tribulus terrestris**	Caltrop									3	
*Trifolium subterraneum**	Subterranean Clover							1			

Scientific name	Common name	Q1	Q2	T1	T2	T3	T4	Q3	T5	Q4	Q5
*Triticum aestivum**	Common Wheat					✓					
Typha sp.	Cumbungi								✓		
Vicia sp.*	Vetch				✓		✓				
Vitis sp.*	Grapes	3									
Vittadinia cuneata	Fuzzweed	+			✓						+
*Xanthium spinosum**	Bathurst Burr						✓	1			

Appendix B

Fauna Survey Results

CLASS (BOLD) ***Scientific Name (italics)***	***Common Name***
AVES	
Acanthiza chrysorrhoa	Yellow-rumped Thornbill
Anas superciliosa	Pacific Black Duck
Corvus coronoides	Australian Raven
Cracticus nigrogularis	Pied Butcherbird
Egretta novaehollandiae	White-faced Heron
Elanus axillaris	Black-shouldered Kite
Elseyornis melanops	Black-fronted Dotterel
Eolophus roseicapillus	Galah
Falco cenchroides	Nankeen Kestrel
Falco subniger	Black Falcon
Grallina cyanoleuca	Magpie Lark
Gymnorhina tibicen	Australian Magpie
Haliastur sphenurus	Whistling Kite
Hirundo neoxena	Welcome Swallow
Malurus cyaneus	Superb Fairy-wren
Manorina melanocephala	Noisy Miner
Microcarbo melanoleucos	Little Pied Cormorant
Milvus migrans	Black Kite
Ocyphaps lophotes	Crested Pigeon
Pardalotus striatus	Striated Pardalote
*Passer domesticus**	House Sparrow
Petroica goodenovii	Red-capped Robin
Rhipidura fuliginosa	Grey Fantail
Rhipidura leucophrys	Willie Wagtail
*Sturnus vulgaris**	Common Starling
Taeniopygia guttata	Zebra Finch
Threskiornis molucca	Australian White Ibis
Threskiornis spinicollis	Straw-necked Ibis

CLASS (BOLD) ***Scientific Name (italics)***	***Common Name***
*Turdus merula**	Blackbird
MAMMALIA	
*Lepus capensis**	European Brown Hare
Macropus giganteus	Eastern Grey Kangaroo

**Introduced species*

Appendix C

Habitat Assessment Table

An evaluation of the likelihood and extent of impact to threatened and migratory fauna and flora recorded from within the **Griffith LGA** (TSC Act threatened species); and within a 10 km radius of the subject site (EPBC Act threatened and migratory species). Records are from a search of the Department of Environment, Climate Change and Water (DECCW) Wildlife Atlas and the EPBC Environmental Reporting Tool available from the Department of Environment, Water, Heritage and the Arts website. Ecology information has been obtained from the Threatened Species Profiles on the NSW DECCW website (www.threatenedspecies.environment.nsw.gov.au) and from the Species Profiles and Threats Database on the Commonwealth DEWHA website (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl).

Likelihood of Occurrence in Study Area

Unlikely:	Species, population or ecological community is not likely to occur.
Likely:	Species, population or ecological community could occur and study area is likely to provide suitable habitat.
Present:	Species, population or ecological community was recorded during the field investigations.

Possibility of Impact

Unlikely:	The proposal would be unlikely to impact this species or its habitats. No EP&A Act impact assessment or EPBC Act significance assessment is necessary for this species.
Likely:	The proposal could impact this species, population or ecological community or its habitats. An EP&A Act impact assessment and/or EPBC Act significance assessment is required for this species, population or ecological community.

This assessment has assumed that no mature tree removal would occur in the study area.

Status

National	Commonwealth Environment Protection and Biodiversity Conservation Act 1999
NSW	NSW Threatened Species Conservation Act 1995
E:	Endangered
E(FM):	Endangered, listed under the Fisheries Management Act 1994
CE:	Critically Endangered
V:	Vulnerable
Mi:	Migratory
M:	Marine

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
THREATENED ECOLOGICAL COMMUNITIES				
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	E	EEC	**Unlikely** - *Allocasuarina luehmannii* Woodland in the Riverina and Murray-Darling Depression bioregions is the name given to the ecological community dominated by Buloke (*Allocasuarina luehmannii*), sometimes with co-occurring tree species. The community typically comprises an open tree canopy with a sparse and highly variable ground layer dominated by grasses and herbs, sometimes with scattered shrubs and/or small trees. *Allocasuarina luehmannii* Woodland has been recorded in the southern part of the Riverina bioregion from near Urana and Mulwala in the east to the Barham district, and may extend as far west as Euston in the southern part of the Murray-Darling Depression bioregion. No *Allocasuarina luehmannii* was recorded within the study area during field surveys.	**Unlikely** – the ecological community does not occur in the study area.
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of South-eastern Australia	E	EEC	**Unlikely** - Inland Grey Box Woodland includes those woodlands in which the most characteristic tree species, *Eucalyptus microcarpa* (Inland Grey Box), is often found in association with *E. populnea* subsp. *bimbil* (Bimble or Poplar Box), *Callitris glaucophylla* (White Cypress Pine), *Brachychiton populneus* (Kurrajong), *Allocasuarina luehmannii* (Bulloak) or *E. melliodora* (Yellow Box), and sometimes with *E. albens* (White Box). Shrubs are typically sparse or absent, although this component can be diverse and may be locally common, especially in drier western portions of the community. A variable ground layer of grass and herbaceous species is present at most sites. At severely disturbed sites the ground layer may be absent. Occurs predominately within the Riverina and South West Slopes regions of NSW down to the Victorian border. The study area is highly disturbed agricultural land, and is unlikely to support this EEC.	**Unlikely** – the ecological community does not occur in the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Weeping Myall Woodlands / Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions'	E	E	**Likely -** The structure of the community varies from low woodland and low open woodland to low sparse woodland or open shrubland, depending on site quality and disturbance history. The tree layer grows up to a height of about 10 metres and invariably includes *Acacia pendula* (Weeping Myall or Boree) as one of the dominant species or the only tree species present. The understorey includes an open layer of chenopods and other woody plant species and an open to continuous groundcover of grasses and herbs. The study area contains patches of *Acacia pendula* in roadside reserves consistent with the requirements of the TSC Act for classification of the ecological community.	**Likely** – the majority of the proposed activity in areas containing the EEC would be undertaken in existing table drains, and would require no mature tree removal. Consultation should be undertaken to ensure that tree root damage would not place the community at risk.
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	CE	E	**Unlikely** - Characterised by the presence or prior occurrence of White Box, Yellow Box and/or Blakely's Red Gum. The trees may occur as pure stands, mixtures of the three species or in mixtures with other trees, including wattles. Commonly co-occurring eucalypts include *Eucalyptus bridgesiana*, *E. polyanthemos*, *E. rubida*, *E. pauciflora*, *E. cinerea*, *E. mannifera*, *E. macrorhyncha*, *E. microcarpa* and others. The study area is highly disturbed agricultural land with little evidence of keystone species for this EEC, and is unlikely to contain derived native grassland.	**Unlikely** – the ecological community does not occur in the study area.
BIRDS				
Australian Painted Snipe *Rostratula australis*	V	E	**Unlikely** - Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. Forages nocturnally on mud-flats and in shallow water. The species has been recorded within 10km of the study area. The study area does not contain preferred aquatic habitat with a cover of vegetation. The species may utilise waste water ponds within the locality for foraging, although this is unlikely to be preferred habitat due to the intermittent water levels.	**Unlikely** – habitat for the species is not likely to occur in the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Australasian Bittern *Botaurus poiciloptilus*	-	V	**Unlikely** - Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (Typha spp.) and spikerushes (Eleoacharis spp.). The species has been recorded within 10km of the study area. The study area is unlikely to provide preferred habitat for the species due to a lack of permanent freshwater wetlands with aquatic vegetation.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Barking Owl *Ninox connivens*	-	V	**Unlikely** - Inhabits eucalypt woodland, open forest, swamp woodlands and, especially in inland areas, timber along watercourses. Denser vegetation is used occasionally for roosting. During the day they roost along creek lines, usually in tall understorey trees with dense foliage such as Acacia and Casuarina species, or the dense clumps of canopy leaves in large Eucalypts. Nests in hollows of large, old eucalypts including River Red Gum (*Eucalyptus camaldulensis*). The study area does not contain woodland or forest habitat preferred by the species. Planted Eucalypt species within the locality are unlikely to provide preferred habitat for the species.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Black-tailed Godwit *Limosa limosa*	M, Mi	V	**Unlikely** - Primarily a coastal species. Usually found in sheltered bays, estuaries and lagoons with large intertidal mudflats and/or sandflats. Further inland, it can also be found on mudflats and in water less than 10 cm deep, around muddy lakes and swamps. Individuals have been recorded in wet fields and sewerage treatment works. The species may be a rare vagrant to the evaporation pans for opportunistic foraging, but this is unlikely to provide preferred habitat for the species. The evaporation pans would provide only temporary foraging habitat for the species.	**Unlikely** - the activities proposed would be unlikely to have an impact on preferred habitat for the species.
Black-necked Stork *Ephippiorhynchus asiaticus*	-	E	**Unlikely** - Inhabits permanent freshwater wetlands including margins of billabongs, swamps, shallow floodwaters, and adjacent grasslands and savannah woodlands; can also be found occasionally on inter-tidal shorelines, mangrove margins and estuaries. The species has a single record within 10km of the study area. The study area is unlikely to provide preferred habitat for the species due to a lack of permanent freshwater wetlands.	**Unlikely** – habitat for the species is not likely to occur in the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Blue-billed Duck *Oxyura australis*	-	V	**Unlikely** - Prefers deep water in large permanent wetlands and swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached. Usually nest solitarily in Cumbungi over deep water between September and February. They will also nest in trampled vegetation in Lignum, sedges or Spike-rushes, where a bowl-shaped nest is constructed. The species has been recorded within 10km of the study area. The study area is unlikely to provide habitat for the species due a lack of large permanent freshwater wetland areas with aquatic vegetation.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Brolga *Grus rubicunda*	-	V	**Unlikely** - Often feed in dry grassland or ploughed paddocks or even desert claypans, although they are dependent on wetlands too, especially shallow swamps. The species has been recorded approximately 15km from the subject area. The study area is unlikely to provide preferred habitat due to a lack of wetland areas, dry grassland and ploughed paddocks.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Brown Treecreeper *Climacteris picumnus victoriae*	-	V	**Unlikely** - The species has been recorded within 10km of the study area. The species as identified within the locality are unlikely to classify as the eastern subspecies, which is listed under the TSC Act.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Bush Stone-curlew *Burhinus grallarius*	-	E	**Unlikely** - Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. The species has been recorded approximately 10km from the study area. The study area is unlikely to provide preferred habitat for the species due to a lack of open forest and woodland, and woody debris.	**Unlikely** – habitat for the species is not likely to occur in the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Cattle Egret *Ardea ibis*	M, Mi	-	**Unlikely** - The Cattle Egret is found in grasslands, woodlands and wetlands, and is not common in arid areas. It also uses pastures and croplands, especially where drainage is poor. Will also forage at garbage dumps, and is often seen with cattle and other stock. The study area provides limited vegetation and wetland areas for suitable habitat of this species. This species may pass over the study area however the proposed activity would not impact this species or its habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Diamond Firetail *Stagonopleura guttata*	-	V	**Unlikely** - Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum Eucalyptus pauciflora Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. The species has been recorded within 10km of the study area. The study area is unlikely to provide preferred habitat for the species due to a lack of grassy eucalypt woodland in the cleared agricultural environment.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Flame Robin *Petroica phoenicea*	M	V	**Unlikely** - The Flame Robin's preferred habitat type is forests and woodlands up to about 1800 m above sea level. In winter, birds move to lower and more open areas, including gardens. In NSW it breeds in upland moist eucalypt forests and woodlands, often on ridges and slopes, in areas of open understorey. It migrates in winter to more open lowland habitats such as grassland with scattered trees and open woodland on the inland slopes and plains. The species has been recorded approximately 15km from the study area. Preferred habitat for the species is unlikely to exist in the study area due to a lack of woodland, forest, and grassland habitat.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Fork-tailed Swift *Apus pacificus*	M, Mi	-	**Unlikely** - Migratory marine visitor to eastern Australia. It is a highly nomadic and dispersive species which feeds on insects in the air. This species may pass over the study area however the proposed activity would not impact this species or its habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Freckled Duck *Stictonetta naevosa*	-	V	**Unlikely** - Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. The species has been recorded within 10km of the study area. The study area is unlikely to provide preferred habitat for the species due a lack of Cumbungi, Lignum or Tea-tree. The species may utilise waste water ponds within the study area from nearby industry during drier times.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Gilbert's Whistler *Pachycephala inornata*	-	V	**Unlikely** - In NSW it occurs mostly in mallee shrubland, but also in box-ironbark woodlands, Cypress Pine and Belah woodlands and River Red Gum forests. Within the mallee the species is often found in association with an understorey of spinifex and low shrubs including acacias, hakeas, sennas and grevilleas. In woodland habitats, the understorey comprises dense patches of shrubs. A single recording of the species exists approximately 20km from the study area. The predominately cleared agricultural study area is unlikely to provide habitat for the species due to a lack of forest and woodland area.	**Unlikely** - the study area does not provide suitable habitat for this species.
Glossy Black-Cockatoo *Calyptorhynchus lathami*	-	V	**Unlikely** - Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (Allocasuarina littoralis), Forest She-oak (A. torulosa) or Drooping She-oak (A. verticillata) occur. In the Riverina area, the species inhabits open woodlands dominated by Belah (Casuarina cristata). The species has been recorded approximately 15km from the study area. The study area is predominately cleared agricultural land and is unlikely to provide preferred habitat for the species. The planted *Allocasuarina cunninghamiana* existing near the study area may provide foraging habitat for the species, but is unlikely to be preferred habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Great Egret *Ardea alba*	M, Mi	-	**Likely** - Reported in a wide range of wetland habitats including swamps and marshes, margins of rivers and lakes, damp or flooded grasslands, pastures or agricultural lands, reservoirs, sewage treatment ponds, and drainage channels. The study area provides suitable habitat for the species in the form of waste water ponds and agricultural lands that may be utilised for foraging, however the proposed activity would not impact this species or its habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Grey-crowned Babbler (eastern subspecies) *Pomatostomus temporalis temporalis*	-	V	**Unlikely** - Inhabits open Box-Gum Woodlands on the slopes, and Box-Cypress-pine and open Box Woodlands on alluvial plains. Flight is laborious so birds prefer to hop to the top of a tree and glide down to the next one. Birds are generally unable to cross large open areas. The species has been recorded within 10km of the study area. The predominately disturbed agricultural study area is unlikely to contain suitable woodland habitat for the species.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Grey Falcon *Falco hypoleucos*	-	V	**Unlikely** - Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions. Also occurs near wetlands where surface water attracts prey. Preys primarily on birds, especially parrots and pigeons; reptiles and mammals are also taken. A single record of the species exists within 10km of the study area. The study area may provide opportunistic foraging potential for the species, although the highly disturbed agricultural land is unlikely to provide preferred habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Hooded Robin *Melanodryas cucullata*	-	V	**Unlikely** - Prefers drier woodlands (eucalypt, cypress pine, mluga) with fallen logs, stumps and ground litter. Uses open paddocks that have stumps, dead trees and re-growth. The species has been recorded within 10km of the study area. The predominately disturbed agricultural study area is unlikely to contain suitable woodland habitat for the species. Little woody debris or ground litter exists.	**Unlikely** – habitat for the species is not likely to occur in the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Latham's Snipe *Gallinago hardwickii*	M, Mi	-	**Unlikely** - Occurs in permanent and ephemeral wetlands. The species usually inhabits open, freshwater wetlands with low, dense vegetation. The study area does not contain wetland habitat with low, dense vegetation preferred by the species. This species may pass over the study area however the proposed activity would not impact this species or any potential habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Little Eagle *Hieraaetus morphnoides*	-	V	**Unlikely** - Occupies open eucalypt forest, woodland or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter. The species has been recorded within 10km of the study area. The study area is dominated by cleared agricultural land and is unlikely to provide preferred habitat for the species. The species may be an occasional opportunistic forager in the area.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Magpie Goose *Anseranas semipalmata*	M	V	**Unlikely** - Mainly found in shallow wetlands (less than 1 m deep) with dense growth of rushes or sedges. Equally at home in aquatic or terrestrial habitats; often seen walking and grazing on land; feeds on grasses, bulbs and rhizomes. Activities are centred on wetlands, mainly those on floodplains of rivers and large shallow wetlands formed by run-off; breeding can occur in both summer and winter dominated rainfall areas and is strongly influenced by water level; most breeding now occurs in monsoonal areas; nests are formed in trees over deep water; breeding is unlikely in south-eastern NSW. The species has been recorded within 10km of the study area. The study area is unlikely to provide preferred habitat for the species due to a lack of shallow wetlands with dense aquatic vegetation. The species may utilise waste water ponds from industry within the locality.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Major Mitchell's Cockatoo *Cacatua leadbeateri*	-	V	**Likely** - Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and introduced melons and on the seeds of species of saltbush, wattles and cypress pines. The species has been recorded within 5km of the study area. The species may forage within the study area, which contains saltbush and abundant introduced melons.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Malleefowl *Leipoa ocellata*	V, Mi	E	**Unlikely** - The species prefers Mallee areas, although it is found in Bimble Box and White Cypress Pine. The species prefers sandy to sandy loam soils and habitats with a dense but discontinuous canopy, dense and variable shrub and herb layers. The predominately disturbed agricultural study area is unlikely to provide preferred habitat for the species due to a lack Mallee, Bimble Box and White Cypress Pine communities. This species may pass over the study area however the proposed activity would not impact this species or any potential habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Osprey *Pandion haliaetus*	M, Mi	V	**Unlikely** - Favour coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. A single record for the species exists within 10km of the study area. The study area is unlikely to provide preferred habitat for the species due to a lack of permanent water bodies.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Painted Honeyeater *Grantiella picta*	-	V	**Likely** - Inhabits Boree, Brigalow and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Also eats saltbush fruit, berries, seed and flowers. Migratory species. Recorded from many locations in the Griffith area. The species may utilise Boree patches within the study area. Saltbush may also provide foraging habitat within the study area.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species as no mature Boree would be removed.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Pied Honeyeater *Certhionyx variegatus*	-	V	**Likely** – Widespread but nomadic and irregularly seen. Inhabits wattle shrub (primarily Mulga*, Acacia aneura*), mallee, spinifex and eucalypt woodlands, usually when shrubs are flowering; feeds on nectar, predominantly from various species of emu-bushes (*Eremophila* spp.); also from mistletoes and various other shrubs (e.g. *Brachysema* spp. and *Grevillea* spp.); also eats saltbush fruit, berries, seed, flowers and insects. Highly nomadic, following the erratic flowering of shrubs. The species has been recorded within 5km of the study area. The species may utilise the Acacia and saltbush within the study area for opportunistic foraging, but is unlikely to provide preferred habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
Plains-wanderer *Pedionomus torquatus*	V	E	**Unlikely** – The species occurs in semi-arid, lowland native grasslands that typically occur on hard red-brown soils. These grasslands support a high diversity of plant species, including a number of state and nationally threatened species. Preferred habitat typically has 50% bare ground, 10% fallen litter, and the remaining 40% comprises herbs, forbs and grasses. A single recording of the species exists within the Griffith LGA. The study area consists of modified agricultural areas that are unlikely to provide suitable habitat for the species.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Rainbow Bee-eater *Merops ornatus*	M, Mi	-	**Unlikely** - The Rainbow Bee-eater occurs mainly in open forests and woodlands, shrublands, and in various cleared or semi-cleared habitats, including farmland and areas of human habitation. The species may utilise irrigation channels for potential nest sites in disturbed areas, although unlikely. This species may pass over the study area however the proposed activity would not impact this species or any potential habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Speckled Warbler *Pyrrholaemus saggitatus*	-	V	**Unlikely** - The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. Large, relatively undisturbed remnants are required for the species to persist in an area. The species has been recorded within 10km of the study area. The study area is dominated by cleared agricultural land with very few undisturbed remnants existing. The species is unlikely to persist in the study area.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Spotted Harrier *Circus assimilis*	-	V	**Likely -** Occurs in grassy open woodland including acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe (e.g. chenopods) (Marchant and Higgins 1993; Aumann 2001a). It is found mostly commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. The species has been recorded within 10km of the study area. The species may be a visitor to the study area for opportunistic foraging in agricultural land, although is unlikely to be reliant on habitat available in the study area.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species
Superb Parrot *Polytelis swainsonii*	V	V	**Unlikely** - The species inhabits Box-Gum, Box-Cypress-pine and Boree Woodlands and River Red Gum Forest. In the Riverina the birds nest in the hollows of large trees (dead or alive) mainly in tall riparian River Red Gum Forest or Woodland. On the South West Slopes nest trees can be in open Box-Gum Woodland or isolated paddock trees. Species known to be used are Blakely's Red Gum, Yellow Box, Apple Box and Red Box. May forage up to 10 km from nesting sites, primarily in grassy box woodland. The species has been recorded within 10km of study area. No potential nesting or foraging habitat exists within the study area for the species. The species may utilise the area as a fly-way.	**Unlikely** - habitat for the species is not likely to occur in the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Turquoise Parrot *Neophema pulchella*	-	V	**Unlikely** - Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges and creeks in farmland. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants, or browsing on vegetable matter. The species has been recorded approximately 20km from the study area. The study area does not contain eucalypt woodland preferred by the species.	**Unlikely** - habitat for the species is not likely to occur in the study area.
Varied Sittella *Daphoenositta chrysoptera*	-	V	**Unlikely** - Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. The species has been recorded approximately 15km from the study area. The predominately cleared agricultural study area is unlikely to provide preferred habitat for the species.	**Unlikely** - habitat for the species is not likely to occur in the study area.
White-bellied Sea-Eagle *Haliaeetus leucogaster*	M, Mi	-	**Unlikely** - Characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Birds have been recorded in (or flying over) a variety of terrestrial habitats. The subject site does not contain large areas of open water required by the species. This species may pass over the study area however the proposed activity would not impact this species or any potential habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species
White-browed Treecreeper population in the Carrathool LGA south of the Lachlan River and Griffith LGA *Climacteris affinis*	-	E	**Unlikely** - Occurs in a range of semi-arid and arid tall shrublands and woodlands across the southern half of Australia. In NSW, the species occupies a variety of habitats including Mulga, Brigalow, Gidgee, Belah, Buloke and White Cypress. The species may also occur in habitats adjacent to those detailed above, including Coolibah, River Red Gum and Black Box. The population has been recorded approximately 25km from the study area. The study area is unlikely to provide preferred habitat for the population due to the lack of preferred tree species and the fragmented nature of the woodland.	**Unlikely** - habitat for the population is not likely to occur in the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
White-fronted Chat *Epthianura albifrons*	-	V	**Likely** - The White-fronted Chat lives in salt marsh and other damp areas with low vegetation such as swampy farmland and roadside verges. Sometimes occurs on beaches and the edges of lakes. The species has been recorded within 5km of the study area. The species may utilise roadside verges with adjacent damp irrigation channels within the study area.	**Unlikely** - the activities proposed would be unlikely to have an impact on habitat for the species.
White-throated Needletail *Hirundapus caudacutus*	M, Mi	-	**Unlikely** - This is a highly nomadic and dispersive species, which follows low pressure atmospheric pockets where it feeds on insects. The species is generally found in eastern New South Wales and occasionally in inland NSW. There is no preferred habitat for this species in the study area. This species may pass over the study area however the proposed activity would not impact this species or any potential habitat.	**Unlikely** - the activities proposed would be unlikely to have an impact on suitable habitat for the species.
FROGS				
Growling Grass Frog, Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog *Litoria raniformis*	V	E	**Unlikely** - This species is found mostly amongst emergent vegetation, including *Typha* spp. (bullrush), *Phragmites* spp. (reeds) and *Eleocharis* spp. (sedges), in or at the edges of still or slow-flowing water bodies such as lagoons, swamps, lakes, ponds and farm dams. The species has been recorded approximately 20km from the study area. The study area is unlikely to provide habitat for the species due to a lack of emergent vegetation.	**Unlikely** – habitat for the species is not likely to occur in the study area.
MAMMALS				
Greater Long-eared Bat *Nyctophilus timoriensis (South-eastern form)*	V	V	**Unlikely** - Inhabits a variety of vegetation types, including mallee, bulloke *Allocasuarina leuhmanni* and box eucalypt dominated communities, but it is distinctly more common in box/ironbark/cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of NSW and southern Queensland. Roosts in tree hollows, crevices, and under loose bark. The study area does not provide potential roost sites or preferred foraging habitat.	**Unlikely** - there are no suitable roost sites in the study area and the proposed activity would not impact foraging habitat for this species.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Inland Forest Bat *Vespadelus baverstocki*	-	V	**Unlikely** - Roosts in tree hollows and abandoned buildings. It has been recorded from a variety of woodland formations, including mallee, mulga and River Red Gum. The study area does not provide potential roost sites or preferred foraging habitat.	**Unlikely** – there are no suitable roost sites in the study area and the proposed activity would not impact foraging habitat for this species.
Little Pied Bat *Chalinolobus picatus*	-	V	**Unlikely** - Occurs in dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress-pine forest, mallee, Bimbil box. Roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings. The study area does not provide potential roost sites or preferred foraging habitat.	**Unlikely -** there are no suitable roost sites in the study area and the proposed activity would not impact foraging habitat for this species.
Southern Myotis *Myotis macropus*	-	V	**Unlikely** - Preferred habitat is riparian. Roosts in caves, mines, tree hollows, aqueduct tunnels and under bridges and in dense vegetation in the vicinity of bodies of slow-flowing or still water (including estuaries). The study area does not provide potential roost sites or preferred foraging habitat.	**Unlikely** there are no suitable roost sites in the study area and the proposed activity would not impact foraging habitat for this species.
FISH				
Murray Cod, Cod, Goodoo *Maccullochella peelii peelii*	V	V	**Unlikely** – no habitat exists for this species in the study area	**Unlikely** – habitat for the species is not likely to occur in the study area.
Macquarie Perch *Macquaria australasica*	E	E	**Unlikely** – no habitat exists for this species in the study area	**Unlikely** – habitat for the species is not likely to occur in the study area.
PLANTS				
Mossgiel Daisy *Brachyscome papillosa*	V	V	**Unlikely** - The species is recorded primarily in clay soils on Bladder Saltbush (*Atriplex vesicaria*) and *Maireana aphylla* plains, but also in grassland and in Grey Box (*Eucalyptus microcarpa*) - Cypress Pine (*Callitris* spp.) woodland. There are no records for this species in the Griffith LGA. The study area does not contain suitable habitat for the species.	**Unlikely** – habitat for the species is not likely to occur in the study area.

Species / Communities	Status		Likelihood of occurrence in study area	Possibility of impact
	National	NSW		
Austrostipa metatoris	V	-	**Unlikely** - The species grows in sandy areas of the Murray Valley; habitats include sandhills, sandridges, undulating plains and flat open mallee country, with red to red-brown clay-loam to sandy-loam soils. There are no records for this species in the Griffith LGA. The study area does not contain suitable habitat for the species.	**Unlikely** – habitat for the species is not likely to occur in the study area.
Slender Darling-pea *Swainsona murrayana*	V	V	**Unlikely** - The species has been collected from clay-based soils, ranging from grey, red and brown cracking clays to red-brown earths and loams. Grows in a variety of vegetation types including bladder saltbush, Black Box and grassland communities on level plains, floodplains and depressions and is often found with Maireana species. There are no records for this species in the Griffith LGA. The study area does not contain suitable habitat for the species.	**Unlikely** – habitat for the species is not likely to occur in the study area.

Appendix D

EP&A Act Part 3A Assessments of Impact

Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions – *Endangered Ecological Community*

Criteria	Assessment
i) How is the project likely to affect the lifecycle of a threatened species and/or population?	
a) displaces or disturbs threatened species and/or populations;	Not relevant to this endangered ecological community.
b) disrupts breeding cycle;	Not relevant to this endangered ecological community.
c) disturbs the dormancy period;	Not relevant to this endangered ecological community.
d) disrupts roosting behaviour;	Not relevant to this endangered ecological community.
e) changes foraging behaviour;	Not relevant to this endangered ecological community.
f) disrupts pollination cycle; g) disturbs seedbanks; or h) disrupts recruitment (i.e. germination and establishment of plants);	Not relevant to this endangered ecological community.
i) affects the interaction between threatened species and other species in the community (eg. Pollinators, host species, microrrhizal associations).	Not relevant to this endangered ecological community.
j) affects migration and dispersal ability;	Not relevant to this endangered ecological community.
ii) How is the project likely to affect the habitat of a threatened species, population or ecological community?	
a) disturbs any permanent, semi permanent or ephemeral water bodies;	The proposal would be unlikely to disturb any permanent, semi permanent or ephemeral water bodies.

Criteria	Assessment
b) degrades soil quality;	The proposal would disturb the soil where the pipeline is constructed through excavation of the trench and compaction of the soil adjacent to the pipeline by machinery. The construction of the pipeline would require a 450 mm – 600 mm wide excavation for the laying of the 100 mm pipe, and an associated six metre easement for the operation of machinery. As much as possible, the pipeline would be laid within existing table drains adjacent to roadways. In the vicinity of the Myall Woodland the proposal would remove soil for the trench from the roadside drain, which has already been disturbed. Compaction of the soil within the ecological community by machinery may occur where it is necessary to operate machinery on the northern side of the drain; however this is expected to be minimal due to the bulk of the work being conducted from the road on the southern side of the drain. Soil disturbance and vegetation removal may cause soil erosion during the proposed construction activities. This would have the potential to contribute to sedimentation of the drainage lines in the study area. As the majority of the proposed activity would take place within existing table drains and flat vineyard areas, soil impacts are likely to be minimal.
c) clears or modifies native vegetation;	The proposed activity would remove a small number of juvenile (<50cm in height) Boree trees which comprise part of the ecological community. These juvenile trees exist within the table drain of the subject site, and would most likely be otherwise removed at a later stage by periodic road maintenance not related to the proposal. There is the potential for mature Boree trees to be disturbed through the lopping of branches overhanging the subject site and root damage during the excavation of the proposed pipeline trench. Boree has a moderate tolerance to root disturbance, and there is evidence that the species can recover from root damage, and will coppice and produce suckers from damaged roots (DPI 2000 & YRSC 2010). Mitigation measures have been prescribed in Section 6 of this document to ensure that the viability of the ecological community is not compromised by the proposed activity. Provided these mitigation measures are implemented, the proposed activity would not clear or modify a significant amount of native vegetation.
d) introduces weeds, vermin or feral species or provides conditions for them to increase and/or spread;	Six weed species listed as noxious for the Griffith City Council, were identified in the study area. The movement of traffic across the site and soil disturbance associated with construction have the potential to facilitate the spread of weeds throughout the study area. The use of heavy machinery on site and an increase of traffic may also facilitate the introduction of weeds to the site. Mitigation measures relating to weed control listed in Section 6 of this document would be implemented to prevent the spread of weeds.
e) removes or disturbs key habitat features such as trees with hollows, caves and rock crevices, foraging habitat;	The proposal would be unlikely to remove or disturb key habitat features.
f) affects natural revegetation and recolonisation of existing species following disturbance.	The proposal would be likely to affect the natural revegetation and recolonisation of existing species within the roadside drain through removal of vegetation and soil disturbance; however it would be unlikely to affect that ability of the ecological community to revegetate and recolonise the road reserve.

Criteria	Assessment
iii) Does the project affect any threatened species or populations that are at the limit of its known distribution?	The proposal does not affect any threatened species or populations that are at the limit of its known distribution.
iv) How is the project likely to affect current disturbance regimes?	
a) modifies the intensity and frequency of fires;	The proposal would not modify the intensity and frequency of fires.
b) modifies flooding flows;	The proposal would be likely to facilitate flows of water through the roadside drain by removing vegetation, but would not modify flooding flows.
v) How is the project likely to affect habitat connectivity?	
a) creates a barrier to fauna movement;	The removal of juvenile trees from the roadside drain and construction of the pipeline would not create a barrier to fauna movement.
b) removes remnant vegetation or wildlife corridors; and	The ecological community in the study area is isolated within the locality and surrounded by cleared agricultural land. NSW NPWS (2003) (cited in DECCW 2008) estimated that 94 percent of Myall Woodland had been cleared within the Riverina. The community is likely to provide a wildlife corridor and refuge for small birds within the highly disturbed landscape. Up to 10 juvenile Boree trees would be removed from the subject site, however they exist within the table drain and would most likely be otherwise removed by routine road maintenance unrelated to the proposed activity. The proposal would not remove a significant amount of remnant vegetation or wildlife corridor.
c) modifies remnant vegetation or wildlife corridors.	There is the potential for mature Boree trees to be disturbed through the lopping of branches overhanging the subject site and root damage during the excavation of the proposed pipeline trench. Boree has a moderate tolerance to root disturbance, and there is evidence that the species can recover from root damage, and will coppice and produce suckers from damaged roots (DPI 2000 & YRSC 2010). The proposal would be unlikely to significantly modify the remnant vegetation and wildlife corridor.
vi) How is the project likely to affect critical habitat?	The proposal would not affect any listed critical habitat.
Conclusion	The proposed development would be unlikely to have a significant impact on the endangered ecological community *Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South western Slopes bioregions*.

Appendix E

Commonwealth EPBC Act - Matters of National Environmental Significance

***Environment Protection and Biodiversity Conservation Act 1999* Significant Impact Guidelines – Matters of National Environmental Significance**

1) Are there any matters of national environmental significance located in the area of the proposed action?

No.

2) Considering the proposed action at its broadest scope, is there potential for impacts on matters of national environmental significance?

It is unlikely that the proposed action would have an impact on any matters of national environmental significance (NES).

3) Are there any proposed measures to avoid or reduce impacts on matters of national environmental significance?

As it is unlikely that the proposed action would have an impact on any matters of national environmental significance this is not applicable.

4) Are any impacts of the proposed action on matters of national environmental significance likely to be significant impacts?

As it is unlikely that the proposed action would have an impact on any matters of national environmental significance this is not applicable.

Conclusion

No matters of NES were identified within the area of the proposed action, and therefore it is concluded that the proposed development is unlikely to cause a significant impact to any matter of NES.

Appendix F

Database search results

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