



ENVIRONMENTAL MANAGEMENT PLAN – WATERWAY CROSSINGS- CATEGORY B DOCUMENT NO. SPA-EMP-WC-ENV- 0001-REV 2

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ABBREVIATIONS AND KEY TERMS

Acronym	Full Title
AC	Advisory Committee
ALT	Alliance Leadership Team
AMT	Alliance Management Team
APM	Alliance Project Manager
ARG	Agency Reference Group
CHMP	Cultural Heritage Management Plan
CFA	Country Fire Authority
CMA	Catchment Management Authority
DEWHA	Department of Environment, Water, Heritage and the Arts (Commonwealth)
DPCD	Department of Planning and Community Development
DPI	Department of Primary Industries
DSE	Department of Sustainability and Environment
EEO Act	Energy Efficiency Opportunities Act 2006 (Commonwealth)
EES	Environment Effects Statement
EMF	Environmental Management Framework
EMP	Environmental Management Plan
EMS	Environmental Management Strategy
EP	Environmental Program
EPA	Environment Protection Authority
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)
FFG Act	Flora and Fauna Guarantee Act 1988 (State)
GBCMA	Goulburn Broken Catchment Management Authority
GHD	GHD Pty Ltd
HV	High Voltage
JHG	John Holland Pty Ltd
KP	Kilometre Point- measure used to specify location along pipeline starting from Goulburn River

MSCL	Mild Steel Concrete Lined
MWC	Melbourne Water Corporation
OMP	Offset Management Plan
OMS	Offset Management Strategy
NES	National Environmental Significance (Matters of)
PAA	Project Alliance Agreement
PEC	Plan of Environmental Controls
PIA	Project Impact Assessment
ROW	Construction Right of Way
RAP	Registered Aboriginal Party
SEP	Site Environmental Plan
SEPP	State Environment Protection Policy
SEPP (WoV)	State Environment Protection Policy (Waters of Victoria)
SKM	Sinclair Knight Merz Pty Ltd
SPA	Sugarloaf Pipeline Alliance
SPP	Sugarloaf Pipeline Project
TMP	Traffic Management Plan
TOC	Targeted Out-turn Cost
VHCS	Very High Conservation Significance
WAP	Work Activity Pack

Key Terms	
Alliance	The Sugarloaf Pipeline Alliance
Construction ROW	This refers to the approved corridor that is required for the construction of the pipeline. It is anticipated that this will be up to 20-50m, depending on the steepness of the slopes within the ROW. The Construction ROW does not include sites that are related to features other than the pipeline installation (e.g. pump stations, sub-stations, inlets).
Construction Sites	Refers to the parts of the construction footprint outside of the construction ROW (e.g., pump stations, sub-stations, inlets, site compounds)
Construction Area	This refers to the collective area of works. This may include the Construction ROW, Construction Sites, tracks to gain safe access to the Construction ROW or Sites as well as additional work requirements (eg telecommunication service connections to sites) This term will be used to describe whole of project works and each EMP section when titled appropriately e.g. Construction Area – Waterway Crossings
Site Environment Officer	A person with environmental qualifications and training, engaged by the Alliance, who will be associated with each of the Construction Teams to oversee compliance with the EMS and EMP documents.

1 INTRODUCTION

1.1 Purpose

The purpose of this Environmental Management Plan – Waterway Crossings – Category B (EMP) is to describe the means by which the Sugarloaf Pipeline Alliance (SPA) will manage and control the works associated with the construction activities of the Sugarloaf Pipeline Project (SPP) at each of the waterway crossings and associated floodplain (where applicable) classified as Category B. This is to ensure that appropriate environmental protection and impact minimisation techniques are implemented before, during and after construction.

There are a series of EMPs prepared for the purposes of addressing environmental issues during construction of the SPP. Several of these are for a specified section of the pipeline as shown in **Appendix A**, whilst others are for specific sites so as to ensure the comprehensive yet necessary management of these sites to minimise impacts on all aspects of the environment. These are, but not limited to, the following:

- The Goulburn River Pumping Station;
- Waterway Crossings (Category B);
- Waterway Crossings (Category A);
- Tunnel Portals in Toolangi State Forest

The EMP reflects MWC obligations to achieve the Environmental Statement of Commitments identified in the Environmental Management Framework (EMF). The EMP also seeks to consistently comply with other requirements within the EMF and achieve the required objectives and targets (refer to Section 9 of the EMF) set for the design, pre-construction, construction and post-construction phases of the SPP.

MWC has overall responsibility for delivery of the project and has contracted with the SPA members to design and construct the project. The day to day responsibility for implementation of the EMF and therefore the EMP is the duty of the SPA, however Melbourne Water is nevertheless accountable for overall compliance with the conditions for approval under the Planning and Environment Act 1987 and other statutory requirements.

1.2 Background and Scope

The waterways along the Sugarloaf Pipeline Project (SPP) have been categorised into four categories (A, B, C and D) as described in Table 1. These waterways were classified in collaboration with GBCMA and Melbourne Water, based on their nature and significance.

The Waterways covered in this EMP only include the category B designated waterways located along the SPP from the Sugarloaf Reservoir to the Goulburn River Pump Station site in Killingworth. (Refer to Section 3 of this document for more details)

Table 1: Waterway categories

Category	Criteria
A	Permanent, high value waterways (Yea River, Kalatha Creek), requiring special crossing techniques.
B	Permanent and ephemeral waterways with channel geometries too complex to be constructed by standard pipeline crews.
C	Ephemeral, channelled waterways, without deeply incised channels, steep banks, active erosion, significant potential for high flows or exceptional riparian vegetation quality.
D	Ephemeral, unchannelled watercourses / drainage lines.

The Waterway Crossings (Category B) EMP covers impacts associated with the construction activities of the Sugarloaf Pipeline Project at 14No.designated waterways and any associated floodplain (where they exist) as shown in Table 2.

Table 2: Waterways included in this Waterway Crossings (Category B) - EMP

Waterway Name (Designated ID)	Waterway Crossing No (WX No)	Property No	Responsible Catchment Management Authority
Ewing Creek (1-112-14)	25	330	Goulburn Broken CMA
Caraman Creek (1-112-11)	43	59	Goulburn Broken CMA
Unnamed tributary of Yea River (1-112-41)	120	64	Goulburn Broken CMA
Unnamed tributary of Yea River (1-112-42)	51	66, 68	Goulburn Broken CMA
Unnamed tributary of Yea River (1-112-52-1)	56	78, 79.1	Goulburn Broken CMA
Unnamed tributary of Yea River (1-112-52)	57	79, 79.1	Goulburn Broken CMA

Waterway Name (Designated ID)	Waterway Crossing No (WX No)	Property No	Responsible Catchment Management Authority
Katy Creek (1-112-57)	61	385	Goulburn Broken CMA
Unnamed tributary of Dixons Creek (1-49-2-1-5-1)	87	129	Melbourne Water
Unnamed tributary of Dixons Creek	88	129	Melbourne Water
Dixons Creek (1-49-2-1-5)	112	423	Melbourne Water
Dixons Creek (1-49-2-1)	97	624	Melbourne Water
Unnamed tributary of Dixons Creek	98	624	Melbourne Water
Dixons Creek (1-49-2-1)	99	625	Melbourne Water
Steels Creek (1-49)	101	1079	Melbourne Water

The Figures attached in **Appendix B** shows the extent of the construction area within this EMP, where works relating to the pipeline construction will occur. Appendix A shows the locations of these waterways relative to the overall alignment of the SPP. The Goulburn Broken CMA and Melbourne Water are the responsible catchment management authorities who will provide approval/permits for undertaking any works within the designated waterways north and south of the divide respectively along the project.

This EMP also includes ancillary construction activities including site access tracks, material stockpile areas, works associated with reinstatement and grading of embankments from an approximate 1:3 slope to match into existing conditions and rock beaching for scour protection as well as traffic management work areas.

This EMP describes the general construction methods of laying the pipeline through the waterways, erosion control measures and rehabilitation of the waterway, as well as the processes through which construction activities will be monitored and its performance evaluated.

Construction activities in this section include, but are not limited to:

- Erosion protection and dewatering measures within the waterway;
- Site preparation (i.e. clear and grade);
- Traffic access to the construction area;
- Pipeline Construction; and
- Reinstatement and rehabilitation of the waterway.

This EMP also includes supporting Environmental Programs (EPs) which address the environmental issues as outlined in the appendices of the EMS. Further information on the Environmental Programs (EPs) applicable to the waterway crossings section is summarised in Section 4 of this document.

Works outside the “Waterways Crossings” section will be covered in separate EMPs as shown in **Appendix A**. More detail on the key issues can be found within Section 4 – Environmental Programs.

1.3 Key Issues

The key issues, both potential and perceived impacts of the Waterways Crossings (Category B) section of the SPP, have been considered in this report. These are summarised as follows:

- **Flora and Fauna** – The clearing of habitat areas in areas classified as Woodland, Forests and Scattered Trees, grasslands and/or waterbodies may impact on fauna and flora species of significance. Ewing Creek crossing, in particular the grasslands above the banks of the waterway are classed as **known** Golden Sun Moth grassland habitat.

Habitat identified as known for the Murray Spiny Cray at Katys Creek, and potential impacts on a range of other threatened fauna such as Macquarie Perch and Ancient Greenling within the Yea River catchment, threatened frogs and waterbirds within all waterways.

To minimise the loss of flora and fauna values, the construction ROW has been minimised to a width of 20m (where possible) within the waterways and realigned where possible. Examples of realignment of the construction ROW include crossing WX112 to avoid clearance of native vegetation.

The Vegetation Management Program and Fauna Management Program of this EMP were developed for the Waterway Crossings Construction ROW to address these issues.

- **Sediment & Erosion** – Construction of the pipeline will involve the disturbance, clearance and excavation of the construction ROW with access tracks and stockpile areas. Clearing of vegetation on hill slopes, watercourse bed and banks potentially increases the risk of erosion and subsequent deposition of soil into the waterways during rainfall events. The potential risk associated with high intensity rainfall events disturbing stockpiles of topsoil, spoil and pipe trench backfill material, which results in the transportation of material into the waterways are addressed in the Sediment and Erosion MP.
- **Waterways** – The impact associated with disturbance to the channel bed and embankments during construction activities within the waterway leading to the likelihood of erosion during successive high flows. Banks in natural watercourses in the project area are usually covered by vegetation which provides protection against erosion during high flows. Disturbance and removal of the vegetation increases the likelihood of bank erosion during high flows. Changes to water quality resulting from construction activities may also impact on aquatic ecology arising from bed and bank disturbance and removal of riparian vegetation.
- **Reinstatement** – The reinstatement of cleared areas post construction is critical to rehabilitating native vegetation and fauna habitats (including any EPBC Act 1999 or FFG Act 1988 listed species habitat). Reinstatement plans have been developed for the applicable EVC’s for the waterways within the construction ROW and are addressed in the Reinstatement Management Program of this EMP.
- **Social** – There are both perceived and real impacts on amenity and scenic views associated with construction works over the waterways in this section of the project. This is mainly a concern during construction and until the reinstatement of vegetation is completed. A landscape and visual risk associated with the removal of trees and vegetation along the waterways in close proximity to the road reserve.

1.4 How to use this Environmental Management Plan

This EMP describes the construction techniques and environmental management control measures that will be implemented to construct the category B waterway crossings of the SPP. All Alliance personnel (including direct and indirect sub-contractors) will use these techniques and control measures as outlined in this document, the associated EPs, as well as other internal working documents/procedures in order to minimise impacts on the environment. This EMP will ensure that appropriate environmental protection and impact minimisation techniques are implemented before, during and after construction. In the absence of these, there will be offset arrangements. The EMP has been prepared in a manner such that information on environmental requirements can be relayed to all levels of personnel in a relevant, accessible and understandable manner.

2 INTERFACE WITH OTHER ENVIRONMENTAL DOCUMENTS

The structure of the SPP's environmental management documentation is shown in Figure 1 below. The EMS provides the overarching direction for the environmental management for this project. EMPs, such as this Waterway Crossings - Category B EMP shall be prepared for "sections" of work with similar environmental and cultural heritage issues and therefore management measures.

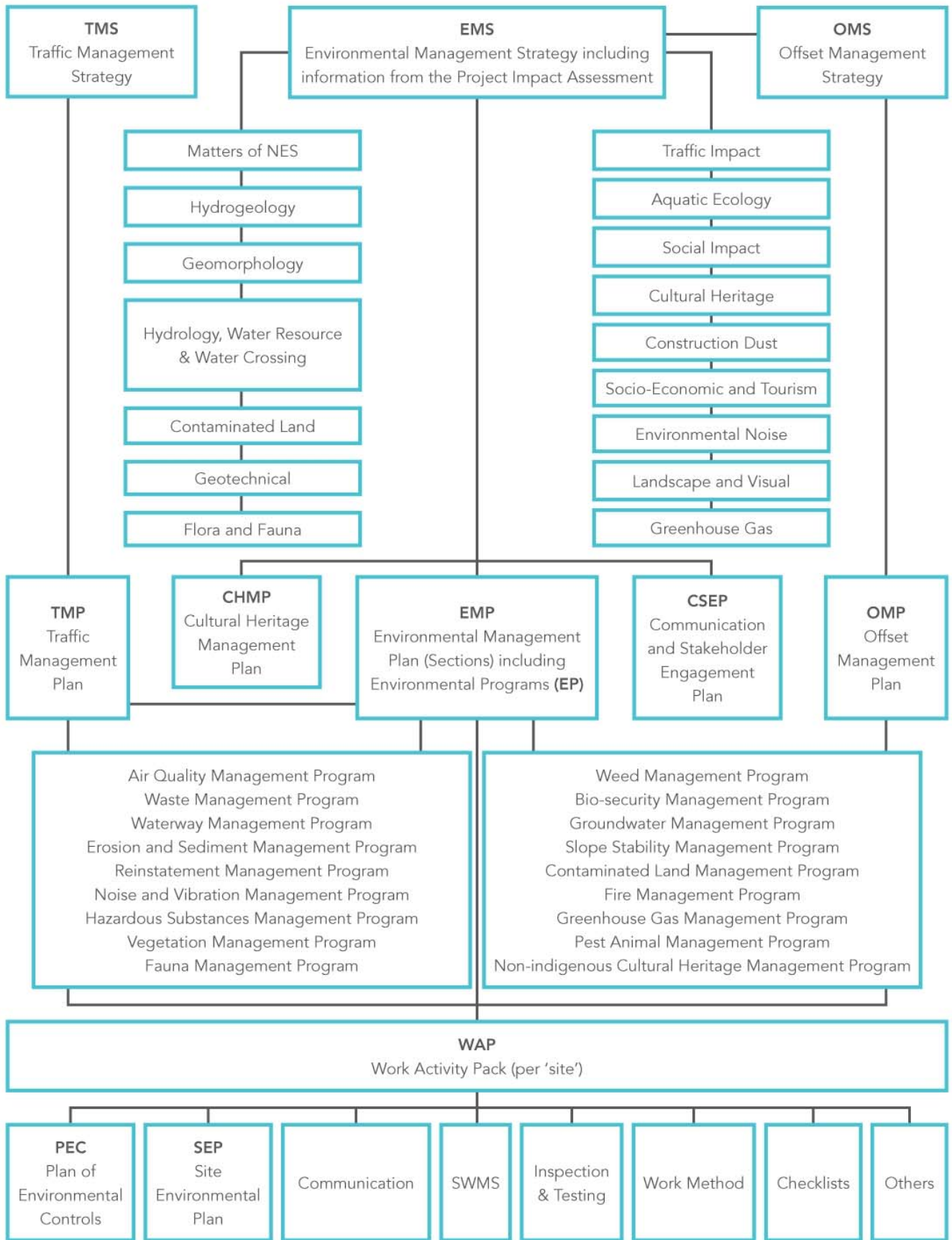
The information in the EMP will be used to develop Site Environmental Plans (SEPs) and Plan of Environmental Controls (PECs) which will be included in the Work Activity Packs (WAPs). The WAPs will be prepared to provide site-specific directions and procedures, used by the construction crews, for each 'site'.

There are a suite of documents prepared for each EMP. These include 18 EPs, as well as this document. Together these documents provide more specific details about the range of mitigation and management measures that will be undertaken for the various construction scenarios. The EMPs are staged based on 'sections' of work. These sections may include a length of the pipeline or a specific site (e.g. the high lift pump station or a river crossing) and have been determined by the environmental and cultural heritage values in conjunction with the construction plans.

It should be noted that this document must be read in conjunction with all the Environmental Programs for the EMP as outlined in Section 4.

All supporting documents which may be attached to the EPs (e.g. forms and checklists) may be subject to change to reflect the Alliance's adaptive management approach.

Figure 1: Environmental Management Documentation Structure



3 DESCRIPTION OF THE CATEGORY B WATERWAY CROSSINGS

3.1 Section Characteristics

The Waterway Crossings – Category B EMP considers all works undertaken at the 14 No. designated category B waterways that intersect the Sugarloaf pipeline alignment as shown in Table 2. The extent of works considered under this EMP is shown in the Figures attached in Appendix B and are applicable for the works undertaken to construct the pipe at the waterway crossings only. All works associated with the construction of the pipeline outside these boundaries are covered in other EMPs relevant to the zone of works.

The waterways covered in this EMP are considered to have a higher environmental value than other waterways that intersect the pipeline route due to characteristics such as condition of riparian vegetation, extent of surrounding vegetation corridor, water quality, and complex channel geometry. It is therefore necessary to develop more detailed crossing options for each of these waterways to minimise the level of disturbance from construction works, in contrast to the standard techniques used for the remaining waterways along the pipeline route.

The waterways crossings (Category B) identified in this EMP have all been impacted significantly by agricultural activities. The overall environmental condition of the waterways resulting from human activity has led to increased erosion and degradation resulting from the clearing of vegetation and development of agriculture in the region.

Significant changes have occurred around most of the creeks covered, as the land around them has been modified for agricultural use. Uncontrolled access by domestic stock to riparian land has led to loss of riparian vegetation, excessive run-off, bank erosion, decline in important wildlife habitat, reduced water quality and damage to in-stream ecosystems. The result is usually over grazing that erodes bank soils allowing weed invasions, and develops stock tracks that erode during heavy rain and result in increased sediment and nutrients being washed into the watercourse.

Many of the waterways are lacking in riparian vegetation, or at best have fragmented cover, which increases the susceptibility of the bed and banks to erosion.

A scattered vegetation corridor exists along most of the waterways consisting of a combination of native and non-native species. Some crossings have established trees located on the banks; however the majority of these species are generally non-native or have been planted with the intention of minimising channel erosion in the past (e.g Willows).

A number of noxious weed species have been recorded within the various waterways, at least five (5) are regionally controlled with blackberry and willows being categorised as weeds of national significance (WONS).

A number of known and possible habitats listed either as Critically Endangered under the Environment Protection of Biodiversity and Conservation (EPBC) Act 1999 (EPBC) or listed as Threatened under the Flora and Fauna Guarantee (FFG) Act 1988 (Victoria) have been identified within this EMP, these include:

- Golden Sun Moth has been recorded from the grassy banks above Ewing’s Creek within the boundaries of the EMP. Therefore these grassy areas at this waterway crossing is considered to be **known** GSM grassland habitat; (Further studies have been carried out to determine the extent of the GSM population. Management and mitigation measures for the Golden Sun Moth (GSM) are being developed in consultation with DSE.)
- **Possible** and **unlikely** Woodland, Forests and Scattered-Tree (WFST) habitat;
- With one exception, all of the waterway crossings are considered to be **possible** water body habitat because there is moderate to high chance of threatened species using these habitats either at the crossing point, or in immediately downstream or upstream areas that could directly affected by the proposed works (e.g., Macquarie Perch, threatened frogs and waterbirds).
- Katy’s Creek at the location of the pipeline is **known** to support the FFG-listed Murray Spiny Crayfish;
- **Possible** Striped Legless Lizard grassland habitat;

No non-indigenous cultural heritage sites have been indentified within the areas considered is this EMP.

Some of the key characteristics, environmental values and risks associated with the waterway crossings are summarised in Table 3. Photos for all the waterways can be found in the Waterways Management Program (SPA-EPR-WC-ENV-0017).

This EMP will be used to assist in the development of a Site Environmental Plan (SEP) and Plan of Environmental Control (PEC), which will describe the site specific environmental actions and controls to be undertaken by site personnel.

Table 3: Environmental Characteristics of Waterways

Waterway Crossing Name	Waterway Crossing No.	Existing Waterway Characteristics	Key Issues identified during investigations
Ewing Creek (1-112-14)	25	<ul style="list-style-type: none"> • Bed and Banks are actively eroding with active headcuts downstream of the Melba Highway. • Ephemeral watercourse. • No overstorey vegetation, riparian area has grass cover in some areas, weed species found in watercourse. • Fragmented vegetation scattered along watercourse. • No existing fences in place to restrict cattle grazing/movement to and within watercourse. 	<ul style="list-style-type: none"> • Grassy areas above the banks of Ewing Creek has the potential to support the EPBC Act 1999 and FFG Act 1988 listed Striped Legless Lizard • Known to support a population of the EPBC Act 1999 and FFG Act 1988 listed Golden Sun Mot • Noxious weeds and weeds of national significance present at the site, these include : Annual Veldt Grass, Blackberry, Spear Thistle, Squirrel-tail Fescue, Sweet Vernal Grass
Caraman Creek (1-112-11)	43	<ul style="list-style-type: none"> • Ephemeral watercourse. • Riparian zone is currently fenced off to prevent stock access. • Some bed erosion has occurred in Caraman Creek since the construction of the culvert under the Melba Highway. 	<ul style="list-style-type: none"> • Noxious weeds and weeds of national significance present at the site, these include : Annual Veldt Grass, Prairie Grass, Spear Thistle, Sweet Vernal Grass, Toowoomba Canary Grass, Willow
Unnamed tributary of Yea River (1-112-41)	120	<ul style="list-style-type: none"> • Deep incised channel with ephemeral flows. • Fragmented vegetation and partly undercut banks. • Ongoing bank and bed erosion. • Area classified as potentially containing EVC Class 47 – Valley Grassy Forest 	<ul style="list-style-type: none"> • Steep gradient likely to increase the risk of active headcuts developing due to bed disturbance. • Risk of turbid runoff reaching the Yea River during a rain event.
Unnamed tributary of Yea River (1-112-42)	51	<ul style="list-style-type: none"> • Deep incised channel with fragmented vegetation and partly undercut banks. 	<ul style="list-style-type: none"> • Noxious weeds and weeds of national significance present at the site, these include : Blackberry, Cleavers,

Waterway Crossing Name	Waterway Crossing No.	Existing Waterway Characteristics	Key Issues identified during investigations
		<ul style="list-style-type: none"> • Ephemeral watercourse. • Tributary has steep valley side slopes comprising of highly dispersive soils and instances of tunnel erosion are present on the slopes. 	<p>Prairie Grass, Spear Thistle Squirrel-tail Fescue, Sweet Vernal Grass, Toowoomba Canary Grass, White Clover</p>
Unnamed tributary of Yea River (1-112-52-1)	56	<ul style="list-style-type: none"> • There is past significant incision by the gully in this confined valley but the bed and banks are now stable with good vegetation cover. • Steep banks present. • Ephemeral watercourse, narrow riparian corridor. 	<ul style="list-style-type: none"> • Noxious weeds and weeds of national significance present at the site, these include : Sweet Vernal Grass, Prairie Grass, Spear Thistle, Cleavers, Toowoomba Canary Grass, Blackberry, White Clover, Squirrel-tail Fescue
Unnamed tributary of Yea River (1-112-52)	57	<ul style="list-style-type: none"> • Ephemeral watercourse with little riparian cover. • Farm dam is situated 90m upstream in the waterway. 	<ul style="list-style-type: none"> • Noxious weeds and weeds of national significance present at the site, these include : Sweet Vernal Grass, Prairie Grass, Spear Thistle, Cleavers, Toowoomba Canary Grass, Blackberry, White Clover, Squirrel-tail Fescue
Katy Creek (1-112-57)	61	<ul style="list-style-type: none"> • The crossing of Katy Creek has a permanent flow regime, base flows potentially fed with groundwater. • Stable meandering channel with narrow and fragmented riparian vegetation cover. • Riparian vegetation confined to a narrow strip. • Katy Creek is currently not fenced and as such the banks continue to erode due to stock damage and lack of vegetation 	<ul style="list-style-type: none"> • Classified as Known Habitat for the Murray Spiny Crayfish • Considering its permanent flow regime, releasing excessive sediment loads could have damaging effects on the downstream aquatic ecology

Waterway Crossing Name	Waterway Crossing No.	Existing Waterway Characteristics	Key Issues identified during investigations
		cover.	
Unnamed tributary of Dixons Creek (1-49-2-1-5-1)	87	<ul style="list-style-type: none"> Ephemeral watercourse Riparian vegetation cover is continuous on both banks. Proposed crossing site is a farm crossing. 	<ul style="list-style-type: none"> Noxious weeds and weeds of national significance present at the site.
Unnamed tributary of Dixons Creek	88	<ul style="list-style-type: none"> Ephemeral watercourse. V-shaped channel with continuous riparian vegetation cover on both banks. 	<ul style="list-style-type: none"> Noxious weeds and weeds of national significance present at the site, these include : Blackberry, Paspalum, Plum, Spear Thistle, Squirrel-tail Fescue, Sweet Vernal Grass, White Clover
Dixons Creek (1-49-2-1-5)	112	<ul style="list-style-type: none"> Ephemeral watercourse, incised. Steep right bank. Narrow riparian corridor. Blackberries cover a significant part of the ground. 	<ul style="list-style-type: none"> Noxious weeds and weeds of national significance present at the site
Dixons Creek (1-49-2-1)	97	<ul style="list-style-type: none"> Channel is incised to bedrock and hence the bed is stable, but the banks are bare, vertical and still actively eroding. Scattered vegetation. 	<ul style="list-style-type: none"> Noxious weeds and weeds of national significance present at the site
Unnamed tributary of Dixons Creek	98	<ul style="list-style-type: none"> Ephemeral watercourse, tributary to Dixons Creek. Incised from a headcut that has advanced from Dixons Creek downstream. No riparian cover present with highly unstable banks. 	<ul style="list-style-type: none"> Still a high potential for further deepening of the bed at the crossing location. Noxious weeds and weeds of national significance present at the site
Dixons Creek (1-49-2-1)	99	<ul style="list-style-type: none"> Dixons Creek at this crossing location is a large channel that is 	<ul style="list-style-type: none"> Noxious weeds and weeds of national significance

Waterway Crossing Name	Waterway Crossing No.	Existing Waterway Characteristics	Key Issues identified during investigations
		<p>likely to have undergone significant historical deepening.</p> <ul style="list-style-type: none"> • Overstorey recruitment. • Steep banks. 	<p>present at the site</p>
Steels Creek (1-49)	101	<ul style="list-style-type: none"> • Ephemeral watercourse, significantly modified due to agricultural use of adjacent properties. • No riparian vegetation. • There is an existing pipe crossing Steels Creek at the same location as the Sugarloaf Pipeline will be crossing the creek. 	<ul style="list-style-type: none"> • Noxious weeds and weeds of national significance present at the site.

3.2 Construction Activities

The construction ROW has been reduced directly within the waterway where possible, taking into account slope, crossfall, existing environmental values, native vegetation present and soil geotechnical conditions at the waterway crossing. Site inspections have been undertaken by the Alliance Team which includes personnel from the construction group, design and specialists for all category B waterways, to establish areas that need to be retained or avoided to minimise disturbance to the creek bed and banks.

Construction of the pipeline through the waterway crossings is generally limited to a 20-30m work area where possible to minimise disturbance to the bed and banks, with the exception of Steels Creek.

This restricted works area directly within the waterway resulted from existing site conditions and accessibility. A minimum ROW corridor of 20m within the waterway is required to safely undertake works, which makes allowance for the following:

- Minimum working space required for plant undertaking works (E.g. excavator, trucks, concrete plant) ;
- Minimum clearance required for an excavator to work safely from the edge of an open trench;
- Material removed from trenching operations shall be stockpiled away from the waterway;
- Pipes will not be stored within the vicinity of the waterway;
- Maintain suitable grades to safely access the waterway (usually 1:3)
- Grading back the existing embankment of the waterway to achieve suitable final grades depending on the ground conditions i.e. slope stability and degree of erosion

In areas that present more difficult conditions, the construction corridor may be larger (>20m). The following conditions are used to describe areas where the works zone (ROW) directly within the waterway will need to be larger (30m):

- Steepness of existing banks providing difficult access;
- Unstable ground conditions (i.e. highly eroded, incised, undercut embankments);
- Rehabilitation of the watercourse (i.e. existing steep banks will need to be graded back to achieve a more manageable slope to minimise erosion and undercutting and achieve final design grades on embankments.)

Table 4 shows the waterway crossings covered within this EMP and the respective construction ROW associated with each crossing of the actual waterway.

Table 4: Construction Width Across Waterways

Waterway Name (Designated ID)	Waterway Crossing No (WX No)	Property No	Construction ROW width across waterway	Comments
Ewing Creek (1-112-14)	25	330	20m	ROW reduced across waterway to minimise disturbance to surrounding vegetation.
Caraman Creek (1-112-11)	43	59	30m	Relatively steep embankment on east – 30m ROW

Waterway Name (Designated ID)	Waterway Crossing No (WX No)	Property No	Construction ROW width across waterway	Comments
				maintained.
Unnamed tributary of Yea River (1-112-41)	120	64	30m	Deep embankments.
Unnamed tributary of Yea River (1-112-42)	51	66, 68	25m	Deep embankments
Unnamed tributary of Yea River (1-112-52-1)	56	78, 79.1	25m	ROW reduced to minimise disturbance to vegetation
Unnamed tributary of Yea River (1-112-52)	57	79, 79.1	30m	Steeper grades in surrounding area.
Katy Creek (1-112-57)	61	385	25m	Reduced to minimise disturbance to surrounding vegetation.
Unnamed tributary of Dixons Creek (1-49-2-1-5-1)	87	129	20m	Reduced to minimised disturbance to surrounding vegetation
Unnamed tributary of Dixons Creek	88	129	30m	Steep, eroded embankments.
Dixons Creek (1-49-2-1-5)	112	423	25m	Minimise level of disturbance to creek.
Dixons Creek (1-49-2-1)	97	624	30m	Steep embankments
Unnamed tributary of Dixons Creek	98	624	30m	Steep embankments
Dixons Creek (1-49-2-1)	99	625	25m	Minimise disturbance to surrounding vegetation
Steels Creek (1-49)	101	1079	45m	Melbourne water have requested for additional works to be undertaken to replace the existing siphon and pump station. These works are not part of the Sugarloaf Pipeline Project, but are required to upgrade the existing asset in close proximity to the proposed pipeline.

Section 5 describes in detail the construction methods to be undertaken during construction of category B waterway crossings.

3.2.1 Steels Creek ROW

The construction ROW within the Steels Creek crossing area is approximately 50m in width to facilitate additional works within the ROW. These works are not directly part of the Sugarloaf Pipeline Project, but are required to facilitate safe construction of the SPP pipe. Currently the existing Steel Creek siphon consists of two (2no) 1300dia (approx) MS pipes which is situated within the ROW, these pipes may need to be removed and reinstated.

The extent of reinstatement works will depend on the existing condition/integrity of the MS pipeline and the proximity to the Sugarloaf pipeline. There is an existing pump station adjacent to Steels Creek which is a Melbourne Water asset; any relocation/replacement works carried out on the existing pipeline will require additional works on the pump station. The intention is to utilise the existing access tracks to provide direct access to undertake construction works and use any other available space within the ROW to store materials and setup plant to conduct works safely.

3.3 Ancillary Construction Activities

Construction of the waterway crossings may require further ancillary activities, which include:

- **Construction Access** requirements to the waterways.
- **Storage of materials:** this may include additional area required to stockpile excavated material and top soil, as well as bedding material required to backfill the trenches after the pipe has been laid. These areas are necessary, particularly near creek crossings where the banks are unstable and/or erodable and hence material and/or pipes cannot be stored near or around the creek banks. In these areas, the ancillary construction activities area will also be used for pipe lay down so that the construction ROW across these creek crossings can be minimised. This area will also be used to stockpile rock beaching material to be used in waterway reinstatement works.
- **Reinstatement works:** additional areas may be required within the *creek bed/banks* to match into the existing batters/grades onsite (in accordance with the design) and construct rock beaching to provide additional erosion/scour protection. Further rehabilitation of the upstream/downstream sections of the creek may be required in the immediate area to ensure that any erosion prone areas are managed appropriately so existing degradation to the bed and banks is minimised. This is summarised in Section 3.4.

3.4 Waterway Rehabilitation

Waterway management covered under this EMP includes the protection of the pipeline from bed and bank erosion, as well as the restoration of in stream conditions to improve, protect and restore environmental values of a waterway.

Measures used to enhance the waterways include:

- Rock beaching used in areas prone to erosion to provide protection and structural stability to the banks
- Battering embankments to a more gradual slope. Decreasing the steepness of the bank aims at improving the stability of the bank material against failures such as undercutting and slumping. Battering the bank also helps to establish vegetation.
- Rock beaching placed in the creek bed used to control the upstream-progression of active erosion heads.
- Drop Structures in the form of rock chutes or equivalent;

- Where possible maintaining riffles and ponds (in-stream habitat);
- Revegetation of disturbed areas with native vegetation species to improve the overall habitat quality and manage further bank erosion.

Where the existing condition of the waterway is degraded to an extent that more extensive rehabilitation and revegetation works are required, construction works may require greater area to match into the existing waterway profile adjacent to the works area. Planned rehabilitation works areas will be provided to the responsible CMA for approval as part of the Works on Waterways Permit Application.

The design detail for Ewing Creek is shown in Appendix C as an example of the additional rehabilitation works required within the watercourse, which is included as part of the permit application to the CMA.

3.5 Catchment Management Authority Permit

A permit to undertake works within the waterways needs to be obtained from the responsible authority (either Melbourne Water for waterways south of the divide or the Goulburn Broken CMA for waterways north of the divide) prior to the commencement of construction. The permit conditions shall be incorporated into the Site Environmental Plans used to manage construction activities.

Detailed waterway crossing rehabilitation drawings will be submitted to the relevant Catchment Management Authority with the permit applications to provide further details on:

- Extent of earthworks required within the waterway to reduce current steep grades;
- Extent of rock beaching required to provide further erosion protection;
- Additional erosion protection measures incorporated into the rehabilitation design to ensure that the works area does not adversely impact on the downstream environmental values of the watercourse
- Where possible maintaining riffles and ponds (in-stream habitat)
- Extent, density and type of revegetation along the waterway are shown in the Figures attached in Appendix A of the Reinstatement Management Program (.SPA-EPR-WC-ENV-0014).

Appendix C shows the extent of design detail provided to the CMAs to provide permit approval. The waterway crossing at Ewing Creek has been used as an example in the EMP. Each waterway will be assessed independently with appropriate erosion controls and reinstatement measures shown on the design drawings.

3.6 Traffic Management Work Areas

This Traffic Management Plan (TMP) considers the management of traffic associated with the construction of the Sugarloaf Pipeline Project at the various waterway crossings described in this EMP. Traffic management (speed reduction, signage etc.) will be required if plant is required to move from one side of a waterway to the other to access the work site, however, traffic management works (paved access points, widening road etc.) are not required as part of waterway crossing construction. Temporary access tracks will be constructed within the waterways to allow Plant to gain direct access to construct the pipeline and associated reinstatement works. Temporary creek crossings with appropriate drainage and sediment controls will be constructed for construction vehicles and plant. Most of the waterway crossings shall be accessed directly from the construction ROW adjacent to the waterways.

Access points from Melba Highway will be established at the waterway crossings at Dixons Creek (WX87 & WX88) to provide direct access to the waterways from Melba Highway for the delivery of materials required

to construct the pipeline and rehabilitation works along waterways. Appropriate traffic management will be setup in accordance with the Traffic Management Plans (TMP) - SPA-TMP- DB-TRA-0001 & SPA-TMP-YG-TRA-0001

Some vegetation removal may be required to maintain a minimum line of sight at this access point. This extension includes the width of the existing road reserve on either side of the road, as well as a length of 506m made up of 253m each side of an access point. The 253m is a Vicroads nominated standard for sight distance that exiting vehicles will require for safe movement. This will involve the trimming and/or removing of vegetation which if required, will be undertaken in accordance with the relevant Vegetation Management Program – Waterway Crossings (Category B) and Fauna Management Program – Waterway Crossings (Category B).

It should be noted that the lopping/trimming of tree branches at temporary access points along the pipeline are not activities that require native vegetation offsets under the Framework if the lopping is the minimum extent necessary and

- The native vegetation is to be removed or lopped to enable the construction or maintenance of a vehicle access across a road reserve from a property boundary to a public road,
- The maximum total width of native vegetation permitted to be removed is 6 metres,
- There is no practical opportunity to site the access point to avoid the removal or lopping of native vegetation.
- The lopping is for line of sight activities needed to maintain the safe function of existing roads from the access point.
- Maintenance works covered by this involve the lopping or pruning of trees that will result in no more than 1/3 of the foliage being removed from any individual plant and does not affect the health of the tree.
- For tree removal required for line of sight activities NV Framework offsets apply.

If there is extra tree removal required that was not previously recorded within the approved OMP for that section of works, then an amendment to the approved OMP for this section of works will be provided to DSE at the completion of work in that section, accounting for the final native vegetation losses for that section of the pipeline.

Refer to Appendix B which shows the traffic management works area within this Waterway Crossings (Category B) EMP section.

Refer to Appendix D for the Traffic Management Plans (TMP) relevant to this EMP section. They include the Yea South TMP and the Yarra Glen TMP; - SPA-TMP- DB-TRA-0001 & SPA-TMP-YG-TRA-0001 respectively for details of the activities to be undertaken within the traffic management area.

4 ENVIRONMENTAL PROGRAMS

The following Environmental Programs (with a broad outline of the documents' intent) have been developed to address the site specific impacts of works at the category B waterway crossings sections of the SPP (see attached documents). The site-specific details of the mitigation measures proposed to manage each of the environmental disciplines will be addressed in a series of 18 individual environmental programs, of which two have been developed as global documents to address the specific environmental aspect for the whole of the project area. The Environmental Programs identifies all issues of significant environmental and non-indigenous cultural matters within the Glenburn Section which are to be protected.

The Environmental Programs have been developed to achieve the targets and objectives which are specified in the EMF.

- **Air Quality Management Program**

The purpose of the Air Quality Management Program is to identify site-specific mitigation measures for local amenity and ambient air quality during construction of the waterway crossings. In particular, site-specific mitigation measures are identified to reduce the impacts that this project may have upon local receptors, which include but are not limited to:

- Dust suppression via localised water spraying over vehicle access tracks;
- All vehicles are to have their loads covered while transporting material to or from the work area on public roads;
- Areas of disturbed soil are to be re-vegetated as soon as practicable so as to minimise the potential for wind blown dust; and
- A dust deposition gauge will be deployed to establish a performance-monitoring site for audit purposes. The monitor is to be located at an appropriate distance between construction operations at the Steels Creek crossing and the surrounding vines on property #1079.

This program endeavours to comply with the relevant legislation and adopt the principles found in the Environmental Guidelines for Major Construction Sites (a Best Practice Environmental Management Guideline from EPA Victoria, EPA Publication 480, 1996).

- **Biosecurity Management Program – Project-wide**

The purpose of the Biosecurity Management Program (BSMP) – Project-wide is to identify site, disease and bio-hazard specific mitigation measures to manage the spread of any infectious disease (such as animal borne diseases), as well as biosecurity hazards (such as *Phylloxera* and *Phytophthora*) as a result of works arising from the SPP, therefore protecting existing social, economic and environmental values along the entire construction area. The BSMP has been developed in consultation with relevant industry experts on the varying biosecurity hazards.

Refer to document number SPA-EPR-GL-ENV-0001 for the project-wide BSMP.

- **Contaminated Land Management Program**

The purpose of the Contaminated Land Management Program (CLMP) is to identify site-specific mitigation measures to ensure that pre-existing areas of potentially contaminated land and/or groundwater

encountered during construction of the Waterway Crossings is appropriately dealt with to minimise the risk to Alliance personnel, public safety and environmental health.

Mitigation measures include, but are not limited to:

- Site personnel informing the SEO and OH&S Advisor when contaminated land is located or suspected and a consultant employed to manage the identification, removal and remediation of the site or land potentially affected; and
- Disposal of contaminated materials consistent with the relevant regulations.
- **Erosion and Sediment Management Program**

The purpose of the Erosion and Sediment Management Program is to identify site-specific measures to manage sediment and erosion control associated with the construction of the Waterway Crossings within the SPP. This program aims to minimise any adverse impacts on the crossings of high value waterways of the Project.

Mitigation measures include, but are not limited to:

- Erection of silt fencing to restrict the flow of sediment;
- Diversion of flows around the construction site;
- Installation of appropriate flow/erosion control measures during the project to minimise runoff and sediment entering the waterways; and
- Construction of a sedimentation pond(where required) to store water pumped from excavated pits and trenches.
- **Fauna Management Program**

The purpose of the Fauna Management Program is to identify both general and specific mitigation measures to manage the impact on native species, so as to ensure that the abundance, diversity and geographic distribution of native fauna (particularly Commonwealth and State listed threatened species and communities) are not significantly affected at local or higher landscape scales.

Mitigation measures include, but are not limited to:

- Undertake Targeted surveys;
- Additional mitigation measures that need to be implemented if any threatened fauna species on the FFG list potentially occur within the works area such as GSM and SLL;
- Fencing around the construction area;
- Regular site inspections to detect animals in areas such as trenches; and
- Employing the services of qualified Wildlife Specialists.
- **Fire Management Program**

The purpose of the Fire Management Program is to identify the fire threats relating to construction activities within this EMP section, as well mitigation measures to minimise the hazards associated with any forms of uncontrolled fire.

Mitigation measures include, but are not limited to:

- Regular communication with Fire and Civil Emergency Services; and

- Procedures for undertaking hot works.

- **Slope Stability Management Program**

The purpose of the Slope Stability Management Program is to identify specific mitigation and management measures to avoid or minimise the impacts of the construction on geological sites for the Waterway Crossings works within the SPP, as well as any potential instability issues.

Mitigation measures include, but are not limited to:

- Conducting regular inspection of cut and fill batters by a qualified geotechnical engineer or engineering geologist for signs of instability; and
- Regrading slopes to a milder angle or buttressing if inspection of slopes show signs of instability.

- **Greenhouse Gas Management Program – Project-wide**

The purpose of the Greenhouse Gas Management Program (GHMP) – Project-wide is to determine the greenhouse gas emissions for the SPP as a whole, as well as to identify measures by which greenhouse gas emissions can be monitored and managed throughout the construction phase of the project.

Refer to document number SPA-EPR-GL-ENV-0002 for details of the project-wide GHMP.

- **Groundwater Management Program**

The purpose of the Groundwater Management Program is to identify specific mitigation measures to manage the groundwater impacts associated with the construction of the Waterway Crossings,

Mitigation measures include, but are not limited to:

- Treatment of water from excavations and sedimentation ponds; and
- Ensuring correct handling and storage of fuels, lubricants and chemicals to protect groundwater quality.

- **Hazardous Substances Management Program**

The purpose of the Hazardous Substances Management Program is to identify specific mitigation measures to minimise the risks of hazards arising from the intentional use and storage of hazardous substances whilst planning and constructing the pipeline within the waterways.

Mitigation measures include, but are not limited to:

- Development of Hazardous Substances procedures for the storage, use and disposal of potentially hazardous substances and made available at the work site; and
- Only trained and authorised personnel are to use, handle and dispose of hazardous substances.

- **Non-Indigenous Cultural Heritage Management Program**

The purpose of the Non-Indigenous Cultural Heritage Management Program (NICHMP) is to identify the location, nature and significance of any non-indigenous sites within the various waterway crossings (Category B) within the SPP, as well as identify specific mitigation measures to manage the impacts of construction on non-indigenous cultural heritage values. The NICHMP is closely related to the Aboriginal Cultural Heritage Management Plan (CHMP) (refer to Section 10). The assessment for the CHMP has been undertaken concurrently with the NICHMP and some of the cultural heritage values within the study area relate to both Indigenous and non-Indigenous use of the land. The process for impact mitigation, harm minimisation and avoidance has been the same for both management plans.

No known non-Indigenous cultural heritage site has been identified to be in the vicinity of the waterway crossings under this EMP.

Mitigation measures include, but are not limited to:

- Identifying all non-indigenous cultural heritage values within and around the construction area and supply this information to the design team in order to avoid impact; and
- If any previously unknown archaeological deposits are uncovered during the construction phase, work must cease in that area and a cultural heritage advisor must be contacted.

- **Noise and Vibration Management Program**

The purpose of the Noise and Vibration Management Program (NVMP) is to identify sensitive receptors potentially affected by the construction of the pipeline along the category B waterway crossings. This program aims to manage and mitigate potential noise and vibration impacts associated with the construction works through the waterways.

Mitigation measures include, but are not limited to:

- All mechanical plant must be silenced by best practical means using current technology.
- All vehicular movements to and from the site must only be made during the scheduled normal working hours unless approval has been granted by the relevant authorities (EPA/Shire Council); and
- Background noise limits apply for works undertaken outside normal working hours.

- **Pest Animals Management Program**

The purpose of the Pest Animal Management Program is to identify mitigation measures to manage the impacts arising from pest animals. This could include the effects that pest animals have on native flora and fauna species managed through the Fauna Management Program and the Vegetation Management Program, as well as to prevent the exacerbation of existing pest animal impacts around the construction area.

Mitigation measures include, but are not limited to:

- Rabbit warrens, if discovered and are unlikely to be destroyed by the excavation activities, are to be destroyed by cross ripping the soil. These areas are much less likely to be recolonised by rabbits. A tractor-mounted ripper is used to penetrate the soil to a depth of at least 60 cm; and

All live sightings and fox corpses seen during monitoring and other post-construction activities will be collated by the Alliance and this information will be provided to the local DPI/DSE.

- **Reinstatement Management Program**

The purpose of the Reinstatement Management Program (RMP) is to identify rehabilitation practices that will be undertaken to reinstate vegetation and environmental conditions within the category B waterway crossings pre-construction, during and post construction. The RMP identifies the Alliance's commitments to reinstate native vegetation, including potential habitat for *Environment Protection and Biodiversity Conservation (EPBC) Act 1999* and *Flora and Fauna Guarantee (FFG) Act 1988* listed species, and as agreed with Melbourne Water.

Mitigation measures include, but are not limited to:

- Remediation of soil compaction in the construction area;
- Replacement of removed topsoil in the construction area;
- Reinstatement of riparian vegetation and in-stream habitat;

- Remediation works associated with improving the condition of the waterway within the construction corridor; and
- Re-vegetation of the area with relevant native flora species.

- **Vegetation Management Program**

The purpose of the Vegetation Management Program is to identify specific measures to avoid and/or minimise disturbance to Environment Protection and Biodiversity Conservation (EPBC) Act 1999 and Flora and Fauna Guarantee (FFG) Act 1988-listed flora species, other native flora species such as remnant paddock trees, and patches of native vegetation prior to, during and after construction of the waterway crossings (Category B) within the SPP.

Mitigation measures include, but are not limited to:

- Establishing fenced exclusion zones around known remnant native vegetation, scattered remnant trees and threatened species habitat;
- Maintaining minimal width of construction area immediately through the waterway and top of bank;
- Using existing access roads/tracks; and
- Topsoil excavated during construction will be carefully managed and replaced after construction.

- **Waste Management Program**

The purpose of the Waste Management Program (Waste MP) is to identify specific measures to minimise the hazards associated with any form of general, prescribed, controlled, hazardous and dangerous wastes generated or found within the Category B waterway crossings construction area. The Waste MP also discusses opportunities to minimise the production of wastes during construction through recycling and reusing materials where appropriate.

Mitigation measures include, but are not limited to:

- Segregation of waste into separate waste streams at the source including providing bulk waste bins for the segregation and management of waste materials; and
- Maintaining records in a central location of volumes and types of waste disposed.

- **Waterway Management Program**

The purpose of the Waterway Management Program is to identify specific controls for works on waterways to be undertaken by the construction crew to ensure the preservation of the environmental values of the Goulburn and Yarra River Catchments. These values may include, but are not limited to, water quality, aquatic ecology, bank stability, as well as visual and landscape amenity.

Mitigation measures include, but are not limited to:

- Timing of works to reduce the period between the start of construction and the completion of reinstatement works to minimise impacts on protected species;
- Spoil and disturbed soils will be stockpiled 10m clear of the waterway inverts ;
- Identifying unstable/eroding waterways with the potential for future bed deepening and headward erosion in order to determine the depth to which the pipeline will be set, or if bed stabilisation works are required;
- Incorporate appropriate erosion control measures within the waterways to control sediment and runoff;

- Where possible use existing access roads and tracks rather than constructing new access routes. Where possible, work from top of bank; and
- Reuse of contained runoff water onsite or dewatering via irrigation to land with the approval of the landholder is the preferred option, with appropriate Environment Staff supervision.

- **Weed Management Program**

The purpose of the Weed Management Program (WeedMP) is to identify measures to control and/or eradicate noxious weeds, environmental weeds, Weeds of National Significance (WONS) and unlisted common weeds of pastures before, during and after construction of the Category B waterway crossings.

Mitigation measures include, but are not limited to:

- Vehicle access points will be established within the construction area and all vehicles entering the site will enter and exit only through the recognised access points; and
- A vehicle wash down logbook will be kept in each vehicle and is to be completed each time a vehicle enters or exits the construction area during the clear and grade or reinstatement phase of works.

5 CONSTRUCTION METHODS

Construction methods used to deliver the SPP must take into consideration and adhere to all the mitigation and management measures defined in the EMS.

5.1 Description of the Works

The outside pipe diameter varies from 1750mm (north of the dividing range) to 1404mm (south of the dividing range) with the change in diameter taking place at the top of the dividing range (KP 47.75), downstream of the control storage tank (addressed in further detail within the Toolangi Forest EMP-SPA-EMP-TO-ENV-0001).

The pipeline construction Right of Way (ROW) at waterway crossings will vary between 20-30 m wide, depending on the specific site conditions encountered. i.e. where the presence of steep banks is encountered, degree of reinstatement works required (rock beaching, bank layback, revegetation which may extend beyond the required width for pipe laying activities)

The width of the construction ROW ensures that construction activities can be safely carried out with minimum risk of accident or injury to construction personnel, whilst also taking into consideration various environmental and cultural heritage impacts. The construction area is attached in Appendix B. The optimum construction ROW has been determined using the Alignment Risk Assessment and Decision Analysis Process outlined in the EMF.

The waterway crossings will be undertaken by a specialist pipeline crew using modified standard trenching techniques. This specialist crew is separate to the standard pipeline crew laying other sections of the pipeline and is specialised in trenching operations across waterways. Whilst the environmental controls associated with trenched waterway crossings will differ depending on flow conditions and waterway form, the actual construction method will not vary greatly across these waterways.

Once environmental controls are installed in accordance with the Environmental Programs, in particular the Waterway Management Program, the following sequence of activities will be undertaken as summarised below:

- Clearing of vegetation and strip and stockpile topsoil from banks;
- grade banks in accordance with design drawings (if required);
- strip and stockpile waterway bed material;
- construct temporary platform if necessary for works access using clean rock rip rap;
- excavate trench to required depth (with continued dewatering as required);
- lay pipe bedding material (or concrete boxwork);
- position pipes in trench and weld together (where trench dewatering is particularly troublesome the pipe sections will be welded prior to positioning in the trench);
- lay backfill (and concrete cap/encasement where applicable);
- replace stockpiled bed and bank material; and

- reinstate in accordance with design drawings, reinstatement management program and landscape plans.

5.1.1 Pre-construction Survey

Prior to the commencement of works, a detailed feature survey of the site layout, existing assets, as well as the limits of the site will be completed. Whilst detailed flora and fauna surveys have been completed, a final flora and fauna survey walk through of the construction area will also be undertaken in accordance with the Fauna Management Program and Vegetation Management Program. The information obtained will be relayed onto the construction plans.

Areas and features of any environmental or cultural heritage significance as identified in the environmental programs of this EMP will be noted on plans and to ensure these areas are marked or fenced off with a combination of signs and high visibility markers, such as construction safety fencing or bunting, prior to the commencement of construction works. These areas will be marked up and shown on the Plan of Environmental Controls (PECs) for the site and will be consistent with all the EPs attached to this EMP.

5.1.2 Clearing of Vegetation

The extent of clearing of vegetation at waterway crossings will be minimised where possible. Large native vegetation cleared during this phase may be able to be reused to form part of the habitat restoration measures along the waterway, as agreed with the relevant CMA. Hollow bearing logs removed within the construction ROW, which have been identified as potential threatened fauna habitats will be required to be stored for use in the reinstatement of the site.

5.1.3 Access to Waterway Crossings Construction Sites

During the construction phase access will be gained from the adjoining ROW corridors. All the waterways with the exception of Katy’s Creek are ephemeral and currently dry. It is proposed to gain access through all of the waterways to minimise the construction of additional access tracks from the Melba Highway. Table 5 summaries the access requirements across waterways.

Using the adjoining ROW will minimise additional tracks that will need to be created across private property and clearing of trees from the Melba Highway, also limit any delays expected along the Hwy due to movement of construction plant to either side of the waterway. The duration of construction works within the waterway will be minimised, with rehabilitation works to follow.

In areas of steep terrain, the surrounding area in the ROW will need to be graded to a level that would allow plant to dig a trench to the levels required. In some cases the waterways are quite steep and the bed is >5m below the top of the embankment, providing insufficient reach for an excavator to undertake trenching activities. Grading the surrounding area and construction of a temporary track will allow for safe access by plant, to undertake trenching works.

Temporary vehicle crossings shall be provided over waterways in accordance with the CMA approved temporary works drawing. These temporary works will generally consist of laying geofabric on the bed of the waterway, installing a flume pipe and rockwork around to provide a suitable vehicle crossing over the waterways, whilst maintaining flows where applicable.

Table 5: Access across Waterways

Waterway Name (Designated ID)	Waterway Crossing No	Access Requirements
Ewing Creek (1-112-14)	25	There is currently already an existing cleared pathway through Ewing Creek. Temporary track to be located across waterway.

Waterway Name (Designated ID)	Waterway Crossing No	Access Requirements
Caraman Creek (1-112-11)	43	Steep Embankment on west side. To facilitate construction and provide safe access a temporary access track will be constructed through waterway in the ROW corridor.
Unnamed tributary of Yea River (1-112-41)	120	Temporary Access track will be constructed through waterway within the construction ROW.
Unnamed tributary of Yea River (1-112-42)	51	Temporary Access track will be constructed through waterway within the construction ROW r.
Unnamed tributary of Yea River (1-112-52-1)	56	Temporary Access track will be constructed through waterway within the construction ROW.
Unnamed tributary of Yea River (1-112-52)	57	Steep Terrain. To facilitate construction and provide safe access a temporary access track will be constructed through waterway within the construction ROW
Katy Creek (1-112-57)	61	Temporary track in waterway within the construction ROW.
Unnamed tributary of Dixons Creek (1-49-2-1-5-1)	87	Access track will be constructed through the waterway within the construction ROW .
Unnamed tributary of Dixons Creek	88	Steep Terrain. Access track will be constructed through the waterway within the construction ROW.
Dixons Creek (1-49-2-1-5)	112	An existing cattle track currently runs across WX112. Use of appropriate erosion controls shall be installed with suitable grades to allow construction plant safe access. Temporary access track will be constructed to provide continuous access to the adjoining ROW for construction traffic.
Dixons Creek (1-49-2-1)	97	Temporary tracks shall be constructed through the waterway crossing to provide access for plant and pipe stringing required to undertake works. Access tracks are primarily required in this area due to the locations of the 3 Dixon Creek Crossings and there being insufficient turning space in the ROW.
Unnamed tributary of Dixons Creek	98	As Above
Dixons Creek (1-49-2-1)	99	As Above
Steels Creek (1-49)	101	Existing Track located across Creek. Access track will be constructed through the waterway in the ROW corridor to facilitate construction.

5.1.4 Clear and Grade

As noted above, prior to clear and grade, the boundaries of the construction ROW will be marked to ensure that clearing only occurs within the designated areas. Appropriate erosion control measures shall be established to minimise any sediment or runoff entering the watercourse during construction activities. Clear and grade involves creating a safe and accessible construction corridor by removing vegetation and stripping topsoil.

All material stripped during this phase shall be stockpiled 10m from the waterway. Any additional work space area will also be cleared at this stage to provide access for construction.

Any areas of side slope will be benched (ie cut and filled) to create a level surface and safe working area for excavators as required. In any steep cross fall sections, it may be necessary to manage construction in a different manner (eg. establishing a wider construction ROW so as to create a safe working bench) to ensure a safe working area.

5.1.5 Removal of trees for safety reasons

In the event that there are trees located outside the construction ROW which pose a safety hazard to the construction crew, the removal of the tree and/or lopping of branches may be required. If this is required, the SPA commits to following a protocol which will be developed in consultation with the CMAs and DSE. Any such removal of additional trees will be accounted for in offsets.

5.1.6 Modified Standard Trenching

Once the clear and grade stage has prepared the work site, and the centreline of the trench pegged out, the trench where the pipe will be laid, will be constructed.

Standard open cut trenching will be utilised in low flow, shallow or dry conditions. This technique involves setting up a stable work platform on each side of the watercourse and then excavating a trench. The trench is reinstated immediately after placement of the pipeline. Construction of the pipe at waterway crossings requires the trench to be constructed up to 3 metres below the invert of the existing waterway to achieve minimum cover requirements over the top of the pipeline. This trench will be approximately 3 metres wide with varying depths depending on the design and site specific features. Where excavation of the trench at steep sided or deeply incised waterways will result in unstable work areas, some local battering will be required to provide safe access.

Table 3 of this EMP briefly describes the characteristics of the waterways to be crossed within this EMP section. Of the fourteen waterways identified in this EMP, thirteen are ephemeral. Hence, this methodology may apply if works on these waterways can commence and be completed during a period when the waterway is dry (e.g. typically outside the winter season). Prior to undertaking construction works through these waterways, the weekly weather forecast will be checked and monitored to determine if additional erosion and flow controls (e.g. bypass flumes, bypass pumps or rock berms to provide additional flow diversion/controls around construction area) will be required.

Waterways that have constant flows in them will require trenching methods to be incorporated with dewatering methods to maintain a safe works area and protect the environmental values of the watercourse. Additional controls will be required when constant flows into the ROW are likely to occur, which will include a berm to control flow and a bypass pipe to convey flows downstream whilst restricting any egress of water into the construction area. Should dewatering be required, it must be undertaken in accordance with the Groundwater Management Program and Waterways Management Program of this EMP.

Vehicular movements across the waterways will be restricted as much as possible and will depend on, but not limited to the characteristic of the waterway itself (ie steep banks, large drop from top of bank to the

invert of the waterway). Any excess rock and spoil removed from trenching activities in the immediate area of the waterway will be disposed offsite to a suitable location (e.g. Old Castella Quarry)

5.1.7 Pipe Installation

Initially, bedding will be placed in the trench for placement of the pipe. The pipeline will be pre-welded and lifted into the trench using either an excavator or crane depending on the site specific conditions.

This pipe will be joined to the end of the pipe already in the trench and welded together. Each weld will be individually tested followed by joint grouting inside and wrapped outside using a heat shrink sleeve. A ventilation system will be provided for crews working inside the pipe.

The pipe will be encased in a concrete surround extending 300mm around the pipe, suitable backfill material will be placed and compacted in the trench to match existing invert levels of the creek bed.

In steep sided creeks (of which there are a number) manufactured bends will be required, and these may have to be lifted in as an assembled length of pipe using large cranes.

5.1.8 Scour Valves

Scour valves will be installed along the pipeline to drain water from the pipe during maintenance of the pipeline or in an event where the pipe fails. Scour valves are generally located at low points, near waterways or road culverts whereby water released from the pipe by the scour valve will enter an existing watercourse, thus ensuring the water does not damage existing infrastructure (roads, houses etc) or cause erosion of land near the pipeline. The locations of scour valves are described in Table 6 below.

Table 6: Scour Valve Locations on Waterways

Waterway Name (Designated ID)	Waterway Crossing No (WX No)	Scour Valve
Ewing Creek (1-112-14)	25	Yes
Caraman Creek (1-112-11)	43	Yes
Unnamed tributary of Yea River (1-112-41)	120	Yes
Unnamed tributary of Yea River (1-112-42)	51	Yes
Unnamed tributary of Yea River (1-112-52-1)	56	Yes
Unnamed tributary of Yea River (1-112-52)	57	No
Katy Creek (1-112-57)	61	Yes
Unnamed tributary of Dixons Creek (1-49-2-1-5-1)	87	No
Unnamed tributary of Dixons Creek	88	No
Dixons Creek (1-49-2-1-5)	112	Yes
Dixons Creek (1-49-2-1)	97	No
Unnamed tributary of Dixons Creek	98	No
Dixons Creek (1-49-2-1)	99	Yes
Steels Creek (1-49)	101	Yes

At waterway crossings where scour valves are installed on the pipeline, erosion control measures (such as rock beaching) shall be constructed to minimise any erosion caused during the operation of the scour valves. Erosion control measures at scour outlet locations shall be incorporated into reinstatement works.

5.1.9 Erosion Control Measures

Trenching across waterways involves in-stream excavation and pipelaying conducted within a temporarily dewatered section of the waterway. Protection of the works from stream flows shall include various flow control methods (accessed to facilitate safe construction works) depending on the existing waterway site conditions such as:

- Installation of a temporary dam upstream and bypass flume;
- Rock logs, use of rock berms and the use of bypass pumps located on the upstream side to convey flows around the construction area;
- Placement of rockwork/geotextile to minimise erosion;
- Placement of rock rip rap to be used as a stable working platform within the waterway (as required);
- Limiting stormwater entering excavation areas by diverting flows around the immediate construction area;
- Enhancement of controls when heavy rain is forecast;

The flow control methods shall be accessed on an individual site basis to provide a safe working area for construction works during the project. Generally dewatering methods will consist of setting up flow control devices both upstream and downstream of the construction area (ie aqua barrier/berm). Pumps or a flume will be used to bypass flows around the construction area. The flow control measures used will vary across each site due to existing conditions.

Dewatering shall not be required in ephemeral waterways, however upstream and downstream flow control measures shall be used to protect the waterway from construction works or unpredicted storm events. Bypass pumps or flumes may be used depending on the flows expected in the waterways.

Dewatering activities within trenches will be managed onsite using pumps to bypass flow from the works area if groundwater is encountered. This water will be tested to ensure compliance with SEPP (WoV) guidelines prior to any discharge into the waterway. The use of sedimentation ponds, sediment tanks etc shall be incorporated where appropriate.

At the completion of the pipeline, the stockpiled trench material excavated during trenching will then be returned to the trench and compacted in a controlled manner and tested in accordance with the construction specification.

Rip rap rock shall be placed over the trench in accordance with design drawings and requirements approved by the relevant CMA.

Topsoil removed during grading will be spread across the ROW and contours reinstated to match existing conditions or achieve grades to provide erosion protection on the embankments. Any excess spoil will be removed from the site and disposed offsite to a suitable location (e.g. Old Castella Quarry).

5.1.10 Waterway Rehabilitation Measures

Methods of waterway rehabilitation will vary depending on existing waterway conditions, including the existence of in stream habitat, bed and bank stability, existence of riparian vegetation and the condition of

adjoining sections of the waterway. Waterway rehabilitation measures can take the form of soft engineering approaches, hard engineering approaches or a combination of both.

Soft engineering approaches include local earthworks to regrade waterway banks, placement of rock for stabilisation or revegetation of waterway bed, banks and riparian zones where vegetation is non-existent due to land clearing or development. Hard engineering approaches include the installation of rock weirs with the provision for fish passage, groynes or channelization to improve flow conditions.

A summary of some soft-engineered rehabilitation measures proposed for the waterway crossings covered in this EMP is outlined in section 3.4. Detailed design drawings will be provided to the relevant CMA for approval prior to the issue of a permit and commencement of works.

Further details of these measures to be incorporated in the designs is provided below.

Bank layback: Bank layback works are used in waterway rehabilitation to reduce the gradient/steepness of the banks. This is a common measure aimed at reducing stream powers by creating a wider flow area and improving the stability of the bank material against mass failures such as undercutting and slumping. Battering the bank also helps to establish vegetation by protecting against the loss of top soil from steep slopes or transport of top soil from high velocity flows.

Rock beaching: Rock beaching or riprap is often used in waterway rehabilitation works, often along the banks of the waterway to provide protection from high velocity flows or to provide structural stability to the banks where limitation on bank layback works exist due to the presence of high value vegetation or limiting factors such as adjacent assets. Rock riprap is also used in the construction of grade control structures, or bed protection works to prevent erosion and subsequent transport of sediment downstream. Rock beaching will be used in areas as necessary to provide bed and bank protection and structural stability to the banks.

Bed erosion control: A common problem in waterways impacted by development or land clearing is the presence of an erosion head. Erosion heads are a natural reaction to change in stream dynamics caused by land clearing upstream or modification to the stream form. Progression of upstream erosion cuts can lead to loss of in-stream habitat and the transport of sediment downstream leading to change in overall waterway condition. Rock riprap can be used to halt erosion heads and establish more stable flow conditions.

Drop Structures: Where significant erosion has occurred due to steep gradients, drop structures can be used to reduce the impact of high velocity stream flows on the waterway bed. Drop structures such as rock chutes will be designed and constructed using rock riprap, to reduce the gradient of the waterway bed and also providing pool and riffle zones and fish passage upstream.

Revegetation: Revegetation of disturbed areas with indigenous species is used both as a bank stabilisation measure and also to improve the overall health of the riparian zone and provide better habitat quality for aquatic and waterway dwelling species.

Generally in waterway rehabilitation works some or all of the above types of measures are used in combination, based on site inspections and in consultation with waterway rehabilitation specialists. Rehabilitation works for the Category B Waterway Crossings will be designed and developed in consultation with construction personnel, waterway specialists and the relevant CMA.

5.1.11 Cleanup and Reinstatement

After the pipeline and associated valves are laid, the ROW will be cleaned up and reinstated. Any extra workspace and temporary access tracks will also be restored at this time. The clean up and reinstatement will be undertaken progressively and as soon as practicable after the pipe laying so as to minimise the lag time between the two phases.

Rehabilitation of the waterway will be undertaken in accordance with the Reinstatement Management Program (RMP), reinstatement drawings, revegetation drawings and in accordance with the approval conditions specified by the relevant CMA. The management approach to reinstatement is addressed in the RMP, which should be referred to for further details.

Rehabilitation of compacted soils in the ROW must be conducted in areas of construction activity such as heavy traffic areas, access roads and areas of exposed subsoil. Compacted areas will be ripped, aerated or tilled to a depth sufficient to alleviate potential compaction and water-logging in the root-zone:

The subsoil will be worked with graders and prepared for the topsoil placement. The terrain and contours through the waterways will be reinstated back to as close as existing conditions as possible or improved to minimise further erosion.

During the reinstatement process, the removal of construction fences will occur. Where removed, these fences will be replaced by new material to match the existing type of fences in the properties or as agreed with the individual land owners.

Any lineal fences erected along the ROW boundaries may also be removed although it could be removed by the landowner at a later stage once the vegetation or pasture has been established. This will be determined in consultation with the landowner.

6 RISK ASSESSMENT & DECISION ANALYSIS

The Alignment Risk Assessment & Decision Analysis process as outlined within the EMS is the key decision process applied at a detailed site level to conduct risk assessments and make decisions for the construction techniques, rehabilitation and micro-siting of the pipeline alignment. This process has been applied for the Waterways Crossings Category B section of the pipeline and its nominal construction area.

6.1.1 Prior to Environmental Risk Assessment

The level of risk associated with the majority of risk issues was reduced in the process of selecting the initial pipeline alignment by predominantly avoiding high value built and natural assets, and developing various management plans and associated documents.

Key risk issues in the Waterways Crossings Category B section and associated planned control measures included the following:

Risk Category	Key Risk Issue	Planned Control Measures
Surface water quality/ Ground water quality	Impacts of construction works within the waterway on water quality;	Sediment and erosion controls are implemented to minimise sedimentation and erosion. Construction methodology chosen to have minimum impact on groundwater environment.
Aquatic Ecology	Impacts of construction works within the waterway on aquatic ecology	Sediment and erosion controls are implemented to minimise sedimentation and erosion. Rehabilitation measures will ensure minimum disturbance time.
Erosion and Sedimentation	Impacts associated with bed and bank erosion due to construction works within the waterway;	Construction methodology chosen to have minimum impact on bed and banks. Sediment and erosion controls are implemented to minimise sedimentation and erosion.
Terrestrial Fauna	Potential loss of fauna species.	Alignment chosen to minimise impact on potential significant species/communities where possible.
Terrestrial Flora	Potential loss of flora species.	Alignment chosen to minimise impact on potential significant species/communities where possible.
Cultural Heritage	Potential to disturb areas and vegetation with indigenous cultural significance.	Alignment chosen to avoid culturally significant locations, in particular scar trees and indigenous camp sites.

The key risk issues were identified by discussion with the associated specialists and design and construction teams.

6.1.2 Application of Environmental Risk Assessment & Decision Analysis

The Environmental Risk Assessment was subsequently applied to assess the environmental issues and risks associated with direct and potential impacts from the pipeline alignment and the nominal construction area for the Killingworth sites.

To assess the adequacy of planned control measures, the level of risk associated with each risk issue was assessed assuming their implementation. Where possible additional risk reduction measures were proposed to further reduce the risk according to the following categories:

- Specific localised change in pipeline alignment or construction site dimensions (e.g. propose additional or reduced dimensions);
- Alter Construction Management processes (e.g. propose a change in construction technique, change in site management processes or contingencies);
- Implement Rehabilitation (e.g. propose options for during or post construction); and
- Offset / Compensation.

A residual risk assessment was undertaken assuming the implementation of these risk reduction measures. Adopted risk reduction measures were chosen on the basis of reducing risk to So Far As Reasonably Practicable (SFARP) using the Decision Analysis process. These risk reduction measures, which are predominantly around construction management processes, have been included into the individual Environmental Programs and/or the SEPs and PECs at a site by site level.

6.1.3 Environmental Risk Assessment & Decision Analysis Outcomes

This process identified no initial or residual extreme risks for the Category B Waterways EMP section. Four risk issues were identified as having a high residual risk, after proposed risk reduction measures:

- Potential impacts to the EPBC-listed Golden Sun Moth (GSM) (also FFG-listed) in possible habitat
- Potential impacts to the EPBC-listed Striped Legless Lizard (SLL) (also FFG-listed) in possible habitat
- Loss of possible woodland forest and scattered tree habitat (WFST)
- Barrier or hindrance to movement of arboreal fauna species as a result of removal of vegetation

Identified high risk issues associated with the Golden Sun Moth in known habitats are:

- Loss of habitat;
- Injury or death during habitat removal; and
- Possible long term effects (ongoing loss of habitat, barriers to movement, increases in prey, etc).

GSM and SLL controls are included in the Terrestrial Fauna Mitigation Plan and Waterways Fauna Management Program. In addition to this offset actions are to be undertaken in the Sheoak and Yea to Devlin Bridge EMP section. Offset actions include research and conservation actions.

Measures for rehabilitation of WFST are included in the Terrestrial Flora Mitigation Plan and the Category B Waterways Reinstatement Management Program. The alliance has minimised the loss of WFST as far as practicable through realignment and narrowing of the ROW.

Measures to minimise barriers or hindrance to Fauna include rehabilitation, removal of fauna pre construction, net Gain offsets, Gaps in sediment fencing, use of glider poles and rope ladders.

There were no other issues identified with a high residual risk.

A summary of risk issues with a medium risk rating are summarised in the following table.

Residual Medium Risk Category	Residual Medium Risk Issue
<i>Agricultural Reinstatement</i>	Fire
<i>Aquatic Ecology</i>	Increased turbidity from possible sandbag diversions, loss of habitat for fish and macroinvertebrates, destruction of burrowing crayfish burrows,
<i>Biosecurity</i>	Potential spread of animal and plant borne disease).
<i>Contaminated land</i>	Release of Hydrocarbon from onsite plant
<i>Flooding and Inundation</i>	Flooding of waterway
<i>Geotechnical</i>	Major instability of cut/fill batter, major instability of cut bench potentially impacting third party asset, major instability in rehabilitated slope.
<i>Groundwater</i>	Unexpected encountering of high groundwater flows during works
<i>Landscape and Visual</i>	Visual amenity of travellers related to removal of trees near WX99
<i>Noise and Vibration</i>	High noise levels impacting nearby receivers during daytime hours, high noise levels impacting nearby receivers for any works after 6pm, ground vibration affecting nearby residents.
<i>Surface Water-Erosion and Sedimentation</i>	Increased turbidity during sandbagging operations
<i>Surface Water – Water Quality</i>	Disturbance of stream bed increases turbidity during flow and/or rainfall.
<i>Terrestrial Fauna</i>	Removal of habitat (including for ground dwelling, hollow-bearing dependent, arboreal and waterways species), spread of Amphibian Chytrid Fungus, bushfire, possible impacts to species including Stripped Legless Lizard, Golden Sun Moth, Spot Tailed Quoll, Southern Brown Bandicoot, Growling Grass Frog, Brown Toadlet, FFG listed waterbirds and other non protected fauna species, creation of barrier or hinderance to movements of species.
<i>Terrestrial Flora</i>	Loss of scattered remnant large old trees, loss of Valley Grassy Forest, Riparian Forest, Swampy Riparian Woodland, Creekline Grassy Woodland, Herb-Rich Foothill Forest, Damp Forest. introduction/spread of environmental and/or noxious weeds, introduction/spread of <i>Phytophthora cinnamoni</i> .
<i>Traffic</i>	Delivery of pipes and construction materials causing traffic delays, construction at close proximity to roadway causing delays by traffic control, traffic delays as a result of speed reduction during work times, detours and traffic control measures, risk of road blockade.

For many of the risk issues described above, no further risk reduction measures were proposed as the planned control measures were considered best practice. The severity of a potential impact largely contributes to a medium risk rating.

Justification for not adopting risk reduction measures is provided in Revision 2 of the *Waterways Crossings Category B Alignment Development Risk Register*.

There is some risk associated with Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation (EPBC) Act 1999*.

There is a known population of the EPBC-listed Golden Sun Moth within the Waterways Crossing - Category B EMP section. Another EPBC-listed species considered possible to occur providing a high risk include the Striped Legless Lizard. There are also other EPBC-listed fauna species that may potentially occur within the Waterways Crossing - Category B section, with construction ROW activities currently providing a *medium* risk; these include the Growling Grass Frog, Spot Tailed Quoll and Southern Brown Bandicoot of which only the Southern Brown Bandicoot is not also listed under the *Flora and Fauna Guarantee Act 1988* (FFG Act). There is a very low likelihood of other EPBC-listed species occurring. FFG-listed species include the Brown Toadlet (unlikely waterbody habitats). The full range of mitigation measures for habitats that are considered **possible** to support threatened fauna species is provided in Fauna Management Program (FMP) for the Waterways crossing EMP section.

If any threatened fauna species are found in **possible** or **unlikely** habitat during the construction process, then these areas will be remapped as **known** habitat and appropriate stepwise procedures will be implemented. These stepwise procedures, as described in

the FMP, include temporary halting construction at that particular location until a suitable future course of action has been developed and agreed with DSE (and other regulatory authorities if required).

No threatened flora species are known to be present within this EMP section.

It is possible that some burrowing crayfish burrows may be destroyed although they will be avoided if possible. *Engaeus curvisutris* is FFG listed and may occur in this area.

6.1.4 Construction ROW

The Alignment Risk Assessment and Decision Analysis process determined that the nominal construction ROW determined for the Waterways Crossing - Category B EMP section was reduced where possible from the base case construction ROW (30 m width) to 20m width directly within the waterway crossing.

Subsequent to a constructability and operability review, including the consideration of the potential to reduce some of the risks described in the sections above, additional area was required in some areas to allow for site operations, amenities and construction vehicle movement. The reasons for the necessity to increase the width of the construction ROW in certain areas consist of:

- Additional works required on Steel's Creek Siphon and the pump station at Crossing 101 (Steel's Creek).
- Additional ancillary areas required to stockpile materials to facilitate construction works within the waterways (ie a minimum clearance of 10m shall be maintained to stockpile materials and spoil from the invert of waterways.)
- Additional Traffic Management Works space to facilitate flow of public traffic and construction entering/exiting from Melba Hwy.

7 PERFORMANCE MEASURES

Refer to Appendix G for the SPA's external auditing and reporting requirements. In response to the Minister for Planning's procedures for environmental monitoring, auditing and reporting of the SPP, the Alliance has developed measurable targets that will demonstrate the achievement of the targets and objectives outlined in this EMP. The table showing the environmental targets to be measured and reported against is shown in Appendix J.

8 WORK ACTIVITY PACKS

The WAP will be used by the construction crew on site to ensure they are meeting the required planning and environment requirements. This Pack will not serve the Environmental Management purpose alone and therefore will cover topics including, but not limited to:

- Site Environment and Heritage Plans;
- Plan of Environment and Heritage Controls;
- Communication and notifications;
- Safe work method statements;
- Risk assessments;
- Plans and instructions;
- Forms and Checklists;
- Inspection and test plan;
- Approvals, Permits and Licenses; and
- Construction traffic.

These WAPs will be approved by the Sugarloaf Pipeline Alliance Project Manager or delegate. WAP's will be prepared for each waterway crossing zone within this EMP. The properties affected by the construction of the waterway crossings and therefore included in the WAP are:

- Property # 330 (occurs in the construction area);
- Property #59 (occurs in the construction area);
- Property #64 (occurs in the construction area);
- Property #66 (occurs in the construction area);
- Property #78-79 (occurs in the construction area);
- Property #385 (occurs in the construction area);
- Property #129 (occurs in the construction area);
- Property #423 (occurs in the construction area);
- Property #624-625 (occurs in the construction area);
- Property #1079 (occurs in the construction area);

9 APPROVALS MATRIX

A summary of all the statutory approvals (including any license and permits) relevant to this Waterway Crossings EMP Section is attached in Appendix E.

10 OTHER DOCUMENTS AND STRATEGIES

Other strategies that must be incorporated into the WAPs and SEPs where appropriate and implemented and managed by the appropriate Project personnel are listed as follows:

- Communications and Media Relations Strategy
- Cultural Heritage Management Plan – The Cultural Heritage Management Plan has been approved by Aboriginal Affairs Victoria (AAV). The CHMP identifies specific survey requirements (if any) and mitigation measures which have to be implemented prior to the commencement of works as well as during the construction phase. Refer to CHMP No: 10207 A-E and 104588 F-H *Complex Cultural Heritage Management Plan*.
- Offset Management Strategy - The Offset Management Strategy addresses the Offset requirements associated with the use and development of the Sugarloaf Pipeline Project to meet the requirements of Victoria’s Native Vegetation Management Framework. The OMS has been developed in consultation with DSE and is one of the principle approval documents required to be approved prior to the commencement of any project works. The OMS has been approved by the Minister for Environment and Climate Change.
- Offset Management Plan – Native vegetation offsets association with this EMP section are covered in the respective OMPs for the adjacent sections (e.g Native vegetation removal for Ewing Creek is covered in the Central Victorian Uplands OMP).
- Traffic Management Strategy - The TMS addresses the management of traffic associated with the construction of category B waterway crossings to ensure that the Project meets its contractual and authority obligations relating to traffic on roads affected by this project in a safe and efficient manner. The TMS identifies the traffic risks and forms the overarching document from which Traffic Management Plans are prepared. Traffic Management plans will be included within the EMPs which the Minister for Planning or his delegate will endorse.
- Traffic Management Plans – The Traffic Management Plan (TMP) which addresses the traffic management issues within the waterway crossings work sites will be attached in Appendix D. The TMP that applies to this EMP has been developed in consultation with VicRoads. A memorandum of consent will be required to be sought from VicRoads prior to the commencement of works.

APPENDIX A: EMP ZONES MAP

Refer to the attached plan titled "Appendix A – EMP zones"

APPENDIX B: CONSTRUCTION AREA FOR THIS EMP SECTION

The following drawings attached shown the construction areas within the waterways crossings (Category B) EMP:

SPA-DWG-WC-ENV-03 (WX 25 – Ewing Creek)

SPA-DWG-WC-ENV-04 (WX43 – Caraman Creek)

SPA-DWG-WC-ENV-05 (WX 120 – Unnamed Tributary of Yea River)

SPA-DWG-WC-ENV-06 (WX51 0 - Unnamed Tributary of Yea River)

SPA-DWG-WC-ENV-08 (WX56/57 - Unnamed Tributary of Yea River)

SPA-DWG-WC-ENV-010 (WX 61 - Katy's Creek)

SPA-DWG-WC-ENV-012 (WX 87/88 – Unnamed Tributary of Dixons Creek)

SPA-DWG-WC-ENV-013 (WX112 – Dixons Creek)

SPA-DWG-WC-ENV-014 (WX 97/98/99 – Dixons Creek)

SPA-DWG-WC-ENV-015 (WX101 – Steels Creek)

APPENDIX C: ADDITIONAL FIGURES

Example of Design Reinstatement Drawing for (Ewing Creek) – SPA-DWG-WC-CON-0003 & M484/654

APPENDIX D: TRAFFIC MANAGEMENT PLAN

The Waterway Crossings EMP (Category B) is covered by the Yea South Traffic Management Plan (TMP) - SPA-TMP- DB-TRA-0001 & Dixons Creek TMP - SPA-TMP-YG-TRA-0001 which are attached as a separate document.

APPENDIX E: STATUTORY REQUIREMENTS FOR WATERWAY CROSSINGS (CATEGORY B)

Act	Description	Authority	Relevant to Waterway Crossings EMP section
Aboriginal Heritage Act 2006 (Vic)	Preparation and approval of Cultural Heritage Management Plan	Secretary to Aboriginal Affairs Victoria	Yes
Building Act 1993 (Vic)	Permit for construction of pump stations and other buildings	Private Certifier (to be confirmed)	No
Country Fire Authority Act 1958 (Vic)	Approval to work on total fire ban days.	CFA	Yes
Electricity Industry Act 2000 (Vic) Gas Industry Act 2001 (Vic)	Approval to cross Multinet assets	Multinet/Alinta	No
Electricity Safety Act 1998 (Vic)	Consent to cross the HV O/H power easement and crossing underground power.	SPAusNet	No
Electricity Safety Act 1998 (Vic)	Approval to cross HV O/H power easements and crossing underground power.	SPAusNet	No
Environment Effects Act 1978 (Vic)	EES referral	Minister for Planning	Yes
Environment Protection and Biodiversity Conservation Act 1999 (Cth)	EPBC referral	Minister for the Environment Heritage and the Arts	Yes
Flora and Fauna Guarantee Act 1988 (Vic)	A permit is required to undertake research, handle, relocate, salvage, husbandry of flora and fauna species identified by this Act.	Department of Sustainability and Environment	Yes

Act	Description	Authority	Relevant to Waterway Crossings EMP section
Forests Act 1958 (Vic)	Gazettal of closures of forestry tracks through Toolangi State Forest	Department of Sustainability and Environment	No
Forests Act 1958 (Vic)	Application for a Forest Produce Licence to remove timber	Department of Sustainability and Environment	No
Forests Act 1958 (Vic)	Licence to occupy forest under s52	DSE	No
Gas Industry Act 2001 (Vic)	Approval to cross GasNet assets easement, parallel easements and temporary access track within easements	GasNet	No
Heritage Act 1995 (Vic)	A permit to carry out works or activities to a heritage place or object.	Heritage Victoria	No
Heritage Rivers Act 1992 (Vic)	Approval to divert water from the Goulburn River Part of the Works on Waterways approvals (under s67, s68 of the Water Act 1989)	Goulburn-Broken Catchment Management Authority	No

Act	Description	Authority	Relevant to Waterway Crossings EMP section
Land Acquisition and Compensation Act 1986 (Vic)	To compulsory acquire land for the pipeline, pumping station and sub station		Yes
Land Act 1958 (Vic)	Licence to occupy Crown Land (including government roads)	Department of Sustainability and Environment	No
Land Act 1958 (Vic)	Approval to build over the government road at 'Sheoak'	Department of Sustainability and Environment	No
Native Title Act 1993 (Cth)	Native title notification	Department of Sustainability and Environment	No
Planning and Environment Act 1987 (Vic)	Gazettal of Section 16 exemption.	Minister for Planning	Yes
P&E Act s16 - Condition 1: The use and development of land must be in accordance with development plans, or subsequent amendments to these plans, endorse by the Minister for Planning.	Detailed development plans.	Minister for Planning	Yes
P&E Act - s16 - Condition 2: Works must not commence before an environmental management framework to guide the implementation of the works is prepared by the proponent to the satisfaction of the Minister for Planning following consultation with the Minister for Environment and Climate Change.	Environmental Management Framework	Minister for Planning / Minister for Environment and Climate Change	Yes
P&E Act - s16 - Condition 3: Works must be implemented in accordance	Offset Management Strategy	Minister for Environment and Climate Change	Yes

Act	Description	Authority	Relevant to Waterway Crossings EMP section
with Victorians Native Vegetation Management: A Framework for Action (2002), including that, prior to the removal, destruction or lopping of native vegetation an Offset Management Strategy must be approved by the Minister for Environment and Climate Change.	CVU, Glenburn, Toolangi HNF and Yarra Glen OMPs	Minister for Environment and Climate Change	Yes
P&E Act - s16 - Condition 4: Works must be implemented generally in accordance with an environmental management plan, or environmental management plans for segments of the works, or amended environmental management plans, prepared by the proponent that have been endorsed by the Minister for Planning, or his delegate, following consultation with the Minister for Environment and Climate Change, or his delegate.	EMP - works to be conducted in accordance with EMPs	Minister for Planning / Minister for Environment and Climate Change	Yes
P&E Act - s16 - Condition 5: Works in a segment must not commence before an environmental management plan has been endorsed by the Minister for Planning, or his delegate, for that segment. The commencement of works in any segment is not dependent on an environmental management plan being endorsed for any other segment.	EMPs - No works to commence prior to sign off	Minister for Planning	Yes
P&E Act - s16 - Condition 6: Works must not commence before any offset payments or other measures to address potential adverse effects of the project works are provided by the proponent through binding commitments, for relevant	See AC recommendation 17 (sheet 'Ministers response - 45 AC Recs')	Minister for Planning / Minister for Environment and Climate Change	Yes

Act	Description	Authority	Relevant to Waterway Crossings EMP section
purposes and particular amounts specified in writing by either the Minister for Planning or the Minister for Environment and Climate Change.			
P&E Act - s16 - Condition 7: Works must not commence before a financial bond for relevant purposes and particular amounts specified in writing by Minister for Environment and Climate Change is provided by the proponent that may be drawn down for repair or reinstatement of environmental conditions at the direction of the Minister for Environment and Climate Change.	To be determined by the Minister for Environment and Climate Change	Minister for Environment and Climate Change	Yes
P&E Act - s16 - Condition 8: The environmental performance of the works must be monitored, audited and reported in accordance with procedures that are specified by the Minister for Planning following consultation with the Minister for Environment and Climate Change.	To be determined by the Minister for Planning in consultation with the Minister for Environment and Climate Change	Minister for Planning / Minister for Environment and Climate Change	Yes
P&E Act - s16 - Condition 9: The proponent must pay all costs of monitoring, auditing and reporting the environmental performance of the works in accordance with condition 8.	Alliance to cover costs of monitoring, auditing and reporting.		Yes
P&E Act - s16 - Ministers Response to Advisory Committee Recommendations (No. 45)	Refer to sheet 'Ministers response - 45 AC Recs'		Yes
Rail Corporations Act 1996 (Vic); Water Act 1989 (Vic)	MW and VicTrack agree to site specific conditions (letter format) and discussions. If agreement can not be made, MW to invoke their powers under the Water Act.	VicTrack	No
Road Management Act 2004 (Vic)	Permit for 'road opening' or 'road occupying'.	Murrindindi Shire Council	No

Act	Description	Authority	Relevant to Waterway Crossings EMP section
Road Management Act 2004 (Vic)	Permit for 'road opening' or 'road occupying'.	Yarra Ranges Council	No
Road Management Act 2004 (Vic)	Permit for 'road opening' or 'road occupying'.	Nillumbik Shire Council	No
Road Management Act 2004 (Vic)	Traffic Management Plans	Murrindindi Shire Council and Yarra Ranges Shire Council	Yes
Road Management Act (2004)	Approval for pipeline and other structures (AV, SC, CP) within or crossing road reserves and 'road opening' or 'road occupying' permits	VicRoads - Metropolitan South East Region	No
Road Management Act (2004)	Approval for pipeline and other structures (AV, SC, CP) within or crossing road reserves and 'road opening' or 'road occupying' permits	VicRoads - North Eastern Region	No
Telecommunications Act 1997 (Cth); Water Act 1989 (Vic)	Approval to cross Optic Fibre, parallel to Optic Fibre, cross minor Telstra and parallel to minor Telstra	Telstra	Yes
Water Act 1989 (Vic)	Approval for pipeline located within or crossing MW assets/pipe tracks, including Maroondah Aqueduct and Siphon (but not waterways). Modification to aqueduct off takes, supply interruption etc.	Melbourne Water	Yes
Water Act 1989 (Vic)	Approval from Yarra Valley Water (YVW) to cross YVW assets	Yarra Valley Water	No
Water Act 1989 (Vic)	Approval from Goulburn Valley Water (GVW) to cross GVW assets	Goulburn Valley Water	No
Water Act 1989 (Vic)	Permit to work on or adjacent to designated waterways (floodplains) north of the divide	Goulburn Broken Catchment Management Authority	Yes
Water Act 1989 (Vic)	Permit to work on or adjacent to designated waterways (floodplains) south of the divide	Melbourne Water on behalf of Port Phillip and Westernport CMA	Yes
Water Act 1989 (Vic)	'Permit to Work' to undertake works on Melbourne Water assets.	Melbourne Water	Yes
Water Act 1989 (Vic)	Section 133 Notices need to be served on landowners no less than 7 days before construction starts. This will give Melbourne Water authorised personnel the right to enter land to construct subject to		Yes

Act	Description	Authority	Relevant to Waterway Crossings EMP section
	conditions including hours of work (7.30am - 6pm). Compensation is payable under section 155 of the Act (which will happen before or after entry of land).		
Wildlife Act 1975 (Vic)	To research, handle, relocate, salvage, husbandry of wildlife.	Department of Sustainability and Environment	Yes

APPENDIX F: ROLES & RESPONSIBILITIES

MWC has overall responsibility for delivery of the project and has contracted with the SPA members to design and construct the project. The day to day responsibility for implementation of the EMF and therefore the EMP is the duty of the SPA; however Melbourne Water is nevertheless accountable for overall compliance with the conditions for approval under the Planning and Environment Act 1987 and other statutory requirements.

Leadership

Management and supervisory personnel will lead by example and set high standards for environmental management. They will act in a timely manner to correct any nonconforming conditions or behaviours and promote environmental awareness, individual environmental responsibility (ownership) and continual improvement at every opportunity.

The Alliance Project Manager has overall authority in the determination of all matters affecting the implementation and operation of the Alliance. The Alliance Project Manager reports to the Alliance Leadership Team (ALT) and is responsible for:

- Reviewing and authorising the EMP and the associated Environmental Programs (EPs);
- Assigning Environmental responsibilities to Alliance Management Team (AMT) members;
- Providing sufficient resources to ensure the EMP is fully implemented; and
- Participating in the review of the Environmental Management System and other relevant Environmental meetings and programs.

Organisational Structure

The Project Services Manager is accountable to the Alliance Project Manager for the overall environmental performance and compliance. The Environmental and Heritage Manager is to directly report to the Project Services Manager and is accountable for the day to day environmental performance and compliance with this EMP and the overarching EMS.

Figure 2 demonstrates the SPA team structure and provides the key activities these teams undertake as part of delivering the Project.

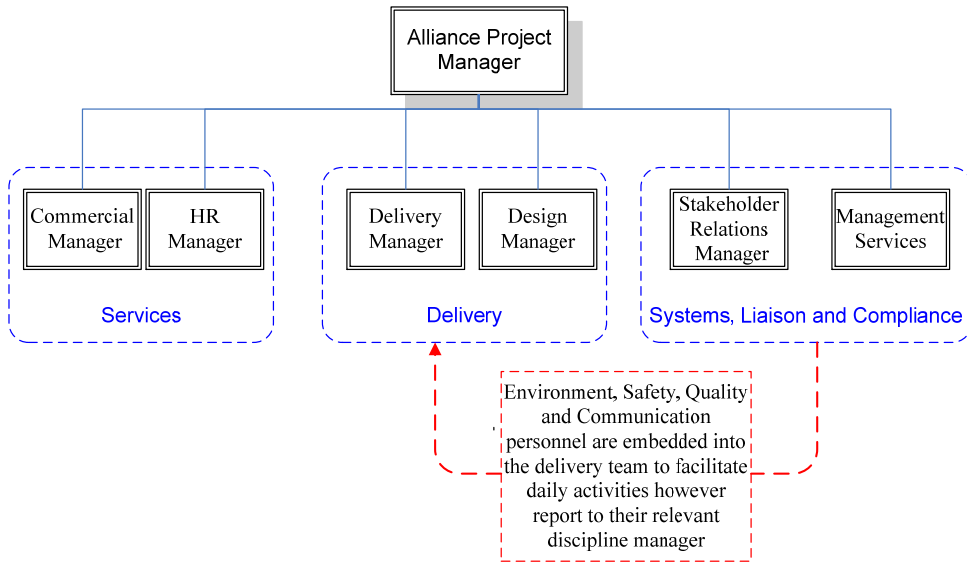


Figure 2: Sugarloaf Pipeline Alliance Organisation Structure and Operating Structure

The Environment and Heritage Team within the Project Services Group have dedicated resources for:

- The development and implementation of Environmental Management Plans and associated Environmental Programs, Cultural Heritage Management Plan and Offset Management Plan; and
- The development and implementation of property specific Site Environment Plans and Plan of Environmental Controls for inclusion into the Work Activity Packs.

The Environment and Heritage Team comprises both field-based support personnel and EMP administrative personnel.

Throughout construction two field-based teams coordinated by Site Environment Coordinators will work with construction personnel to ensure that EMPs and SEPs are implemented effectively on the ground and that all construction activities are compliant with the requirements of the EMPs and the overarching EMS.

An Environmental Compliance Coordinator will have the responsibility of working with both the Site Environment Coordinators and Environmental Specialists to ensure all relevant and required monitoring takes place. In addition the Environmental Compliance Coordinator will develop Environmental Management Plans and update SEPs and PECs as required.

An Environment Controls Officer will work across all areas in a support role providing an independent opinion on site environmental controls and measures undertaken as well as providing specialist advice, training and support in ensuring high risk elements such as bio-security are adequately established and maintained.

The Environment and Heritage Manager will monitor field activities and the development and implementation of the EMPs and SEPs as well as reporting on progress and activities through the Community and Environment Manager to the Alliance Management Team, Alliance Project Manager and Alliance Leadership Team.

Figure 3 shows the structure of the Environmental and Heritage group who will be responsible for ensuring compliance with this EMP and associated EPs.

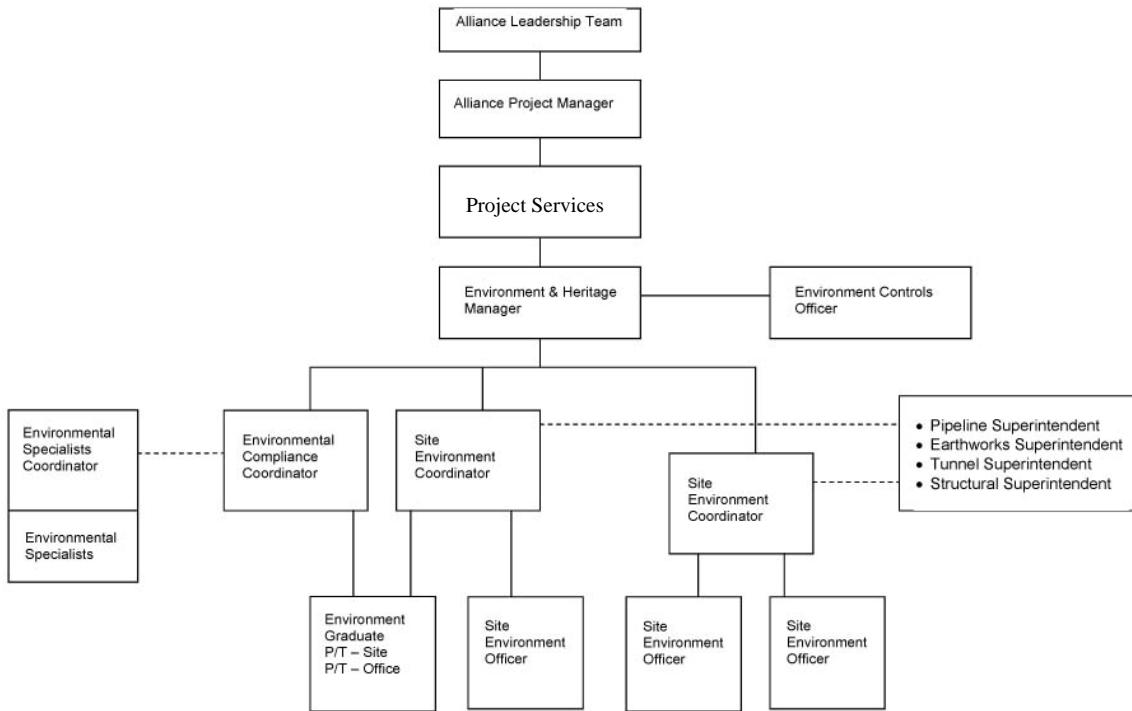


Figure 3: Structure of Environmental and Heritage Team

Responsibilities

Project Team

Specific environmental responsibilities will be allocated in position descriptions and through the Control Procedures.

The Alliance Project Manager, AMT and Wider Project Team, together with the Environmental and Heritage Team have the following key responsibilities in relation to environmental management:

- Ensure construction is carried out in accordance with the requirements of the Project Alliance Agreement and Approvals;
- Ensure construction is carried out in an environmentally sustainable way and in accordance with the design;
- Develop, implement and maintain an environmental management system in accordance with the requirements of ISO 14001;
- Develop, maintain and implement this EMP and associated EPs in accordance with the overarching EMS;
- Ensure environmental risks are managed in accordance with this EMP and associated EPs;
- Ensure that environmental obligations and requirements are included in the service agreements and subcontracts as standard requirements;
- Provide subcontractor personnel with adequate plans and procedures for the management of specific environmental elements during the works, so that the works are carried out in compliance with Environmental Law, regulations, the EMS and the EMPs;
- Provide adequate resourcing of appropriately skilled and experienced personnel for the project;
- Ensure that environmental roles, responsibilities and accountabilities are incorporated into position descriptions and that performance is regularly reviewed;

- Prepare information and opportunities for community groups in relation to environmental design, site protection measures and site monitoring;
- Ensure that systems are in place and stakeholder issues, complaints and comments on the Project are handled in a timely manner;
- Ensure appropriate training of personnel in respect to the environmental protection measures and responsibilities; and
- Monitor and report on performance, including sustainability Key Result Areas.

Subcontractors

Subcontractors will:

- Where required, at the direction of the relevant Alliance Manager in consultation with the Environmental and Heritage Manager, comply with this EMP which will be included in the WAPs, for the scope of works to be undertaken for the Project;
- Not commence works on site until their construction method statement(s) have been approved by the Alliance’s Environmental Representative;
- Develop an organisation structure to ensure adequate responsibility for, attention to and resourcing of environmental works as part of the subcontracted works;
- Ensure that the subcontractor team members are aware of and fully comply with the requirements of this EMP and the overarching EMS;
- Undertake relevant environmental monitoring in accordance with the required scope of works to be undertaken and the requirements of this EMS as applicable;
- Undertake site audits and review environmental performance of the works as applicable; and
- As applicable update, revise and implement any contract-specific measures in accordance with the revised schedule of works, site layout and environmental risk requirements.

Specialist Alliance Environmental Personnel and Subcontractors

The key roles and responsibilities of Alliance environmental specialists and Subcontractors engaged for specialist environmental support roles include:

- Aboriginal heritage consultants to assist with liaison with relevant Aboriginal and associated archaeological issues;
- Archaeologist to provide advice relating to European historic sites;
- Flora surveys and assessment of “Net Gain” requirements;
- Collection and propagation of local provenance seed;
- Translocation of rare and threatened flora from areas to be cleared;
- Rescue and translocation of any wildlife that has fallen into open trenches;
- Placement of protective fencing around areas of native vegetation or other significant ecological features;
- Water quality monitoring program - sampling and analysis;
- Groundwater level and quality monitoring program – sampling and analysis;
- Air quality monitoring program if required;

- Noise monitoring;
 - Agriculture and viticulture specialists to provide advice on bio-security measures; and
- Others as required during the course of the Project.

APPENDIX G: PERFORMANCE EVALUATION

Internal

The SPA will regularly measure its performance against:

- Internal Key Performance Indicators;
- Internal objectives and targets related to the control of significant environmental and heritage aspects;
- Compliance with endorsed management plans and programs; and
- Compliance with legislative requirements.

Internal auditing of construction activities will be carried out by the Communications and Environment Group. These audits will cover both compliance and system elements. The Environmental & Heritage Manager is responsible for managing the Environmental Monitoring and Inspection Program.

Quarterly internal environmental audits will be carried out in accordance with Alliance internal quality procedures. In particular Auditing Procedure No: SPA-MPR-GL-PDR-0012 describes the planning, conducting, documenting and reporting of all internal Alliance audits.

Audit reports will be prepared on completion of the audit in accordance with SPA internal document SPA-FRM-GL-PDR-012A. The report includes the following as applicable:

- Audit Report (SPA-FRM-GL-PDR-012A);
- Audit Record (Checklist) (SPA-FRM-GL-PDR-012B); or
- Audit Action List (SPA-FRM-GL-PDR-012D).

Any observations resulting from an audit that the Alliance considers requires an action of the auditee shall be documented on an internal procedural Audit Action List (SPA-FRM-GL-PDR-012D) and non-compliances, corrective and preventive action will be documented in accordance with the Non-conformance and Corrective Action procedure (SPA-MPR-GL-QUA -0007).

Complaints relating to environmental matters made by members of the public to the EPA will be treated as environmental incidents and managed in accordance with SPA-MPR-GL-ENV-0019 "Environmental Incident Management and investigations" and SPA-MPR-GL-ENV-0018 "Environmental incident reporting".

Where required, specialist consultants shall be engaged to help establish internal monitoring systems and to train relevant personnel in the collection of samples, use of scientific instrumentation and recording and analysis of data. For specific monitoring requirements, refer to the individual Environmental Programs.

Any monitoring results that exceed the relevant limit / target shall be treated as incidents and managed in accordance with internal procedures.

Inspection, testing and calibration of monitoring equipment will be the Project's Environmental Team responsibility, and will be managed in accordance with the internal procedural document "Monitoring and Test Equipment" Inspection and test records shall be maintained in the Equipment Calibration Register.

Construction inspections will be undertaken on a regular basis in accordance with the Environmental Management Programs.

External auditing will be conducted by suitably qualified environmental management practitioners. There may also be requirements for further external auditing associated with statutory project approvals.

The environmental parameters to be monitored will include, but not be limited to, the following:

- Traffic disruption;
- Erosion and sedimentation;
- Landslip hazards;
- Disruption of groundwater movement/inflow;
- Waterway condition;
- Land condition/reinstatement
- Weed occurrence;
- Fauna recovery;
- Dust affecting crops; and
- Greenhouse gas emissions.

Monitoring results will be collated and assessed with procedures and practices continually improvement for effectiveness.

Results from the monitoring program will be reported as per the Projects internal reporting requirements set out in the internal procedural document "Project Reporting".

External

In response to Recommendation 45 of the Advisory Committee, the Minister has required that:

"The Project Order made under Section 16 of the Planning and Environment Act 1987 requires the environmental performance of the works to be monitored, audited and reported in accordance with procedures which I will endorse following consultation with the Minister for Environmental and Climate Change.

As part of these procedures, an external EPA-accredited auditor is to be appointed by the proponent (Melbourne Water) to audit the environmental performance of the project. The appointee is to be agreed with DPCD"

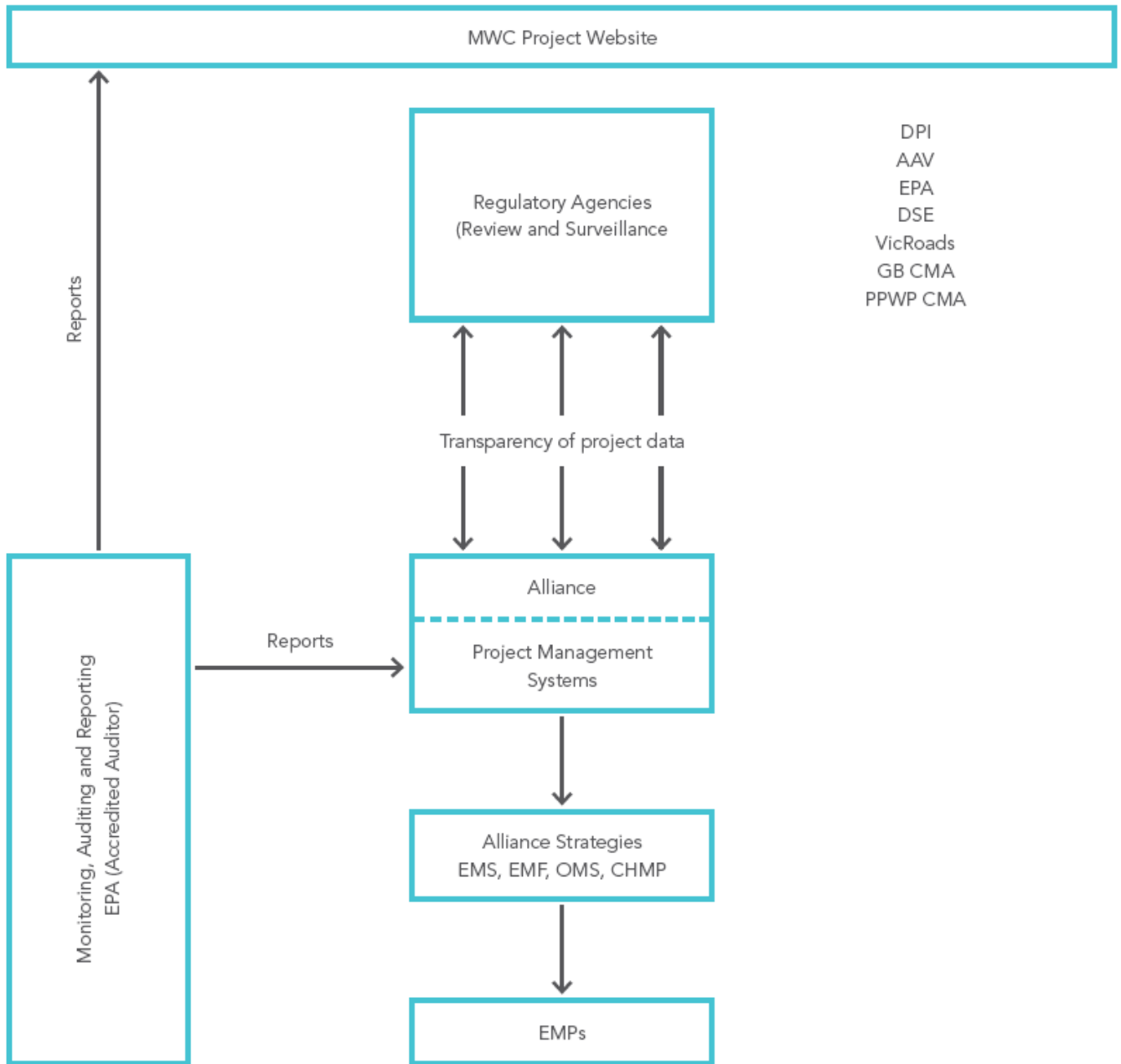
Figure 4 outlines the process by which the EPA accredited auditor will audit and report on the performance of the works, and the DPCD reviewer will input to EMP sign off. Further, during the progress of the works, these measures also provide a mechanism for continuous improvement.

Summary statements from the EPA accredited auditor and DPCD reviewer will be made publicly available.

In addition, the work being undertaken will be subject to review and surveillance by relevant regulatory agencies, who will have transparent access to Alliance Management Systems, including the day-to-day verification documentation recorded as part of Project Quality Management Systems.

This model will ensure that the project is delivered in a manner that meets the requirements and standards set out for the project.

Figure 4: Integrated Project Management System Incorporating External Audit and Reporting Function



APPENDIX H: INCIDENT AND EMERGENCY MANAGEMENT

Environmental and Heritage Value Identification

Where an environmental and/or heritage value, such as additional patches of matted flax lily is discovered on site that has not previously been identified, protocols are outlined in this EMP and associated Environmental Programs, as well as the EMS and WAPs that must be followed.

Field staff will undergo sufficient inductions (Appendix I) and ongoing 'toolbox talks' to ensure they are aware of incident and emergency management requirements and procedures.

Incident and Emergency Management and Response

Any environmental incidents and emergencies or non conformances detected shall be notified to the appropriate internal personnel, formally recorded on the Incident Register in Lotus Notes and where required by regulatory authorities. The procedures to be adopted will be based on the internal procedural documents "*Environmental Incident Management and Investigations*" and "*Environmental Incident Reporting*".

Where a non-conformance is identified, either through audits or general observations, or through reports from the public and/or any agencies, a corrective action request will be developed. The request will clearly:

- Describe the nature of the non-conformance;
- List the criteria against which the non-conformance has been determined;
- Record who identified the non-conformance, when and where;
- Recommended measures to rectify the non-conformance and ensure it does not happen again; and
- Monitor performance of recommended measures for effectiveness and revise approach as required.

APPENDIX I: INDUCTION

The Alliance will conduct or contribute to an environmental induction for employees and subcontractors before the commencement of construction. A project induction is to be attended by all project staff, which may include varying content, including environmental information for site managers, SEOs, and construction staff and contractors. The environmental component of the induction will include topics from the various areas of environmental disciplines as covered in the EPs Toolbox talks will also be provided to site personnel as and when new information is required to be communicated, as well as at the start of a new construction activity (e.g. at the start of clear and grade). The site supervisor will facilitate the toolbox meeting, with relevant input from various areas of environmental, construction and safety disciplines. For any discipline specific induction requirements refer to the individual Environment Programs.

As part of this process, awareness and educational material, such as posters and flyers, may be developed for and distributed among the personnel, highlighting the Environmental Guidelines for Major Construction Sites. This material will include the obligations of the Alliance and subcontractors regarding the *Environment Protection Act 1970* and any other relevant legislation.

A skills matrix is being developed to identify any training needs of the Site Environmental Officers who will be responsible for implementing the environmental controls identified in the EPs during construction. A training program/matrix is also being developed internally within the Alliance to identify training opportunities for continual development.

Records will be kept of all personnel undertaking the project induction and any relevant training, including the contents of the training, date and name of trainer/s.

APPENDIX J: PERFORMANCE MEASURES

	What we're measuring	Metric	Target	Performance Reporting
Aboriginal Cultural Heritage	Tracking Non Conformance Reports (NCRs) and random internal audits	% of NCRs ¹ closed out within 20 days	80% of NCRs closed out within 20 days (translates to 100% compliance with CHMP)	As required under the CHMP.
Air Quality (Other than viticulture)	Dust monitoring data from adjacent sensitive receptors	50 µg/m ³ per 24 hours (particles as PM ₁₀) per 12 month period	100% compliance with SEPP (Ambient Air Quality) 1999: <ul style="list-style-type: none"> No more than 5 days exceeding target (50 µg/m³ per 24 hours (particles as PM₁₀) per 12 month period 	6 monthly internal audit reports
Biosecurity	Tracking Non Conformance Reports (NCRs) and random internal audits	% of NCRs closed out within 20 days	80% of NCRs closed out within 20 days (translates to 100% compliance with Biosecurity Management Program)	Compliance report within 2 weeks of the completion of construction within this EMP section

¹ Items which are inspected and found to not meet acceptance criteria or specified requirements will be deemed nonconforming and will be appropriately identified/marked and reported. Any non-conformance detected by Sugarloaf Alliance (SPA) staff shall be documented as a Non-conformance Report (NCR). Where an NCR is raised, appropriate corrective and preventive measures must be implemented to address the non conformance and prevent its recurrence.

	What we're measuring	Metric	Target	Performance Reporting
Contaminated Land, Hazardous Substances and Waste	Tracking Non Conformance Reports (NCRs) and random internal audits of appropriate handling and disposal of hazardous waste material (eg EPA tracking certificates)	% of incidents rectified within 20 days	80% of incidents ² rectified within 20 days (translates to residual levels of contamination meeting EPA Victoria clean fill requirements).	As required, pending the location and identification of potentially contaminated land. As required, based on potential spills or releases related to construction works.
Erosion and Sediment Control and Waterways	Baseline water quality monitoring <ul style="list-style-type: none"> Water quality monitoring (upstream and downstream of construction area) 	<ul style="list-style-type: none"> Turbidity Suspended Solids pH Electrical Conductivity Dissolved Oxygen (DO) 	100% compliance with SEPP (WoV) as a result of construction activities Comply with Works on Waterways Permits	Inspection report to be submitted within 2 weeks of commencement of works within this EMP section Inspection report during construction only if works within this EMP section are not completed within 1 month of commencing Inspection report 6 monthly for 2 years after reinstatement (for whole project area).

² An incident is any unplanned event(s) which has the potential to, or has resulted in personal damage such as an injury, illness, disease and/or damage to plant, materials or property or the environment.

	What we're measuring	Metric	Target	Performance Reporting
Fauna (Aquatic Fauna)	Tracking Non Conformance Reports (NCRs) and random internal audits	% of NCRs closed out within 20 days	80% of NCRs closed out within 20 days (translates to 100% compliance with the FMP and Mitigation Plans for EPBC and FFG Act list Aquatic Fauna Species)	<p>Compliance report to be submitted within 2 weeks of starting construction within this EMP section</p> <p>Compliance report to be submitted within 2 weeks of completion of construction within this EMP section which will also address the effectiveness of mitigation measures</p> <p>Reporting as detailed in FMP and DSE/DEWHA conditions</p>
Fauna (Terrestrial)	Tracking Non Conformance Reports (NCRs) and random internal audits	% of NCRs closed out within 20 days	80% of NCRs closed out within 20 days (translates to 100% compliance with the FMP and Mitigation Plans for EPBC and FFG Act list Terrestrial Fauna Species)	<p>Compliance report to be submitted within 2 weeks of starting construction within this EMP section</p> <p>Compliance report to be submitted within 2 weeks of completion of construction within this EMP section which will also address the effectiveness of mitigation measures</p> <p>Reporting as detailed in FMP and DSE/DEWHA conditions</p>

	What we're measuring	Metric	Target	Performance Reporting
Groundwater	Groundwater levels to be monitored seasonally (3 monthly intervals) in areas identified with potential groundwater issues (ie Yea River floodplain in Yea and Tunnel).	Groundwater table level (mAHD)	No adverse affects to groundwater level measured by the occurrence of a sudden and sustained change to the groundwater level measured six months following completion of works in the area. ³	Report of inspection of site conditions within 2 weeks of starting construction within this EMP section Report of inspections after 6 months and then 1 year after construction for this EMP section
Noise	Noise monitoring data from adjacent sensitive receptors	Noise level (dBA)	100 % compliance with EPA standards: <ul style="list-style-type: none"> No noise limits during normal working hours (7am to 6pm Weekdays and 7am to 1pm Sat) L_{A10} noise level at any residential premises is not to exceed the background noise level (L_{A90}) by 10dBA in the evening (6pm to 10pm Weekdays, 1pm to 10pm Sat and 7am to 10pm Sundays and Public Holidays) 	6 monthly internal audit reports

³ Provision should be made for an independent assessment in the event that a change in ground water level occurs but no adverse affect is identifiable.

	What we're measuring	Metric	Target	Performance Reporting
Reinstatement of agricultural land	<p>Land/Soil condition</p> <p>Review and audit of agricultural land productivity by independent agricultural specialist before construction and after reinstatement</p> <p>Monitor all disturbed areas (drainage, trenches, and exposed soil) for signs of erosion.</p>	<p>% of private agricultural land signed off by independent agricultural specialist</p> <p>Depth (cm) of gully due to erosion</p>	<p>100% sign off by independent agricultural specialist</p> <p>No major gullying (>30cm) evident within the construction ROW compared to baseline.</p>	<p>Inspection report within 2 weeks after construction has completed within this EMP section</p> <p>Inspection report 6 monthly for 2 years for whole project area</p>
Reinstatement of agricultural land	<p>Slope Stability</p> <p>Soil compaction</p>	<p>% compaction</p>	<p>Adherence to Australian Standards (AS 3798, 2007) for 90% compaction immediately after construction</p>	<p>Inspection report to be submitted within 2 weeks of starting construction within this EMP section</p> <p>Inspection report to be submitted within 2 weeks after construction has completed within this EMP section</p> <p>Inspection report 6 monthly for 2 years for whole project area</p>

	What we're measuring	Metric	Target	Performance Reporting
Reinstatement of agricultural land	<p>Native Vegetation (outside ROW and in public land)</p> <p>Tree health survey within 25m from the edge of the ROW and within the Traffic Management Works Area which have been lopped/trimmed to ensure health of tree no adversely impacted upon</p>	% change in health score	Health score no more than 10% reduction from the pre-construction assessment during construction and up to 3 years post construction in private agricultural land	Inspection report to DSE after 1 year and 3 years post construction
Reinstatement of agricultural land	<p>Weed occurrence</p> <p>Weed surveys</p> <p>Monitoring weed germination and establishment in disturbed areas.</p>	Weed species occurrence and densities	Weed species occurrence and densities no greater than adjoining land after 2 years	Report of inspection at 6 month intervals for 2 years for whole project area
Slope Stability	Soil compaction	Soil compaction (%)	Adherence to Australian Standards (AS 3798, 2007) for 90% compaction on agricultural land and 95% in the forest immediately after construction	<p>Inspection report prior to construction</p> <p>Inspection report immediately after completion of construction</p> <p>Inspection report 6 monthly for 2 years</p>

	What we're measuring	Metric	Target	Performance Reporting
Native Vegetation	Tracking Non Conformance Reports (NCRs) and random internal audits	% of NCRs closed out within 20 days	80% of NCRs closed out within 20 days (translates to 100% compliance with the VMP and Mitigation Plans for EPBC and FFG Act list Flora Species)	<p>Compliance report to be submitted within 2 weeks of starting construction within this EMP section</p> <p>Compliance report to be submitted within 2 weeks after construction has completed within this EMP section which will also address the effectiveness of mitigation measures</p> <p>Reporting as detailed in FMP and DSE/DEWHA conditions</p>
Traffic	<p>Tracking Non Conformance Reports (NCRs)</p> <p>Travel times against baseline</p>	<p>% of NCRs closed out within 20 days</p> <p>Travel time (min)</p>	<p>80% of NCRs closed out within 20 days (translates to 100% compliance with Traffic Management Plans)</p> <p>Travel times between Yarra Glen and Yea has less than 20minutes delays compared to baseline</p>	<p>Monthly report based on traffic delays and compliance with TMP during construction</p>