

Regional Rail Link Authority

**Regional Rail Link**

Sunshine Diuris Construction Management  
Plan

RRL-1000-EEC-REP-0004

Revision 1 | 27 May 2016

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**Document Verification**



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## Contents

	Page	
1	Introduction	1
	1.1 Report purpose	1
	1.2 Overview and location	1
	1.3 Design and construction requirements	1
	1.4 Definitions relevant to this plan	2
	1.5 Ecological condition at the Sunshine Diuris Site	4
	1.6 Previous assessments and determinations at the Sunshine Diuris Site	5
2	Risk Assessment	10
	2.1 Risk assessment	10
	2.2 Ecological risk	10
3	Management Measures	11
	3.1 Responsibilities	11
	3.2 Pre-construction	11
	3.3 Construction	16
	3.4 Post construction	22
4	Environmental Monitoring and Reporting Requirements	24
	4.1 Monitoring	24
	4.2 Reporting	24
5	Emergency management protocols	26
6	Offset Program	27
7	Limitations	28
8	References	29

## Appendices

Appendix A

Construction Plan

Appendix B

Environmental Risk Assessment

Appendix C

Risk Matrix

Appendix D

Priority Weeds within Sunshine Triangle

# 1 Introduction

## 1.1 Report purpose

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The Sunshine Diuris Construction Management Plan has been prepared to enforce strict controls on the construction of the Regional Rail Link (RRL) project in the vicinity of the Sunshine Triangle where the Sunshine diuris is located.

The objectives of the plan are to:

- protect and maintain the population of Sunshine diuris at the Sunshine diuris site during construction; and
- protect and maintain the vegetation communities within the Sunshine Triangle during construction.

## 1.2 Overview and location

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The Sunshine diuris (*Diuris fragrantissima*) is one of the most critically endangered orchid species in Australia. It is endemic to Victoria and was once a commonly occurring orchid on the grassy plains to the west of Melbourne. The orchid has experienced a severe decline in distribution as a consequence of European settlement pressures, to the extent that now the last known wild population of the Sunshine diuris is found at a site in the western Melbourne suburb of Sunshine within an area known as the Sunshine Triangle.

The Sunshine diuris is listed as endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), listed under the *Flora and Fauna Guarantee Act 1988*, and listed as endangered under the Department of Environment and Primary Industries (DEPI) Advisory List of Rare or Threatened Plants in Victoria (DSE 2005).

The Sunshine Diuris Site is located on Crown land vested in and managed by VicTrack on behalf of the Victorian Government. The land approximately 15 m to the closest rail is currently leased to Metro Trains Melbourne (MTM) which operates Melbourne's metropolitan train service. These lease arrangements will change after construction of the regional rail link lines.

Details for the proposed long term management of the site are documented in the Sunshine Diuris Long Term Management Plan (RRL-1000-EEC-REP-0003).

## 1.3 Design and construction requirements

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The RRL project proposes construction of new, and modifications to existing, track formation, rail tracks, signalling, overhead traction power and communications systems. The construction of the additional two rail lines for RRL will be accommodated within the existing width of the rail formation by slewing existing tracks to the north resulting in tracks no closer to the Sunshine diuris site than the current layout. Furthermore, to allow space for the RRL tracks, extensive realignment of the suburban network and ARTC lines to the north is required. For the purposes of this document, major construction works are defined as the construction of the railway, including track slewing, grading, construction of the formation, rail tracks, addition of ballast, and associated drainage works. Other minor works include the construction of a noise barrier adjacent to the neighbouring caravan park.

The proposed design does not impact on Matthews Hill Reserve or O'Brien Park, located on the northern side of the rail line.

The construction area for this section of the project works is defined in Appendix A. The construction area is from Stony Creek to the freight crossover (approximate chainages 10.9-11.6 km), and includes the rail formation and tracks, current and proposed access tracks and a noise barrier adjacent to the neighbouring caravan park. This area is included within the

Regional Rail Link 1 project area designated under the *Major Transport Project Facilitation Act 2009*.

Construction access tracks are required for the safety of construction workers, delivery of materials and equipment and to allow construction works. Components of the access tracks will be retained as the permanent access for rail maintenance activities into the rail corridor at the conclusion of the project. The hardstand required for the construction of the noise barrier will be retained in line with DEPI requirements.

Two access tracks are proposed, one along the western edge of the Sunshine Triangle (southern access track) and the other adjacent to the rail corridor (northern access track). The southern access track will have the advantage of providing further separation between the Sunshine Diuris Site and construction traffic movements.

The construction access tracks have been designed for construction machinery and vehicles, inclusive of a 19.0 m long semi-trailer. The hardstand associated with the noise barrier has been designed for access primarily from the east.

The KBR Arup Joint Venture (KAJV) has prepared this plan with scientific input and review from Dr Mark Clements of CSIRO, senior management personnel within the DEPI (now DELWP) and the Sunshine diuris Recovery Team. Further amendments to the plan have incorporated comments from the Footscray to Deer Park Alliance relating to the route of the construction access tracks.

#### **1.4 Definitions relevant to this plan**

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Major construction - the construction of the railway, including track slewing, grading, construction of the formation, rail tracks, ballast, and associated drainage works.

Construction area - the construction area for the project is defined in Appendix A. The construction area is specific to this plan only as it contains a series of actions relating to this area. The construction area is from Stony Creek to the freight crossover (approximate chainages 10.9-11.6 km), and includes the rail formation and tracks and the current and proposed access tracks. This area is included within the Regional Rail Link 1 project area designated under *the Major Transport Project Facilitation Act 2009*.

Adjacent to the Sunshine diuris site – the area within a 50 m radius of the boundary fence of the Sunshine diuris site. This area is shown as the buffer zone around the Sunshine diuris site as indicated in Appendix A.

Sunshine Triangle – the area closely bounded by Sydenham rail line on the northern side, a grain rail siding to the west, which also forms part of the Bacchus Marsh Junction-Newport line, and Sunshine Road to the south. [REDACTED]

[REDACTED] The area is shown in Appendix A.

Sunshine Diuris Site – the small fenced area containing the remaining wild population of Sunshine diuris plants located within the Sunshine Triangle. The area is shown in Appendix A.

**Figure 1 Description Map**

- Note: this has been removed from this report as it contains sensitive ecological information.

## 1.5 Ecological condition at the Sunshine Diuris Site

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### Current condition of Sunshine diuris

The last remaining natural population of Sunshine diuris is located in the western suburbs of Melbourne at Sunshine where there are currently 33 plants. The species has a natural distribution limited to the grassy plains west of Melbourne and has experienced a severe decline in distribution and abundance as a consequence of the pressures of European settlement. By 1900, the orchid was apparently restricted to rail reserves and by 1951 was close to extinction (Murphy *et al.* 2008).

By 1980, the species was restricted to the single site [REDACTED] where approximately 100 plants were recorded and the decline in population numbers continued until by 1992, only one plant was recorded. No flowering plants were observed for five years, then one plant in 1997 and three in 1998. Numbers have slowly increased during the last 10 years, with 24 wild plants recorded in 2007. Some additional plants were introduced to the site during this period and three were observed in 2007, rising to the combined total of wild and re-introduced plants currently believed to be 33 plants (DSE 2010).

### Threats to Sunshine diuris in the Sunshine Diuris Site

The decline of the native population of Sunshine diuris is attributed to widespread habitat destruction and degradation. Most of the native grasslands to the west of Melbourne have been destroyed due to agricultural cropping and grazing or urban and industrial development. The remaining remnants are generally small, fragmented, highly degraded and at extreme risk of further degradation. During the 1970s, four of the remaining five known sites where Sunshine diuris was recorded were destroyed by dumping of soil and ballast, cultivation or spraying with herbicide (Parsons 1981 cited in Murphy *et al.* 2008).

The Sunshine diuris site is severely threatened due to its very small size and location [REDACTED]. Key threats include disrupted ecological processes due to the small area of habitat and small number of plants. The process of natural pollination thought to be effected by a particular species of small native bee is likely to have been disrupted and decreased by the limited area of habitat and size of the population of orchids (Tonkinson 1985 cited in Murphy *et al.* 2008). The maximum recorded rate of natural pollination is only 7 per cent of flowers producing seed pods annually (Cropper 1993 cited in Murphy *et al.* 2008). It is thought that this low pollination rate may be due to there being so few orchids and therefore a decreased opportunity for the native bee to find the flowers and pollinate them.

Other major threats include weed invasion, especially by the exotic Chilean needle grass (*Nassella neesiana*) which represents a serious threat to the site, despite ongoing efforts at control. Other significant weed species include the annual grassy weeds the hairgrasses (*Aira spp.*), large quaking grass (*Briza maxima*) and squirrel tail fescue (*Vulpia bromoides*), fennel (*Foeniculum vulgare*), ribwort (*Plantago lanceolata*), onion grass (*Romulea rosea*) and medics (*Medicago spp.*). Weed control is necessary to protect the site, but is itself a threat if implemented inappropriately as herbicide could destroy the remaining orchids. Hand weeding is undertaken within the Sunshine diuris site.

Predation by the introduced house mouse (*Mus musculus*) is suspected to have destroyed approximately 70 per cent of the plants during the 1980s (Cropper 1993 cited in Murphy *et al.* 2008) and introduced species of snails and slugs regularly damage the remaining plants (Murphy *et al.* 2008). Other invertebrates are likely to be a potential threat on occasion.

Exclusion of grazing by soft-footed native herbivores such as the bandicoot, which is likely to have previously occurred in the area, is preventing natural, regular maintenance of the open inter-tussock spaces between grasses in the native grassland structure, which has been

substituted by the more severe effects of frequent fire management (pers. comm., M. Clements, 20/7/2010).

Altered fire regimes have the potential for positive and negative impacts on the Sunshine diuris plants and site condition. Planned periodic summer fires are a part of current management and are considered by managing authorities to have positive benefits by reducing competition from native grasses such as kangaroo grass (*Themeda triandra*) and grassy and herbaceous weeds including Chilean needle grass and ribwort, and increasing the proportion of bare ground which provides appropriate conditions for seedling recruitment. If fires occur too frequently or at an inappropriate time, negative impacts include damage to plants, increased seedling mortality and destruction of immature seedpods (Murphy *et al.* 2008). If fires occur too infrequently, native grasses can become overly dominant and inhibit regeneration of native herbs and other species, including Sunshine diuris. Early fencing of the Sunshine site in the 1950s and the exclusion of fire is believed to have contributed to the loss of plants within the fenced area over the following 25 years. The plants that survived were located outside the fence in an area that continued to be burnt periodically (Murphy *et al.* 2008).

Changes in land use or works conducted within the rail reserve, human interference due to arson, trampling of plants, illegal removal of plants and seed capsules and infrastructure maintenance are other potential threats to the Sunshine diuris site.

## **1.6 Previous assessments and determinations at the Sunshine Diuris Site**

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Table 1.1 summarises the conditions of the past Commonwealth EPBC Referral decision regarding the Melbourne Airport Rail Link (2001) and recommendations associated with the proposed Sunshine Rail Corridor Third Track project (2006) which did not proceed. The final column provides a response for the current Regional Rail Link project.



**Table 1.1 Previous assessment determinations at the Sunshine Diuris Site**

	Commonwealth EPBC decision on Melbourne Airport Rail Link (2001)	Biosis recommendations for the Sunshine Rail Corridor Third Track project (2006)	Regional Rail Link Response
Overall	Must not remove or physically disturb the Sunshine diuris plants within the orchid site during construction		New tracks are within the existing rail corridor and are no closer than the existing rail infrastructure adjacent to the Sunshine Diuris Site.  No works will occur within the Sunshine diuris site.
Timing	Construction of additional track, and movement of existing tracks, within 100m of the orchid site must only occur between 1 January and 30 April	Works should be confined to the period between January and March	Major construction works adjacent to the Sunshine diuris site are scheduled to occur between 1 January and 31 March when the Sunshine diuris is usually dormant. Prior consultation with DELWP and Department of Environment (DoE) is required prior to commencement if major works are to occur at times other than the restricted timeframe.
Construction (fencing, weeds and drainage)	<p>Must construct a solid construction fence around the perimeter of the orchid site in accordance with the following requirements:</p> <ul style="list-style-type: none"> <li>at least 2 m chain-mesh plastic coated fence with cement foundations erected around the whole site prior to any works commencing;</li> <li>necessarily within 1-1.5 m of the existing fence on the north-eastern side, but elsewhere can be several metres (minimum 4m) outside the existing fence</li> <li>sufficiently distant from the existing fence to prevent downslope impacts (runoff or erosion) to the site, particularly at the south-eastern end where a low embankment is present</li> </ul>	<p>A solid construction fence (at least 2m chain-mesh with cement foundations) should be erected around the whole site prior to any works commencing.</p> <p>This will necessarily be within 1-1.5 m of the existing fence on the north-eastern side, but elsewhere can be several metres outside the existing fence. The construction fence should be located to contain and protect all grassland areas in the vicinity of the Diuris enclosure. Such a fence should be sufficiently distant from the existing fence to prevent downslope impacts (runoff or erosion) to the site, particularly at the south-eastern end where a low embankment is present. The area between the fences should be cemented (or similar) to provide an inert surface</p>	<p>A rigid construction fence will be positioned adjacent to the Sunshine Diuris Site, between the permanent fence and northern access track and will remain in place until construction works are complete.</p> <p>Protective fencing will be erected prior to construction commencing around the perimeter of the Sunshine Triangle. The fence will have rabbit proof netting fencing at the bottom.</p>

	Commonwealth EPBC decision on Melbourne Airport Rail Link (2001)	Biosis recommendations for the Sunshine Rail Corridor Third Track project (2006)	Regional Rail Link Response
	<ul style="list-style-type: none"> <li>• sufficiently distant from the native vegetation outside the existing fence and construction of the fence should not disturb this vegetation</li> </ul>	<p>(preventing plant growth). Except for the zone adjacent to the rail track, it would be preferable to manage weeds at the boundary of the Diuris enclosure rather than concrete this zone, as native grassland extends beyond the fence-line.</p>	
	<ul style="list-style-type: none"> <li>• provides for the area between the fences, where there is no native vegetation, to be covered with a weed inhibiting fabric such as a weed mat and planted with species that will enhance the site and be beneficial to the Sunshine Diuris pollinator;</li> <li>• provides access for people through the chain link fence;</li> <li>• provides a permanent cut-off drain to prevent surface runoff entering the site from the construction area, particularly along the north-eastern side</li> <li>• provides a permanent retaining wall on the north-eastern side between the proposed works area and the new construction fence to contain material and runoff to the works area; and</li> <li>• that the installation of the drainage and retaining walls must not make the site drier, as this will be detrimental to the Sunshine Diuris.</li> </ul>	<p>A permanent cut-off drain will be required to prevent surface runoff entering the site from the construction area, particularly along the north-eastern side; this is particularly important for the northern third of the site which is below the level of the existing tracks. A permanent retaining wall should be constructed on the north-eastern side between the proposed works area and the new construction fence to contain materials and runoff to the works area. The retaining wall should be sturdy and impervious to ensure that any soil is not pushed into the protected area.</p>	<p>An assessment of drainage impacts on the Sunshine diuris site will be undertaken based on final design of the railway and the northern access track. A bund or similar structure will be installed adjacent to the Sunshine diuris site to prevent sediment, pollutants or a significant increase in water flow entering the site during construction.</p>

	Commonwealth EPBC decision on Melbourne Airport Rail Link (2001)	Biosis recommendations for the Sunshine Rail Corridor Third Track project (2006)	Regional Rail Link Response
Management Plan	<p>Must prepare and submit to the Minister for approval prior to commencement of the action, a plan for managing the impacts of construction and operation on the Sunshine Diuris. This will include:</p> <ul style="list-style-type: none"> <li>• control of weed seed, runoff and soil onto the site;</li> <li>• control of weeds within a 20 m buffer area;</li> <li>• minimising impacts of pesticide use;</li> <li>• ensuring adequate security of the site including restricting access to the orchid site to authorised personnel; and</li> <li>• monitoring of the effectiveness of the plan.</li> </ul>	<p>An Environmental Management Plan (EMP) shall be prepared for both the construction and operational phases of the project. This will include a detailed set of management prescriptions for the site, developed in conjunction with construction engineers once details of the construction process are known. An ongoing monitoring program will form an important component of the EMP in both construction and operational phases. An independent auditor with ecological qualifications should be engaged to ensure compliance with the EMP.</p>	<p>Sunshine Diuris construction and long term management plans have been prepared for the project. Both of these plans will also be supported by an overarching environmental management plan. In addition the RRLA will be required to prepare a detailed Construction Environment Management Plan prior to the commencement of works.</p>
Security		<p>There is a need to improve the security of the site (e.g. dumping of spoil in close proximity to the fenced area is an increasing threat). Access to the site from Sunshine Road should be permanently closed except for authorised personnel. This area (from Sunshine Road) should not be used for access during construction or operational maintenance. A sign should be erected to define the site as a “Native Plant Reserve”. The fence should include as much as possible of the grassland within the area bound by the rail tracks, Stony Creek and Sunshine Caravan Park and the</p>	<p>Permanent fence to be erected around the Sunshine Triangle with signage and locked gates.</p>

	Commonwealth EPBC decision on Melbourne Airport Rail Link (2001)	Biosis recommendations for the Sunshine Rail Corridor Third Track project (2006)	Regional Rail Link Response
		whole area should receive active management to control weeds and manage biomass.	
Planning		<p>There are also additional recommendations such as for:</p> <ul style="list-style-type: none"> <li>• penalties for any incident or breach of construction specifications that could result in impacts on the site;</li> <li>• an induction program for contractors;</li> <li>• consideration of specific management and construction processes and techniques to avoid and protect native vegetation; and</li> <li>• clearly defined areas for vehicles, material stockpiles, installation of track and any other infrastructure.</li> </ul>	Section 3 of this management plan addresses these recommendations
Ongoing		A permanent, ongoing financial contribution should be made to assist with the management of the site and its surrounds.	Details are provided in the Sunshine Diuris Long Term Management Plan

## 2 Risk Assessment

### 2.1 Risk assessment

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A risk assessment has been undertaken identifying risks associated with construction activities on the Sunshine diuris and Sunshine Triangle (Appendix B). This risk assessment has been used to prioritise and develop actions documented in Section 3. The risk matrix applied to the risk assessment is based on the Department of Transport, Planning and Local Infrastructure template and is provided in Appendix C.

In summary, the key construction risks identified through the risk assessment are:

- timing of major construction works impacting on the Sunshine diuris when it is flowering;
- ground disturbance from construction activity increases weed invasion from the adjacent area into the Sunshine diuris site and Sunshine Triangle;
- dust emissions covering the Sunshine diuris during the flowering period;
- fire impacting on the Sunshine diuris site and the vegetation within the Sunshine Triangle;
- change in quality, quantity or distribution of the natural drainage to the Sunshine diuris site; and
- accidental intrusion of construction machinery or vehicles into the Sunshine diuris site.

### 2.2 Ecological risk

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The main construction risks are due to the potential interference with natural ecological processes important to the survival of the Sunshine diuris. The orchid is already threatened by disrupted ecological processes including those likely to be affecting the native bee pollinator and mycorrhizal fungi essential for germination, early establishment and ongoing health of mature plants.

Increased risks involved with the process of construction have been ameliorated by scheduling the construction period after the orchid has completed flowering, seed maturation and dispersal. The actions documented in Section 3 will mitigate impacts such as dust emissions, weed invasion, fire risk and changes to natural drainage.

The width of the rail corridor, as an unvegetated area frequently disturbed by train traffic which the native bee pollinator may traverse, will not increase because the rail lines are to be slewed closer together within the same width of formation. The number of trains passing through the rail corridor will increase following construction of the RRL, however this is considered unlikely to constitute a significantly greater risk of disturbance to the flight path of the native bee pollinator.

One of the most important risk mitigation measures, which will be an ongoing annual action to enhance reproduction in the population of Sunshine diuris, is the instigation of regular hand pollination and seed collection prior to works. A proportion of the collected seed will be propagated and some will be stored cryogenically as a genetic seed bank to ensure the long-term security of the orchid since the wild population is very small and highly threatened.

### 3 Management Measures

#### 3.1 Responsibilities

##### 3.1.1 Regional Rail Link Authority (RRLA)

RRLA has responsibility for the implementation of the RRL project, including the preparation of the Sunshine Diuris Construction Management Plan.

The RRLA is also responsible for notifying the Commonwealth and State Government and independently monitoring and auditing any known or likely cases of non-compliance with this plan.

##### 3.1.2 Alliance

An alliance will be formed to undertake detailed design and construction for the work package within the RRL project area that includes the Sunshine diuris site. The contractor, RRLA and the associated Accredited Rail Operator (ARO) will form each alliance. The alliance will implement this Construction Management Plan.

The alliance will need to demonstrate that they have the necessary skills and experience to undertake the work. The alliance will undertake work on behalf of and under direction of RRLA.

#### 3.2 Pre-construction

##### 3.2.1 Permanent protective fencing

Objectives

Protect the Sunshine Triangle which contains the Sunshine diuris site and create a buffer to facilitate rehabilitation of the area as potential plains grassland habitat for the orchid, its fungal symbiont and native bee pollinator.

- Prevent impact and disturbance of the Sunshine diuris site and Sunshine Triangle.
- Provide delineated no go zones for construction machinery and vehicles.

Actions

**Table 3.1 Protective Fencing**

Activity Item No	Management Actions	Timeframe for Action	Implementation
1.1	Construct and maintain a protective rabbit-proof fence. Gate locations are to be discussed with DEPI to allow practical access to the site for management works and emergencies. Access for the construction of the noise barrier must be negotiated with DEPI prior to access, whereby the integrity and effectiveness of the rabbit-proof fence will be maintained during access. Welded gate hinges or similar will be used to prevent the gate being removed. This fencing is mapped in Appendix A.	Prior to construction	Alliance

Activity Item No	Management Actions	Timeframe for Action	Implementation
1.2	Minimise soil and natural drainage disturbance during fence construction by using methods which minimise the impact associated with digging of post holes and prohibit the use of poured concrete within and directly adjacent to the Sunshine diuris site.	Prior to construction	Alliance
1.3	Re-strain all plain wire strands on the existing Sunshine diuris site fence to provide a more effective barrier.	Prior to construction	Alliance
1.4	Vehicles or machinery used during fence construction remain outside the area being fenced at all times to prevent soil disturbance and compaction.	At all times	Alliance
1.5	The perimeter for the protective fence within the Sunshine Triangle to be determined with an ecologist present and by GIS co-ordinates. All individuals of threatened flora, spiny rice- flower ( <i>Pimelea spinescens</i> subsp. <i>spinescens</i> ) arching flax-lily ( <i>Dianella</i> sp. aff. <i>longifolia</i> ) (Benambra) and geranium ( <i>Geranium</i> sp.) previously recorded within the Sunshine Triangle will be fenced separately to protect them during construction if they occur outside the area proposed for fencing. Construction fencing to protect low quality golden sun moth habitat will be erected for the construction of the noise barrier, and should make allowance for the width of the hardstand only. No laydown or parking areas are allowed outside of the fenced construction area (i.e. within remainder of Sunshine Triangle).	Prior to construction	Alliance
1.6	Attach cladding material (e.g. geofabric, shadecloth or similar solid fabric) on the full length and height of the protective fence around the Sunshine diuris site, facing the construction zone.	Prior to construction	Alliance

### 3.2.3 Construction fencing

#### Objective

- Protect the Sunshine diuris site from potential direct or indirect impacts.

#### Actions

**Table 3.2 Construction Fencing**

Activity Item No	Management Actions	Timeframe for Action	Implementation
2.1	Install a rigid fence prior to works commencing, between the protective fencing and northern access track (Appendix A). No pouring of concrete is to occur during construction of this fence.  The barrier is to be positioned within approximately 1-1.5 m of the Sunshine diuris site on the north-eastern side of the fence, closest to the rail (Appendix A).	Prior to construction	Alliance
2.2	Vehicles or machinery used during fence construction remain at all times within the rail construction zone to prevent soil disturbance, compaction and accidental damage	At all times	Alliance

### 3.2.4 Construction timing

#### Objective

- Minimise potential impact on the flowering period of the Sunshine diuris.

#### Actions

**Table 3.3 Construction Timing**

Activity Item No	Management Actions	Timeframe for Action	Implementation
3.1	Major construction works adjacent to the Sunshine diuris site are to be scheduled 1 January to 31 March. Prior consultation with DEPI and DoE is required prior to commencement if major works are to occur at times other than the restricted timeframe.	1 January to 31 March	Alliance in consultation with DELWP
3.2	Excavation of cutting by 4 m for northern access track (south east of the Sunshine Diuris Site) not to occur during the flowering period between 1 Oct-31 Dec. This timeframe is seasonally dependant and is to be verified as appropriate by an ecologist during each season	Not to occur during 1 Oct-31 Dec	Alliance



### 3.2.5 Drainage

#### Objectives

- Prevent surface or subsurface runoff potentially containing sediment and chemical residues from entering the Sunshine diuris site.
- Prevent any significant change to the volume or pattern of dispersal of surface or subsurface water runoff impacting the Sunshine diuris site.

#### Actions

**Table 3.4 Drainage**

Activity Item No	Management Actions	Timeframe for Action	Implementation
4.1	Based on the final design of the northern access track and railway determine the need for a swale drain or other form of drainage in order to prevent any significant change to the volume or pattern of dispersal of surface or subsurface water runoff impacting the Sunshine diuris site. This drainage will be required in the long term.	Prior to construction	Alliance
4.2	Establish a bund or similar structure to prevent sediment or chemical residues from entering the Sunshine diuris site during construction using impervious material. This bund must be maintained regularly to prevent a build-up of sediment or other materials. Undertake further design to make sure the drainage arrangements do not adversely affect the Sunshine diuris site either during or post-construction.	Prior to construction	Alliance
4.3	Inspect and maintain drainage or bunding installed during construction to prevent blockages and overflow of water and/or sediment into the Sunshine diuris site	Daily during construction	Alliance

### 3.2.6 Education, tool box training

#### Objective

- Inform and educate all staff, sub-contractors and personnel of the environmental constraints and requirements associated with the Sunshine diuris site and Sunshine Triangle.

**Actions****Table 3.5 Education, tool-box and training**

Activity Item No	Management Actions	Timeframe for Action	Implementation
5.1	A specific detailed site induction focussed on the constraints associated with the Sunshine diuris site and Sunshine Triangle shall be undertaken by all staff, sub-contractors and personnel working within the construction area.	Prior to gaining access to undertake works on site	Alliance
5.2	All inducted personnel will be required to sign and date a site induction form to confirm attendance at the site induction and understanding of the environmental requirements associated with the Sunshine diuris site. A record of all site inductions is to be retained.	Prior to commencing works	Alliance

**3.2.7 Signage****Objectives**

- Clearly identify areas where vehicles and construction machinery are not permitted access as 'no go zones'
- Raise awareness of the significance of the native vegetation located within the Sunshine Triangle including the Sunshine diuris and the potential civil penalties under state and federal legislation which apply to individuals as a result of damage.

**Actions****Table 3.6 Signage**

Activity Item No	Management Actions	Timeframe for Action	Implementation
6.1	Sunshine diuris site and Sunshine Triangle no-go zones must be clearly delineated on site using fencing and signage	Prior to construction	Alliance
6.2	Signage is to remain in good condition and visible	At all times	Alliance

**3.2.8 Weed control**

Priority weeds known within the Sunshine Triangle are provided in Appendix D.

**Objectives**

- Control priority weeds within the construction area in a manner that minimises soil disturbance, chemical use and potential residual chemicals and any impacts to the Sunshine diuris site and the Sunshine Triangle.
- Control weeds before they set seed to provide effective control and prevent weed increase.

**Actions****Table 3.7 Weed Control**

Activity Item No	Management Actions	Timeframe for Action	Implementation
7.1	An ecologist to assess the distribution of current weed species before construction commences to enable a post-construction weed assessment and comparison (within the construction area)	Prior to construction	RRLA
7.2	Control weeds within the construction area preventing any inadvertent impacts to the Sunshine diuris site or Sunshine Triangle. Restrictions apply to the use of herbicides near the Sunshine Triangle, Sunshine diuris site and the Sunshine diuris population. No use of herbicides within 100 m of the Sunshine diuris site. Notify DEPI prior to any planned weed control activities within the entire Sunshine Triangle.	Prior to construction	Alliance/RRLA in consultation with DELWP
7.3	Install weed mat between the rigid (or similar) construction fence and the Sunshine Triangle permanent protective fence to control weed establishment in this area during construction. Remove on completion of construction.	Prior to construction	Alliance

**3.3 Construction****3.3.1 Dust****Objectives**

- Minimise dust impacts on the Sunshine diuris during emergence and especially during flowering and on other significant vegetation within the Sunshine Triangle.
- Minimise dust so as to avoid having a negative residual impact on the soil or the mycorrhizal fungi present in the soil.

**Actions****Table 3.8 Dust Management**

Activity Item No	Management Actions	Timeframe for Action	Implementation
8.1	During the emergence and flowering period for Sunshine diuris with strong southerly wind conditions, limit construction activities adjacent to the Sunshine Diuris Site	During emergence (1 April – 30 September) and flowering period (1 October – 31 December)	Alliance

Activity Item No	Management Actions	Timeframe for Action	Implementation
8.2	Maintain temporary cladding material (e.g. geofabric, shade cloth or similar solid fabric) on the permanent protective fence	During construction	Alliance
8.3	Use of water carts adjacent to the Sunshine diuris site must be done under the guidance of the site ecologist	At all times	Alliance
8.4	Restrict vehicle speed adjacent to the Sunshine diuris site to 10 km/hr	At all times	Alliance
8.5	Stockpiles and construction laydown areas to be located away from the Sunshine diuris site or Sunshine Triangle (Appendix A)	At all times	Alliance
8.6	Should the dust monitoring station within the Sunshine Triangle need to be temporarily moved for the construction of the noise barrier, alternative measures for monitoring dust will be employed. The advice of a suitably qualified ecologist or botanist will be obtained on any alternative measures that may be required to monitor dust.	At all times	Alliance

## Vehicle movement

### 3.3.2 Objective

- Prevent impact on the Sunshine diuris site and Sunshine Triangle from construction vehicles, machinery and equipment.

### Actions

**Table 3.9 Vehicle movement**

Activity Item No	Management Actions	Timeframe for Action	Implementation
9.1	All vehicles and machinery are to use designated access tracks.	At all times	Alliance
9.2	Immediately cease works and report to RRLA if construction machinery or vehicles accidentally breach the Sunshine diuris site or Sunshine Triangle protective fencing.  Implement incident management procedures.	Immediately	Alliance

Activity Item No	Management Actions	Timeframe for Action	Implementation
9.3	Vehicle movements required for the construction of the noise barrier, within the hardstand area, should preferably be from the east, and should be restricted to vehicles necessary to undertake construction works. Vehicle parking is not allowed within the remainder of the Sunshine Triangle.	At all times	Alliance

### 3.3.3 Vehicle hygiene

#### Objective

- Prevent the spread and introduction of weeds and pathogens into the Sunshine diuris site and Sunshine Triangle.
- Treat all incoming materials, machinery, vehicles and personnel as potentially infected.

#### Actions

**Table 3.10 Vehicle Hygiene**

Activity Item No	Management Actions	Timeframe for Action	Implementation
10.1	Use designated wheel wash down area entering construction area. Wheel wash for all vehicles to be located further than 100 m away from the Sunshine diuris site.	At all times prior to entering the site	Alliance
10.2	Use designated footwear wash down stations for all personnel moving into the construction area as a routine practice.	At all times prior to entering the site	Alliance
10.3	All machinery and vehicles that enter onto the construction area are to be checked to be clean and free of weed seed and other plant material in dirt or mud on the item. Cleanliness of vehicles records to be maintained.	At all times prior to entering the site	Alliance
10.4	No plant or machinery is to be used on the project which has been operating in known pathogen infested areas (e.g. <i>Phytophthora cinnamomi</i> ) unless the appropriate cleaning procedures have been used and documented (DSE 2008).	At all times prior to entering the site	Alliance

### 3.3.4 Hydrocarbon and chemical management

#### Objective

- To minimise the risk of chemical spill, residue and overspray impacting on the Sunshine diuris.

#### Actions

**Table 3.11 Hydrocarbon and chemical management**

Activity Item No	Management Actions	Timeframe for Action	Implementation
11.1	Chemicals and hazardous materials are not to be stored within 100 m of the Sunshine diuris site.	All times	Alliance
11.2	Vehicles and machinery are not to refuel within 100 m of the Sunshine diuris site	All times	Alliance

### 3.3.5 Fire Management

#### Objectives

- Prevent fire caused by construction works, vehicles and equipment from occurring within the Sunshine diuris site and Sunshine Triangle.
- Prevent fire threatening the survival of the orchid population.
- Prevent the use of fire retardant impacting on the Sunshine diuris.

#### Actions

**Table 3.12 Fire Management**

Activity Item No	Management Actions	Timeframe for Action	Implementation
12.1	Prohibit hot works within 50 m of the Sunshine diuris site on days of Total Fire Ban (central fire district) to prevent fire threatening survival of the orchid population	At all times	Alliance
12.2	During the fire danger period, prohibit the use of any machinery not equipped with a functioning spark arrester approved by Standards Australia	At all times	Alliance
12.3	During the fire danger period, when carrying out hot works within 50 m of the Sunshine Triangle the following actions must be taken: use a fire resistant shield or guard to prevent emission of sparks from the work area; keep an area of 1.5 m around the work area clear of flammable material or keep the area wet to prevent fire spread; keep on hand a water supply from a knapsack sprayer of 9 litres or more or a water truck ready for use where the works are occurring; and have a fireproof receptacle at the work site for hot waste (DSE 2011b). Maintain a task hot works checklist to ensure all above items are present prior to starting any hot works.	At all times	Alliance

Activity Item No	Management Actions	Timeframe for Action	Implementation
12.4	Prohibit the use of fire retardant chemicals to control fire within 50 m of the Sunshine diuris site. Avoid the use of chemical retardant foams or substances containing phosphates. Only allow the use of 'Class A' foam approved by the United States Department of Agriculture (USDA) and as used by DELWP in native vegetation areas, potable water and fire rakes (DSE 2011a)	At all times	Alliance
12.5	Prohibit the use of soil disturbance (such as ploughing) for fire control within the Sunshine Triangle	At all times	Alliance

### 3.3.6 Soil erosion, compaction and movement

#### Objectives

- Minimise disturbance of the soil surface and prevent soil movement into the Sunshine Triangle and Sunshine diuris site.
- Immediately actively rehabilitate all areas of disturbance within the Sunshine diuris site and Sunshine Triangle.
- Prevent the spread and introduction of weeds and pathogens into the Sunshine diuris site and Sunshine Triangle.

#### Actions

**Table 3.13 Soil erosion, compaction and movement**

Activity Item No	Management Actions	Timeframe for Action	Implementation
13.1	Vehicle and machinery movement to be restricted to designated access areas.	At all times	Alliance
13.2	Minimise disturbance and compaction of soil due to any non-essential activity by construction machinery, equipment or vehicles within 100 m of the Sunshine diuris site.	At all times	Alliance
13.3	Install and maintain sediment fencing along the edge of the northern access track adjacent to the Sunshine Triangle.	At all times	Alliance
13.4	Any fill proposed to be introduced upslope of the Sunshine Triangle must be certified clean fill.	At all times	Alliance
13.5	Immediately rehabilitate all areas of disturbance not being used for infrastructure provision. Obtain DELWP advice for appropriate rehabilitation actions before they occur.	At all times	Alliance/RRLA in consultation with DELWP

Activity Item No	Management Actions	Timeframe for Action	Implementation
13.6	Install and maintain sediment controls on Stony Creek to prevent impacts from the maintenance access track and broader construction activities. These will also be detailed in the project CEMP.	At all times	Alliance

### 3.3.7 Weed control

Priority weeds known within the Sunshine Triangle are provided in Appendix D.

#### Objectives

- Control priority weeds within the construction area in a manner that minimises soil disturbance, chemical use and potential residual chemicals and any impacts to the Sunshine diuris site and the Sunshine Triangle.
- Control weeds before they set seed to provide effective control and prevent weed increase.



**Actions****Table 3.14 Weed Control**

Activity Item No	Management Actions	Timeframe for Action	Responsibility
14.1	Control weeds within the construction area preventing any inadvertent impacts to the Sunshine diuris site or Sunshine Triangle. Restrictions apply to the use of herbicides near the Sunshine Triangle, Sunshine diuris site and the Sunshine diuris population. No use of herbicides within 100 m of the Sunshine diuris site. Notify DEPI prior to any planned weed control activities adjacent to the Sunshine Triangle in the construction area.	Monitor every 3 months during construction and control as required	Alliance in consultation with DELWP

**3.4 Post construction****3.4.1 Removal of construction fencing****Objective**

- Removal of the construction fence (rigid barriers or similar) does not impact on the Sunshine diuris site.

**Actions****Table 3.15 Removal of construction fencing**

Activity Item No	Management Actions	Timeframe for Action	Implementation
15.1	During removal of construction fencing and barriers, minimise soil and natural drainage disturbance by using methods in keeping with the original fence footprint and disassemble without the use of heavy machinery	After construction	Alliance

**3.4.2 Weed control****Objective**

- Prevent the spread and introduction of weeds and pathogens within the construction area.

### Actions

The weed control requirements for the Sunshine diuris site and Sunshine Triangle are further detailed in the Sunshine Diuris Long Term Management Plan (RRL-1000-EEC-REP-003). Actions applicable to the construction area are detailed in Table 3.16 below.

**Table 3.16 Weed Control**

Action Item No	Management Action	Timeframe for Action	Responsibility
16.1	<p>Control weeds within the construction area with an emphasis on the priority weeds listed in Appendix D.</p> <p>Assess the post-construction weed species in the construction area and their distribution in the areas impacted by construction, adjacent to the Sunshine Triangle every three months for 12 months following construction and control as necessary. A strategy for the long term weed management of the site is contained within the Sunshine Diuris Long Term Management Plan (RRL-1000-EEC-REP-0003) and post-construction weed control should be carried out with reference to the guidance provided in the long term plan.</p> <p>Control weeds within the construction area to prevent inadvertent impacts to the Sunshine diuris site or Sunshine Triangle. Restrictions apply to the use of herbicides near the Sunshine Triangle, Sunshine diuris site and the Sunshine diuris population. No use of herbicides within 100 m of the Sunshine diuris site. Notify DEPI prior to any planned weed control activities within the entire Sunshine Triangle.</p>	Every three months for 12 months immediately following construction.	Alliance/RRLA in consultation with DEWLP
16.2	<p>Reseed disturbed areas as soon as possible in the areas impacted by construction not being used for infrastructure provision, adjacent to the Sunshine Diuris Triangle, using summer growing local provenance (where available) kangaroo grass (<i>Themeda triandra</i>) or autumn – winter growing, locally sourced common wallaby grass (<i>Austrodanthonia caespitosa</i>). Notify DEPI prior to any planned reseeding activities within the Sunshine Triangle</p>	After construction	Alliance/RRLA in consultation with DEWLP
16.3	<p>An ecologist is to assess the distribution of weed species post construction (within the construction area)</p>	After construction (see 16.1)	Alliance

## 4 Environmental Monitoring and Reporting Requirements

It is important that results of monitoring activities stipulated under the Sunshine Diuris Long Term Management Plan are considered by the alliance so their management and site activities are responsive to the biological condition of the orchid. The mechanism for facilitating communication will be through the Management Group, proposed to be formed under the Sunshine Diuris Long Term Management Plan.

### 4.1 Monitoring

Table 4.1 describes the minimum environmental monitoring requirements before, during and after the construction phase.

**Table 4.1 Summary of Monitoring Requirements During Construction**

Environmental issue	Monitoring Requirement	Frequency	Implementation
General	Undertake construction site inspection and review the environmental controls in place	Daily	Alliance
Drainage	Inspect all bunds and/or swale drains adjacent to the Sunshine diuris site for overspill of material from the northern access track and any blockages	Daily	Alliance
Weed control	Assess the post construction weed species and their distribution in the construction area and control as necessary. Reference should be made to the Sunshine Diuris Long Term Management Plan (RRL-1000-EEC-REP-0003)	Three monthly for 12 months immediately post construction, then in accordance with the long term plan.	Alliance/RRLA in consultation with DEWLP
Dust	Dust recorders must be installed and visual dust monitoring must be undertaken during construction works and appropriate dust controls employed where required	At all times	Alliance
Weed control	Inspection of all machinery and vehicles that enter the site for soil, weed seed and other plant material	At all times	Alliance
Erosion	Monitor the effectiveness of erosion and sediment control structures	Weekly, during (where possible) and after run-off and rain events	Alliance

### 4.2 Reporting

RRLA will report any incidents that impact on the Sunshine diuris orchids within the Sunshine Triangle immediately (i.e. on the same day as the incident) to DEWLP and DoE. DEWLP must be engaged in determining immediate and ongoing mitigation actions in

addition to any already outlined in this document and/or in the Construction Environmental Management Plan (CEMP) for the project.

Other reporting requirements to DELWP and DoE as described in this document include:

- Approval of any major works planned to occur outside of the period from 1 January to 31 March
- Notification of any accidental construction machinery or vehicle breach of the Sunshine diuris site or Sunshine Triangle protective fencing

Monitoring requirements for weed control include post construction monitoring in the construction area for a total period of one year and notification of DELWP prior to undertaking any weed control activities (in line with the guidance contained within the Sunshine Diuris Long term Management Plan). A report will be prepared for each monitoring event.

In addition, the RRLA will consult with DELWP and DoE in the preparation of emergency response and contingency plans to ameliorate against impacts on the Sunshine Diuris Site and Sunshine Triangle from potential spills, accidental damage, fire, flood and vandalism.

All other reporting on construction activities will occur in line with project reporting to be undertaken by the RRLA.

## 5 Emergency management protocols

The alliance will consult with key stakeholders and the RRLA in the development of emergency response and contingency plans to provide for abnormal operating conditions, potential emergency situations and incidents associated with the following:

- spills;
- accidental damage;
- fire;
- flooding;
- vandalism.

Contingency and emergency response plans must be approved by RRLA prior to the commencement of works.

## 6 Offset Program

Proposed offsets required under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are detailed in the Regional Rail Link, Sunshine Diuris Long Term Management Plan (Document Reference RRL-1000-EEC-REP-0003).

The offset proposal is consistent with the Draft Policy Statement: Use of Environmental Offsets under the EPBC Act (DEWR 2007). The Australian Government defines environmental offsets as ‘actions taken outside a development site that compensate for the impacts of that development - including direct, indirect or consequential impacts’.

In this case offsets may be required for indirect impacts on the Sunshine diuris. The offsets proposed in the Long Term Management Plan are a combination of direct and indirect offsets.

Offsets required for losses of native vegetation will be provided in accordance with the requirements of Victoria’s Native Vegetation Management Framework.

## 7 Limitations

Excluding an ecological field assessment undertaken in 2013 for access and construction impacts associated with the construction of the noise barrier (KAJV 2013), the KAJV has not undertaken an ecological field assessment for the Regional Rail Link project for the development of this plan. Therefore the ecological information referred to in this Sunshine Diuris Construction Management Plan has been predominately derived from Ecology Partners Regional Rail Link – Section 1: Flora and Fauna Assessment, and Net Gain Analysis, Southern Cross Station to Deer Park, Victoria August 2010 and field investigations and advice from DEPI. Management of impacts associated with the construction of the noise barrier has been informed by KAJV (2013) and KAJV (2013a).

The area represented as Sunshine Diuris in Appendix A – Sunshine Diuris Construction Plan is based on Biosis 2009 spatial data, as the 2010 Ecology Partners spatial data does not reflect the existing fence line around the site.

The alignment for the Exxon fuel line also represented in Appendix A is based on proving undertaken by the KAJV in 2010.

The southern access track alignment and supporting ecological assessment has been provided by the Footscray – Deer Park Alliance.

## 8 References

- Biosis 2009. Spatial data for Sunshine diuris site. Biosis Research Pty, Victoria.
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- Department of Sustainability and Environment 2005. Advisory List of Rare or Threatened Plants in Victoria - 2005. Victorian Department of Sustainability and Environment, East Melbourne, Victoria.
- Department of Sustainability and Environment 2008. Victoria's Public Land *Phytophthora cinnamomi* Management Strategy. Department of Sustainability and Environment, Melbourne.
- Department of Sustainability and Environment 2010. Informal comments provided on Sunshine Diuris Long Term Management Plan 10 December 2010.
- DSE 2011a. Fire and other emergencies. <http://www.land.vic.gov.au/DSE/nrenfoe.nsf/FID/-B093F59135E9BE0B4A25685C0020EBDF?OpenDocument>. Viewed 4/3/2011.
- DSE 2011b. Fire and other emergencies – Equipment and Machinery. <http://www.land.vic.gov.au/DSE/nrenfoe.nsf/FID/-4A901B421098F95B4A25679400258E30?OpenDocument> . Viewed 4/3/2011.
- Ecology Partners Pty Ltd. 2010. Regional Rail Link – Section 1: Flora and Fauna Assessment, and Net Gain Analysis, Southern Cross Station to Deer Park, Victoria. Ecology Partners Pty Ltd. Melbourne.
- KBR Arup Joint Venture (KAJV) 2011. Regional Rail Link Sunshine Diuris Long Term Management Plan (RRL-1000-EEC-REP-003). Revision 4. Prepared for the Regional Rail Link Authority, Melbourne.
- KAJV 2013, Memorandum–Review of additional noise barrier impacts on Matters of National Environmental Significance, 10 September 2013, Prepared for the Regional Rail Link Authority, Melbourne.
- KAJV 2013a, Memorandum–Measures to be implemented to protect golden sun moth habitat during noise wall construction, 20 December 2013, Prepared for the Regional Rail Link Authority, Melbourne.
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## Appendix A

### **Construction Plan**

Note: this plan has been removed as it contains sensitive ecological information.

Appendix B

**Environmental Risk Assessment**

Appendix C Environmental Risk Assessment

Risk #	Risk description	Initial Risk Analysis (inherent)			Control / Mitigation Action(s)	Current Risk Analysis (residual)			Comments
		Likelihood (1-5)	Consequence (1-5)	Risk Matrix Rating		Likelihood (1-5)	Consequence (1-5)	Risk Matrix Rating	
1	Excess dust emissions (greater than existing background level) impacting on Sunshine diuris	4	3	High	1. Dust fencing (cladding material (e.g. geofabric, shade cloth or similar solid fabric) on the full length and height of the fenced area. 2. Implementation of standard dust construction controls (including restricted vehicle speed) 3. Water carts are not to be used adjacent to Sunshine diuris site ( markers to be provided to indicate where the water trucks are to stop) 4. Limit construction to days of low/moderate wind, not southerly during Sep-Nov when the orchid is flowering	3	3	Medium	
2	Protective and dust fencing interfere with wind dispersal of the Sunshine diuris seed impacting on growth and spread of the species	1	1	Low	1. Avoid protective fencing with a solid base, as the pollinators are known to be low flying.	1	1	Low	Considered a low risk as wind dispersal is generally no further than 2 metres
3	Construction waste may provide food source and refuge for pest animals including the house mouse and introduced snails and slugs which are known predators of Sunshine diuris	1	1	Low	1. Strict waste management protocols and waste disposal areas away from Sunshine diuris site 2. In the event of accidental waste spill into the fenced site, removal should only be undertaken under DSE supervision	1	1	Low	No published information supporting these predators
4	Vibration causing soil disturbance and impacting on Sunshine diuris	1	1	Low		1	1	Low	
5	Fire caused by sparks from construction works, vehicles and equipment impact on and potentially destroy Sunshine diuris immature seeds or mature plants pre or post flowering	3	4	High	1. Hot works not to occur within 50 m of Sunshine diuris Site and prohibited on days of total fire ban (central fire district) 2. Prohibit the use of any machinery not equipped with a functioning spark arrester approved by Standards Australia 3. During the fire danger period, when carrying out hot works within 50 m of the Sunshine Triangle the following actions must be taken: use a fire resistant shield or guard to prevent emission of sparks from the work area, keep an area of 1.5 m around the work area clear of flammable material or keep the area wet to prevent fire spread, keep on hand a water supply from a knapsack sprayer of 9 litres or more or a water truck ready for use where the works are occurring, and have a fireproof receptacle at the work site for hot waste. Maintain a task hot works checklist to ensure all above items are present prior to starting any hot works.	2	4	Medium	Impact depends on heat intensity of fire, timing and the development stage of the species
6	Fire caused by sparks from construction works or vehicles and construction equipment may impact on the vegetation community within the Sunshine Triangle	2	3	Medium	1. Hot works not to occur within 50 m of Sunshine diuris Site and prohibited on days of total fire ban (central fire district) 2. Prohibit the use of any machinery not equipped with a functioning spark arrester approved by Standards Australia 3. During the fire danger period, when carrying out hot works within 50 m of the Sunshine Triangle the following actions must be taken: use a fire resistant shield or guard to prevent emission of sparks from the work area, keep an area of 1.5 m around the work area clear of flammable material or keep the area wet to prevent fire spread, keep on hand a water supply from a knapsack sprayer of 9 litres or more or a water truck ready for use where the works are occurring, and have a fireproof receptacle at the work site for hot waste. Maintain a task hot works checklist to ensure all above items are present prior to starting any hot works. 4. Prohibit the use of soil disturbance (such as ploughing) for fire control within the Sunshine Triangle	2	3	Medium	Impact depends on heat intensity of fire, timing and the development stage of the species
7	Fire retardant impacting on the Sunshine diuris	2	4	Medium	1. Avoid the use of chemical retardant foams or substances containing phosphates 2. Only allow the use of 'Class A' foam approved by the United States Department of Agriculture (USDA) and as used by DSE in native vegetation areas, potable water and fire rakes	1	4	Medium	
8	Material lay down/stockpile areas and track access result in the removal of surrounding native vegetation and potential habitat for native pollinator	5	3	High	Select areas for material lay down and stockpile outside of the Sunshine Triangle. 2. Access track utilises existing, single lane past the Sunshine Diuris site and is a direct straight alignment bordering the edge of the rail corridor avoiding quality patch vegetation and the south east corner adjacent to the Sunshine Diuris site. 3. Reduce requirement for access around the Sunshine diuris site by undertaking works on track where possible.	2	4	Medium	
9	Construction interferes with the pollination of Sunshine diuris	3	3	Medium	Hand pollination and collection of 50 per cent of the seed produced during the 2010 and 2011 seasons prior to commencement of construction in 2012. Half of the collected seed will be propagated and half will be stored cryogenetically as a genetic seed bank to ensure the long-term security of the orchid since the wild population is very small and highly threatened.	1	2	Low	

10	Loss of control of vehicle and machinery impact on the Sunshine diuris Site	3	5	High	1. Single land access track past the Sunshine diuris site, low gradient and direct alignment ( no bends or curves), fencing including additional protection barriers (jersey barriers)	2	5	High			
11	Alteration to hydrology and existing land profile and contours impact on the Sunshine diuris Site	3	3	Medium	1. Access track designed to avoid change in profile of hill south of Sunshine diuris site with surface water runoff collect and disposed of away from Sunshine diuris site. 2. Swale drain on southern side of access track past the Sunshine diuris site	2	2	Low			
12	Change in soil composition impact on mycorrhizal fungus and below ground structure of the Sunshine diuris	2	4	Medium	1. Minimise the use of herbicides for weed control and industrial chemicals used for construction. 2. All chemical and hazardous material to be stored in a enclosed secured area with appropriate ventilation system away from the Sunshine diuris site.	2	2	Low			
13	Introduction and spread of weeds and pathogens within the Sunshine diuris Site and Triangle	3	3	High	1. Vehicle and machinery hygiene controls 2. Certification of imported fill	2	3	Medium			
14	Chemical spill, residue and overspray impacting on Sunshine diuris	2	4	Medium	1. Chemical and hazardous materials are prohibited near the Sunshine diuris Site 2. All chemical and hazardous material to be stored in a enclosed secured area with appropriate ventilation system away from the Sunshine diuris site 3.Appropriate bunding F294. Chemical register providing information on composition, drift, conditions of use	1	4	Medium			
15	Accidental damage to Sunshine diuris Site	2	4	Medium	1. Emergency response and contingency plan 2. Stop works immediately. 3. Access track alignment has been designed to minimise impact, timing of works schedule outside of flowering season 4. Contact DSE for advice on appropriate actions	1	4	Medium			
16	Fuel spill directly adjacent to Sunshine diuris Site resulting in contamination of soil and surface water	4	4	Medium	1.Lined swale drains adjacent to access track to capture spill and dispose away from the Sunshine diuris site. 2. No re-fuelling within 100 metres of Sunshine diuris site	2	4	Medium			
17	Loss of control of construction materials e.g. Ballast from construction of access track, material from excavation of hill and soil from construction of swale drain impacting on Sunshine diuris Site	3	3	High	1. Supervision of works. 2. Jersey barrier adjacent to Sunshine diuris site between access track and fence. 3. Additional protection the south east corner of the Sunshine diuris Site during excavation 4. Training and education via Induction, toolbox talks, signage	2	3	Medium			
18	Uncontrolled vehicle access to the Sunshine Triangle	3	3	High	1. Install secure fencing around the Sunshine Triangle. 2. Toolbox and induction. 3. Signage	2	3	Medium			
19	Large numbers of construction workers (greater than 100 individuals) within the proximity to the Sunshine diuris Site and Sunshine Triangle	2	1	Low	1. Training and education via Induction, toolbox talks, signage	2	1	Low			
20	Ground disturbance from construction activity increases weed invasion from adjacent area into the Sunshine diuris site and Sunshine Triangle	4	3	High	1.Reseed disturbed areas with native species (kangaroo and wallaby grass). 2. Follow up with weed control	2	2	Low			
21	Timing of construction works impacting on Sunshine diuris Site	4	3	High	1. Schedule major construction works from 1 January to 31 March. 2. Approval from ecologist, DSE, DSEWPC, if major works are to occur outside of the restricted timeframe prior to commencement. 3. Excavation of hill to occur after flowering period (seasonal dependant to be verified by ecologist)	2	3	Medium			
22	Accidental intrusion of construction machinery or vehicles into the Sunshine Diuris Site		3	4	High	1. Immediately cease works when intrusion occurs 2. Enact incident response procedure 3. Jersey barrier (or similar) adjacent to Sunshine diuris site between access track and fence, and additional jersey barrier during access track construction. 4. Training and education via Induction, toolbox talks, signage		2	3	Medium	

Appendix C

**Risk Matrix**

## C1 Risk Matrix

Table C.1 Risk Matrix

		Consequence				
		Insignificant	Minor	Moderate	Major	Catastrophic
Likelihood	Almost Certain	Medium	High	High	Extreme	Extreme
	Likely	Medium	Medium	High	High	Extreme
	Moderate	Low	Medium	Medium	High	High
	Unlikely	Low	Low	Medium	Medium	High
	Rare	Low	Low	Medium	Medium	High

Appendix D

**Priority Weeds within Sunshine Triangle**

## D1 Priority weeds table

Table E.1 relates to weeds found in the entire Sunshine Triangle. The area to be impacted by construction of RRLA is a much smaller area adjacent to the Sunshine Triangle. Therefore the list provided is for advisory purposes only as it is likely that not all these species will be present within the construction area.

**Table D.1 Priority weeds within Sunshine Triangle**

Common name	Scientific Name	Significance	Timing (growth stage)
Chilean needle grass	<i>Nassella neesiana</i>	WONS, Restricted, very high threat on site	All year
Bristly ox-tongue	<i>Helminthotheca echioides</i>	Nil rating Low to Moderate threat on site	All year
Cat's ear	<i>Hypochoeris radicata</i>	Nil rating Moderate threat on site	All year
Artichoke thistle	<i>Cynara cardunculus</i>	Regionally Controlled, Moderate threat on site	All year
Fennel	<i>Foeniculum vulgare</i>	Regionally Controlled, Moderate threat on site	All year
Canary grass	<i>Phalaris aquatica</i>	Nil rating Moderate threat on site	All year
Paspalum	<i>Paspalum dilatatum</i>	Nil rating Moderate threat on site	All year
Onion grass	<i>Romulea rosea</i>	Nil rating Moderate threat on site	All year
Hair grasses	<i>Aira spp.</i>	Nil rating Low to Moderate threat on site	All year
Squirrel tail fescue	<i>Vulpia bromoides</i>	Nil rating Moderate threat on site	All year
Medics	<i>Medicago spp.</i>	Nil rating Moderate threat on site	All year