

Revegetation Compensation Package

CBD and South East Light Rail (CSELR)



Biosis offices

AUSTRALIAN CAPITAL TERRITORY

Canberra

Floor 1, Unit 3, 38 Essington Street
Mitchell ACT 2911

Phone: (02) 6102 1200

Email: canberra@biosis.com.au

NEW SOUTH WALES

Newcastle

39 Platt Street
Waratah NSW 2298

Phone: (02) 4968 4901

Email: newcastle@biosis.com.au

Sydney

Unit 14 17-27 Power Avenue
Alexandria NSW 2015

Phone: (02) 9101 8700

Email: sydney@biosis.com.au

Wollongong

8 Tate Street
Wollongong NSW 2500

Phone: (02) 4201 1090

Email: wollongong@biosis.com.au

QUEENSLAND

Brisbane

Suite 4 First Floor, 72 Wickham Street
Fortitude Valley QLD 4006

Phone: (07) 3831 7400

Email: brisbane@biosis.com.au

VICTORIA

Ballarat

506 Macarthur Street
Ballarat VIC 3350

Phone: (03) 5304 4250

Email: ballarat@biosis.com.au

Melbourne (Head Office)

38 Bertie Street
Port Melbourne VIC 3207

Phone: (03) 8686 4800

Fax: (03) 9646 9242

Email: melbourne@biosis.com.au

Wangaratta

16 Templeton Street
Wangaratta VIC 3677

Phone: (03) 5721 9453

Email: wangaratta@biosis.com.au

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Prepared by: Carl Corden and Chantel Benbow

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Glossary

Term	Meaning
Acciona	ACCIONA Infrastructure Australia Pty Ltd
Alstom	Alstom Transport Australia Pty Limited
ALR	ALTRAC Light Rail Partnership
CBD	Central Business District
CSELR	Sydney CBD and South-East Light Rail
DBH	Diameter at Breast Height
DPI	Department of Primary Industries
D&C JV	Design and construct joint venture
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
IWLR	Inner West Light Rail
LGA	Local Government Area
LRV	Light Rail Vehicle
NSW	New South Wales
NW Act	Noxious Weed Act 1993
PI	Performance Indicator
RCP	Revegetation Compensation Package
SLR	Sydney Light Rail project
study area	The Project Footprint area of the CSELR project
SSI	State Significant Infrastructure under Part 5.1 of the Environmental Planning and Assessment Act 1979 (EP&A Act).
TfNSW	Transport for NSW
UDRG	Urban Domain Reference Group
VMP	Vegetation Management Plan

1 Introduction

Biosis was commissioned by KMH Environmental, on behalf of Acciona, to develop a Revegetation Compensation Package (RCP) for the Sydney CBD and South East Light Rail (CSELR) project. Acciona are the main civil delivery contractor for the CSELR project (the Project) as further outlined in Section 1.1 below.

Infrastructure Approval for the Project was granted under Section 115ZB of the *Environmental Planning and Assessment Act 1979* (EP&A Act), with a condition of approval (B52) requiring the development of a RCP, as the loss of some vegetation is unavoidable. The RCP provides an offset measure for the loss of vegetation as documented in the Tree Report for the Project (required by condition of approval B48).

Due to the design and construction methodology being at different phases of completion across the Project, impacts to vegetation are only known for those areas where design is sufficiently advanced; therefore the RCP will be updated to reflect the design and detail provided in the Tree Report.

This RCP addresses impacts covering the City Centre Precinct, Surry Hills Precinct, Moore Park Precinct, Randwick Precinct and Kensington/Kingsford Precinct and excludes High Street Randwick and High Cross Park. Remaining vegetation impacts and associated offset requirements for the Project will be addressed through additional revisions of the RCP and the Tree Report.

1.1 Project background

The CSELR project (the Project) will involve construction and operation of a light rail service from Circular Quay to Central, Kingsford and Randwick via Surry Hills and Moore Park. The CSELR will require construction of approximately 12 kilometres of light rail track. The Project is a State Significant Infrastructure (SSI) project under Part 5.1 of the (EP&A Act).

The CSELR is a component of the larger Sydney Light Rail (SLR) project. The Project will be delivered by the ALTRAC Light Rail Partnership (ALR) with design and construction obligations in respect of the CSELR passed down to a design and construct joint venture (D&C JV) consisting of ACCIONA Infrastructure Australia Pty Ltd (Acciona) and Alstom Transport Australia Pty Limited (Alstom). The D&C JV will engage with various other pre-qualified design and construction sub-contractors. TfNSW is the Proponent for the Project. Figure 1 shows the extent of the SLR and the CSELR Project.

The broader SLR project consists of:

- The design, construction, manufacture, testing and commissioning of the CSELR:
 - a new light rail system to service the Sydney Central Business District (CBD) and south east Sydney running from Circular Quay to Central Station via George Street, and on to Kingsford and Randwick via Surry Hills and Moore Park. The CSELR include Light Rail Vehicles (LRVs), CSELR Stops, terminus facilities, interchanges and facilities for the maintenance and stabling of LRVs.
 - public domain works, including a pedestrian zone in George Street from Hunter Street to Bathurst Street.
 - adjustments to existing public roads, existing Utility Services and private properties that are affected by the construction of the CSELR.
- Operation and maintenance of the CSELR and the Inner West Light Rail (IWLR).



Figure 1: SLR and CSELR proposed infrastructure

1.2 Project vegetation impacts

Prior to the development of the Revegetation Compensation Package (the RCP) for the CSELR project, various steps have been taken to avoid and minimise vegetation impacts during the environmental planning stage of the Project and subsequently during detailed design, as well as independent review and advice from the project arborist as documented through the Tree Report, and control measures as documented in the Vegetation Management Plan (VMP) which forms a sub plan to the Construction Environmental Management Plan (CEMP) for the Project.

The Tree Report issued on the 23 October 2015 identifies trees to be removed, transplanted and retained for the Project based on Detailed Design.

The VMP (Biosis 2015) identifies how impacts to vegetation will be minimised during design and construction of the Project including the implementation of the Tree Report, as well as relevant environmental management measures from the EIS/Submissions Report and requirements from the conditions of approval. The VMP confirms only street trees will be impacted through removal, with some marginal forage habitat for a range of native and introduced fauna.

1.3 Scope and objectives

Infrastructure Approval (SSI 6042) was granted for the Project under Section 115ZB of the *Environmental Planning & Assessment Act 1979* (EP&A Act) on 4th June 2014. A Modification of Minister's Approval was granted for the Project under Section 115ZI of the EP&A Act on 17th February 2015. Schedule B of the Modification of Minister's Approval provides revised Conditions of Approval for SSI 6042. Condition of Approval schedule B states:

B47

The Proponent shall, to the greatest extent possible, minimise the removal of vegetation, including at Circular Quay, Moore Park and surrounds, Anzac Parade, Centennial Park and surrounds, Royal Randwick Racecourse (along Alison and Wansey Roads), High Cross Park and within the UNSW lands. Where vegetation has been removed, reinstatement and supplement landscaping shall be undertaken in accordance with the Revegetation Compensation Package required by condition B52. The two mature fig trees located on Centennial Park and Moore Park Trust lands at the end of the heritage listed perimeter fence on the corner of Alison Road and Darley Road shall not be impacted by the SSI.

B47A

In the first instance, the Proponent shall avoid the removal of trees that provide visual screening for Martin Road/Robertson Road residents. However, should trees be required to be removed for operational reasons, the Proponent is required to demonstrate, to the satisfaction of the Secretary, why sharing the bus lane further north (between Robertson Road and Alison Road) is not feasible. This does not include the requirement to remove the two mature trees located adjacent to the corner of Alison Road and Anzac Parade as these require removal to accommodate the left turn slip lanes from Anzac Parade to Alison Road.

B47B

The Proponent shall limit the removal of significant trees (mature and semi-mature fig trees) along Anzac Parade as part of the construction of the cut and cover tunnel. Prior to the removal of any trees for the construction of the tunnel, the Proponent shall demonstrate, to the satisfaction of the Secretary, that it has investigated the following options, and any other option that may be identified by the contractor, to further reduce the impacts to trees in the construction footprint as a result of the Anzac Parade lane diversions:

- (a) Temporarily relocating the footpaths on either side of the road (or temporarily limiting the provision of footpaths to one side of the road) to provide more space for traffic lanes; and*
- (b) Providing five traffic lanes for Anzac Parade instead of six.*


Where these options do not result in traffic flow arrangements acceptable to the RMS, information must be submitted to the Secretary to justify why this is the case, including supporting information from the RMS.

Notwithstanding whether one of the above options is implemented as part of construction, the Proponent shall also employ construction techniques that minimise impacts to tree root zones at all times along Anzac Parade (to its intersection with Alison Road), Alison Road and Wansey Road, including but not limited to those identified in environmental management measure T4 within Table 4.2 of the Modification Report referred to in condition A1e).

B52

*The Proponent shall develop and implement a **Revegetation Compensation Package** for the SSI to outline how vegetation impacts will be compensated for within and adjacent to the corridor. The Package shall be prepared and submitted to the Secretary for approval prior to removal of vegetation, unless otherwise agreed by the Secretary, and in consultation with relevant Councils, the UDRG and the Centennial Park and Moore Park Trust in accordance with TfNSW's Vegetation Offset Guide (2013). The Package should ensure that all vegetation loss, is appropriately offset through regeneration or replanting and include:*

- a) the identification of the extent and types of vegetation impacts as a result of the final design of the SSI;*
- b) details of impact mitigation measures to compensate for vegetation removal;*
- c) measures for the management, protection and monitoring of the compensatory vegetation, for a minimum period of two years;*
- d) timing and responsibilities for the implementation of the provisions of the Package.*



To mitigate visual impacts, direct replacement of vegetation lost should be undertaken in the vicinity of where the vegetation was impacted (where space permits). For all other vegetation to be replanted as part of the Revegetation Compensation Package, vegetation shall be replaced within the same Local Government Area as the impact occurs, unless otherwise agreed by the Secretary.

Where monitoring shows inadequate compensation has been achieved, remedial actions must be undertaken to ensure that the objectives of the Package are achieved.

Further modifications to the Infrastructure Approval have been granted, these include:

- SSI-6042 MOD 2 approved 17 March 2015 – modifications to definition of construction;
- SSI-6042 MOD3 approved 29 September 2015 – modification to CoA B24 Property Access.

2 Development of the RCP

2.1 Relevant plans and documents

Information and advice from various plans and documents has been incorporated into the development of this RCP, including:

- Infrastructure Approval SSI 6042 (Conditions B47 and B52).
- CBD and South East Light Rail Project Environmental Impact Statement (Parsons Brinckerhoff 2013)
- CBD and south east light rail project: Submissions Report, incorporating Preferred Infrastructure Report. Volume 1 – Main Volume, and Volume 2 (Appendices) (Parsons Brinckerhoff 2014).
- CBD and south east light rail project. State Significant Infrastructure Approval (SSI-6042): Modifications Report (Parsons Brinckerhoff 2014).
- CBD and south east light rail project. State Significant Infrastructure Approval (SSI-6042): Submissions Report to Project Modification (Parsons Brinckerhoff 2015).
- Sydney Light Rail – Public Private Partnership: Project Deed. Schedule E1 Scope and Performance Requirements, Appendix 14 – Public Domain (TfNSW 2015).
- Vegetation Management Plan for the Project (Biosis, 2015).
- CSELR Project Arboricultural Impact Assessment – Stage 1 (UTM 2015).
- CSELR Environmental Impact Statement (TfNSW, 2013).
- Construction Environmental Management Plan (In prep.).
- Landscape Plan (In prep.).
- Offset guidelines from the Transport for NSW Vegetation Offset Guide (TfNSW 2013).
- Tree planting guidelines from the Street Tree Master Plan 2011 (City of Sydney 2011) and Randwick Street Tree Master Plan (Randwick City Council).

2.2 Determining compensation requirements

Types of offsets required

In accordance with Infrastructure Approval SSI 6042 (Schedule B52), the *Vegetation Offset Guide* (TfNSW 2013) was the primary reference used in the RCP to calculate offset requirements for the CSELR Project.

The Project does not involve the removal of any native vegetation communities and therefore there is no requirement for primary or secondary offsets. The Project only requires the removal of individual street trees. As stated in the *Vegetation Offset Guide* (TfNSW 2013) an offset is required ‘when clearing one tree or a group of trees that don’t form part of a vegetation community but may have other intrinsic value’. This offset requirement applies to the individual street trees impacted by the Project and includes both native and exotic species (TfNSW 2013).

Offsets for individual trees or groups of trees

Guidelines for offsetting for individual tree removal (TfNSW 2013) based on tree size and diameter at breast height (DBH) are outlined in Table 1.

Table 1: Offset for individual tree removal

Tree type	Offset required
Large tree (DBH greater than 60 cm)	Plant minimum 8 trees
Medium tree (DBH greater than 15 cm, but less than 60 cm)	Plant minimum 4 trees
Small tree (DBH less than 15 cm)	Plant minimum 2 trees

Table 1 does not specify which category to place trees in where the DBH is equal to one of the cut-off values.

For the purpose of calculating offset requirements, the following assumptions have been made:

- Trees with a DBH equal to 60 cm are considered a “medium” tree.
- Trees with a DBH equal to 15 cm are considered a “small” tree.
- The size of the trees to be offset within the Project Boundary will be a minimum of 200 Litres. The size of the trees to be offset outside the Project Boundary will be determined based on consultation with the landowner.

2.3 Selection of revegetation locations

Schedule B52 of the Minister’s Approval states that the RCP is to be developed, in accordance with the Vegetation Offset Guide (TfNSW 2013). The vegetation offset guide states that revegetation locations for tree replanting should be undertaken as close to the removal site as possible.

Where this is not practicable, suitable alternative locations within the same Local Government Area (LGA) as the impact occurs will be identified and agreed upon with the relevant Councils, in the case of this assessment being the City of Sydney (CoS) and Randwick City Council (RCC) as well as Centennial Park and Moore Park Trust (CPMPT), unless otherwise agreed by the Secretary. As such, the RCP is to be developed in consultation with the relevant Councils and CPMPT, as well as the Urban Design Reference Group (UDRG) for the project, refer to **Appendix A**. Consultation will continue throughout the design phase.

Further consultation to identify suitable areas for replanting within each Council area and CPMPT lands will be ongoing as the works progress, or alternate arrangements made in consultation with these parties with the approval of the Secretary.

3 Revegetation works

3.1 Project revegetation requirements

The tree impacts of the identified will require offsetting for the removal of 582 native and exotic trees if no trees are translocated.

The Arboricultural Impact Assessment (i.e. the Tree Report) of the CSELR Project (UTM 2015) indicates that 134 trees (7 large, 43 medium and 84 small) have potential to be translocated. If all of these trees are transplanted offsetting will be required for the removal of the remaining 448 trees.

The Tree Planting Plans provided by ASPECT Studios (10/8/2015) recommend planting of 886 trees within the Project Boundary as part of the offset requirements. The number of trees to be planted within the project boundary is limited by the available space along the rail corridor.

Table 2 lists the revegetation requirements. The numbers of trees required for replanting are calculated using the offsetting requirements provided in Table 1 Table 1, and include options with and without tree translocations.

Table 2: Project revegetation requirements

Tree type	Number of trees to be removed	Revegetation required
CoS LGA		
Large tree	28 (21 – if 7 translocated)	Plant minimum 224 (168) trees
Medium tree	188 (145 – if 43 translocated)	Plant minimum 752 (580) trees
Small tree and palm	40 (29 – if 11 translocated)	Plant minimum 80 (58) trees
Total for Sydney LGA	256 (195 – if 61 translocated)	1,056 (806 – if 61 translocated)
RCC LGA		
Large tree	37 (37 – if 0 translocated)	Plant minimum 296 (296) trees
Medium tree	157 (157 – if 0 translocated)	Plant minimum 628 (628) trees
Small tree and palm	132 (59 – if 73 translocated)	Plant minimum 264 (118) trees
Total for RCC LGA	326 (253 – if 73 translocated)	1,188 (1,042 – if 73 translocated)
TOTAL	582 (448 – if 134 translocated)	2,244 (1,848 – if 134 translocated)

A minimum of 2,244 native and exotic trees should be replanted to achieve revegetation offset requirements for tree impacts of the Project if no translocations occur. This number could be reduced to 1,848 if all 134 suitable trees are translocated.

Table 3 below summarises the replanting requirements within each LGA and CPMPT lands, a summary of the proposed replanting numbers within the project boundary based on ASPECT Studios replanting schedules (as at August 2015), as well as a calculation of the remaining number of trees to be replanted elsewhere within each LGA/CPMPT lands (locations to be agreed during further consultation).

Table 3: Revegetation calculations

LGA	Revegetation Requirements (as per Table 2)	Revegetation proposed within project boundary as per replanting plans	Revegetation required outside Project boundary
CoS	1,056 (806 – if 61 translocated)	437	619 (369 - if 61 translocated)
RCC	1,188 (1,042 – if 73 translocated)	449	739 (593 – if 73 translocated)
TOTAL	2,244 (1,848 – if 134 translocated)	886	1,358 (962 – if 134 translocated)

A total of 886 trees (with no translocation) will be replanted within the Project Boundary (across the CoS and RCC LGAs and the CPMPT lands) in accordance with the replanting plans for the project. An additional 619 trees (with no translocations), or 369 trees (with 61 translocations) will need to be planted outside of the Project Boundary within the CoS LGA to fulfil the offset requirements. An additional 739 trees (with no translocations), or 593 trees (with 73 translocations) will need to be planted outside of the Project Boundary within the RCC LGA to fulfil the offset requirements.

As outlined in Section 2.3 above, these additional replanting areas outside the project boundary would be identified in consultation with the relevant councils as well as CPMPT which will be ongoing throughout the works.

3.2 Species selection

In accordance with the TfNSW *Vegetation Offset Guide* (2013) areas characterised by exotic trees that will require removal may be replanted with exotic tree species where appropriate, to maintain the landscape and/or cultural values of that area (TfNSW 2013). Appendix H of the Arboricultural Assessment (UTM 2015) provides a list of trees that will be removed based on the current design. Given the majority of trees to be removed for the CSELR Project are landscape trees (both native and exotic) it is recommended that this list should be used to provide a table of species suitable for selection for replanting in each of precinct. Where the same species cannot be replanted, an alternative species of tree should be selected from Appendix H of the Arboricultural Assessment (UTM 2015), or as otherwise agreed with the relevant land owner. Weeds listed as noxious under the *Noxious Weeds Act 1993* (NW Act) such as Chinese Tallow Tree *Sapium sebiferum* would not require offset/revegetation.

3.3 Sources of planting stock

A nursery local to the study area should be sourced at least 6 to 12 months prior to replanting works and provided with a list of required species, to ensure that seed can be sourced and propagated for revegetation works on site. Local nurseries that may be suitable for sourcing stock include:

- Randwick Community Nursery.
- Growing Friends' Nursery Plant Sales, The Royal Botanic Gardens & Domain Trust.

All plants shall be true to scheduled nomenclature, well formed, hardened off and disease free nursery stock.

They shall be container grown in potting soil with a firmly established root system but with no large roots growing out of the container. No plant shall be pot bound or excessively pruned.

The condition of plant stock should encourage future growth that is strong and typical of the species. Correct nursery/growing practices shall help ensure the long-term health and viability of the plant stock on site after planting.

The D&CJV Environment & Sustainability Manager/Officer or nominated person in charge of Revegetation works shall allow for a quality inspection of all stock prior to delivery to site, that confirms the following:

- Stock is disease free and healthy.
- Rootball has adequately grown into the container appropriate to the specified size.
- Stock shows no evidence of spirally, being pot bound, or other undesired outcomes of growth at the nursery.

3.4 Site treatment

Site treatment should occur prior to the commencement of revegetation works to ensure the revegetation areas are in best possible condition for new plantings. Site treatment including soil type, mulching, weed and erosion control is described below. This is in accordance with the requirements outlined in the VMP for the Project.

3.5 Planting techniques

Tree planting techniques should be consistent with the City of Sydney (2011) and Randwick City Council guidelines, unless otherwise agreed with the relevant Councils.

The *City of Sydney Street Tree Master Plan 2011* (City of Sydney 2011) contains the following guidelines for planting street trees:

- Be aware of various limitations to the positioning of street trees on footpaths.
- Street trees should be spaced as follow; small trees spaced at 5-7 metre intervals, medium trees spaced at 7-10 metre intervals and large trees spaced at 10-15 metre intervals.
- Various sized trees planted appropriately to suit footpath width and/or type.

The *Randwick Street Tree Master Plan* (Randwick City Council) contains the following general guidelines for planting street trees:

- No trees should be planned for sites with recognised established accident histories.
- Strongly encourage the planting of large trees in parks, or other pockets of public open space such as schools, or adjacent to road reserves where there is little opportunity for planting trees on the nature strip.
- Non-powerline sides of streets should be used first for potential tree sites.
- Always consider the position of street lighting when positioning street trees.

3.6 Protective measures

Construction works, the public and pets can have an adverse effect on the establishment of plantings by defoliating, damaging or removing young plants. To minimise damage to and/or loss of plants, new plantings will be protected using:

- Plastic tree guards or metal tree guards for planted trees up to 200L in size as recommended and supplied by the City of Sydney Council (City of Sydney 2011).
- Temporary exclusion fencing of larger areas where tree guards are not effective.
- Signage and use of coloured marker stakes to discourage public contact by indicating revegetation works are taking place.

Further detail on tree protection measures is provided in the Tree Report. Appropriate training to ensure construction staff are aware of the location of revegetation areas, procedures and practices to follow will be implemented as per the CEMP and relevant sub plans including the VMP.

3.7 Site maintenance

Maintenance is required at the time of and subsequent to revegetation works to ensure the growth and survival of tree plantings. Maintenance requirements such as watering, mulching, fertilising and pest and disease control are described in the VMP.

4 Monitoring and adaptive management

4.1 Monitoring objectives

Monitoring of the revegetation works is required to ensure the measures outlined in this RCP are implemented in accordance with the conditions and that performance criteria are satisfied as far as possible. Monitoring is also needed to gather information to adapt the maintenance schedule, such as identifying replacement planting requirements and reasons for poor tree growth, if the situation requires.

4.2 Monitoring lifespan

Condition of Approval B52 of Schedule B requires monitoring and management of the revegetation works will occur for a minimum period of two years. It is recommended that maintenance responsibilities beyond this period will be handed back to relevant Councils (City of Sydney and Randwick City Councils).

4.3 Monitoring parameters

The monitoring program will draw upon the information contained in this RCP and will involve reporting to assess and document:

- General condition of the study area including continued regeneration response and overall resilience.
- The survival rate of any revegetated areas and the requirements for additional revegetation and/or maintenance.
- Recommendations for corrective measures and/or revised vegetation management techniques as a result of site response to the works specified herein or other factors such as climatic conditions.

4.4 Maintenance, Monitoring and Reporting

Monitoring events will occur at the intervals provided in Table 4. At each phase the vegetation will be reviewed and any actions required documented in the monitoring report. The maintenance contractor will be responsible for undertaking the actions including replacing plants that may have died.

Table 4: Monitoring schedule

Replanting phase (0 – 6 months)	Establishment phase (6 – 12 months)	Maintenance phase (12 – 24 months)
1 visit/2 months	1 visit/3 months	1 visit/6 months

Monitoring reports will include the following items:

- Status of tree (alive/dead)
- Observations of health of tree
- Height of tree
- Presence of insect pests or disease (Y/N, identify if present)
- Details of replacements required for trees that have not survived.

Monitoring reports should be completed with two weeks of each monitoring period (refer to the monitoring schedule in Table 5 below) in order to initiate any management actions and respond to the requirements of the replanted trees as required.

4.5 Adaptive management

An adaptive management approach is to be employed to the works forming part of this RCP. An adaptive management approach involves an integrated process of monitoring, reviewing and then responding to the health and condition of the plantings to identify any alterations to the design and maintenance of works that may be required to ensure the objectives of the RCP are achieved.

For example, the application rates for fertiliser and the watering schedule should be flexible in responding to the health and vigour of the plantings and changing climatic conditions. Monitoring the plantings will also allow for a review of the selected species to enable changes in the species composition of the supplementary planting if it is determined that a particular species or stock sourced from a certain location is not performing adequately. The supplementary planting species, planting densities and planting patterns nominated within this RCP may be subject to change and review if certain species are unavailable or are performing inadequately. Any changes to the RCP would be consulted and approved in accordance with the relevant approval and contract requirements for the project. This will include design changes and the inclusion of High Street Randwick and High Cross Park.

5 Timing and responsibilities

A schedule of timing and responsibilities for completing all tasks required for the RCP is provided in Table 5.

Table 5: RCP schedule

Action	Description	Timing and duration	Reporting	Responsibility
Acquiring plant stock	Sourcing appropriate tree species from a nursery.	6-12 months prior to commencing revegetation works.	Maintain a species list.	D&CJV ESM
Site treatment	Preparing best quality soil, weed control and erosion control.	Prior to the commencement of revegetation works.	Not required.	D&CJV ESM; Appointed revegetation contractors (TBC)
Planting	Planting offset trees and establishing protective measures.	At time of revegetation works.	Maintain species list.	Appointed revegetation contractors (TBC)
Maintenance	Encompasses watering, mulching, fertilising, insect pest and disease control.	At the time of and subsequent to revegetation works.	Inspection checklist	Appointed maintenance contractors (TBC)
Monitoring	Monitoring of revegetation will be conducted within the landscaped areas	As outlined in Section 4.4	Inspection checklist	Appointed maintenance contractors (TBC)
Reporting	Monitoring reports to be prepared following each monitoring event.	Reports to be completed within two week of each monitoring period	A brief report outlining the findings.	Appointed maintenance contractors (TBC)
Implementation of monitoring recommendations (replacement planting, changes to maintenance program)	Corrective action procedures will be implemented to ensure health of revegetation areas.	As required after examination of monitoring reports.		D&CJV ESM; Appointed revegetation contractors (TBC)

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Appendix A – Consultation

