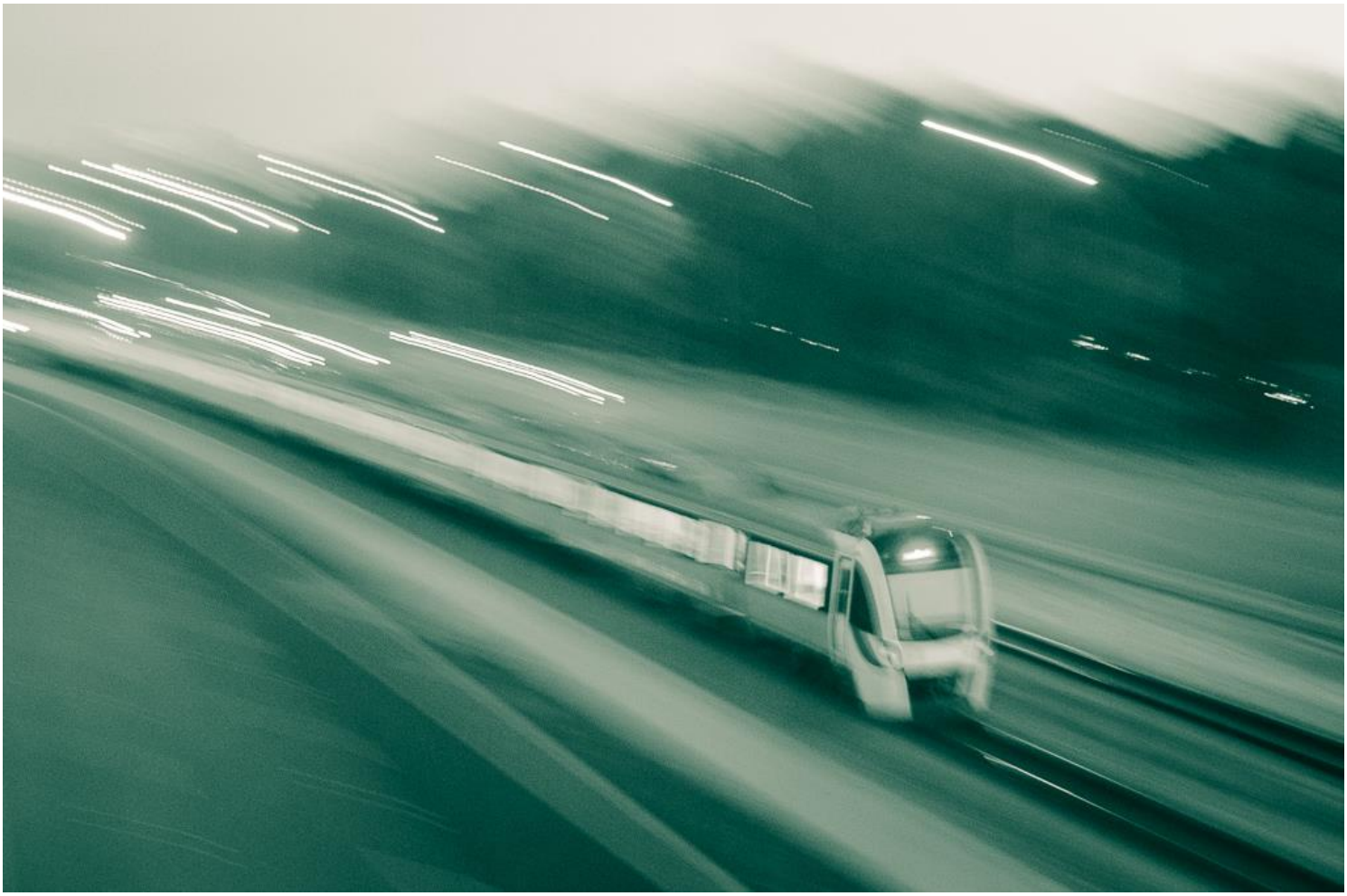
Yanchep Rail Extension: Part 1 – Butler to Eglinton

Construction Environmental Management Plan

Prepared for
Public Transport Authority

5 April 2019



DOCUMENT TRACKING

Item	Detail
Project Name	Yanchep Railway Extension: Part 1 – Butler to Eglinton
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Contents

List of figures

List of tables

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Abbreviations

Abbreviation	Description
ASS	acid sulfate soils
CAR	Compliance Assessment Report
CBD	central business district
CEMP	Construction Environmental Management Plan
DBCA	Department of Biodiversity, Conservation and Attractions
DoEE	Department of the Environment and Energy
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
EP Act	*Environmental Protection Act 1986*
LSP	Local Structure Plan
MNES	Matters of National Environmental Significance
MRS	Metropolitan Region Scheme
PEC	Priority Ecological Community
PSP	Principal Shared Path
PTA	Public Transport Authority of Western Australia
RiWI Act	*Rights in Water and Irrigation Act 1914*
TEC	Threatened Ecological Community
UXO	unexploded ordnance
WAM	Western Australian Museum
WQPN	Water Quality Protection Note
YRE	Yanchep Rail Extension

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1 Introduction

The Public Transport Authority of Western Australia (PTA) is developing the Yanchep Rail Extension (YRE) Project as part of the Western Australian Government's METRONET program of works. The YRE Project is an extension to the Northern Suburbs Railway (also known as the Joondalup line) in Perth's northern suburbs, 40 km north of the Perth central business district (CBD). The YRE Project includes 14.5 km of railway beyond the existing Butler Station, new stations at Alkimos, Eglinton and Yanchep, and associated infrastructure.

The proposal described in this document is Part 1 of the YRE Project from Butler Station to the proposed Eglinton Station in the City of Wanneroo (the proposal).

Following referral of the proposal to the Environmental Protection Authority (EPA) under Section 38 of the *Environmental Protection Act 1986* (EP Act), the EPA determined on 13 March 2018 to set the level of assessment as 'Referral Information – Additional Information Required'. The EPA has requested the PTA to provide a construction environmental management plan (CEMP) to demonstrate how potential environmental impacts of the proposal on key environmental factors will be managed. This document addresses management of impacts during construction only, not during operation.

Table 1-1 Summary of this plan

Item	Detail	
Title of proposal	Yanchep Rail Extension: Part 1 – Butler to Eglinton	
Proponent	Public Transport Authority of Western Australia	
Ministerial Statement No.	Not applicable – proposal is under assessment	
Purpose of this CEMP	Requested by EPA to enable assessment	
Key environmental factors considered in this proposal	Environmental factor	Objective
	Flora and Vegetation	To protect flora and vegetation so that biological diversity and ecological integrity are maintained.
	Terrestrial Fauna	To protect terrestrial fauna so that biological diversity and ecological integrity are maintained.
	Subterranean Fauna	To protect subterranean fauna so that biological diversity and ecological integrity are maintained.
	Landforms	To maintain the variety and integrity of significant physical landforms so that environmental values are protected.
	Terrestrial Environmental Quality	To maintain the quality of land and soils so that environmental values are protected.
	Social Surroundings	To protect social surroundings from significant harm.
	Inland Waters	To maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected.
Key provisions in this plan	See Schedule 1: CEMP provisions	

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The structure of this CEMP is as follows:

- Section 1 – Introduction and summary.
- Section 2 – Further context and rationale for the CEMP and the provisions being proposed.
- Section 3 – Summary of provisions of this CEMP, i.e. the management, monitoring and reporting framework being proposed.
- Section 4 – Provisions for adaptive management and review.
- Section 5 – Details of stakeholder consultation.
- Schedule 1 – Detailed provisions of the CEMP.

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2 Context, scope and rationale

2.1 Description of the proposal

The proposal includes the construction of approximately 7.3 km of narrow gauge dual track railway from the existing terminus of the Northern Suburbs Railway north of Butler Station, heading generally north via new stations at Alkimos and Eglinton, before terminating north of the proposed Eglinton Station. The new stations at Alkimos and Eglinton will include intermodal interchanges for bus services, 'park and ride', 'kiss and ride', active mode facilities and associated infrastructure. The proposal includes a contingency for a turnback facility to be constructed to the north of the Eglinton Station, to allow for the turning of two six-car trains should Part 2 of the YRE Project not proceed.

The development envelope is 63.33 ha in size and comprises two components: a 45.40 ha development footprint and a 17.93 ha construction and access area (**Figure 2-1**). The construction and access area has been selected to coincide with proposed future urban development or roads either reserved by the Metropolitan Region Scheme (MRS) or as detailed within approved and draft Local Structure Plans (LSPs) and therefore designated to be cleared.

The railway will be constructed within the 40 m wide railway corridor. The railway will be constructed generally in a cutting approximately 6 m below the surrounding ground level. The railway and ancillary infrastructure is contained within the railway corridor with either batters and/or retaining walls used to stabilise the slopes down to formation level. Where the cutting passes through a large and high sand dune, the depth of the cutting is at its deepest approximately 20 m from the surrounding ground level. Two new train stations are proposed at Alkimos (approximately 5.3 ha in the development footprint) and Eglinton (approximately 6.9 ha in the development footprint). Intermodal rail, bus, 'park and ride', 'kiss and ride' and active mode (cycling and walking) facilities will be constructed at each station.

The proposal also includes permanent infrastructure for maintenance and emergency vehicle access, drainage, overhead electrification for traction, signalling, communications and other services, access roads and pathways, and access control (e.g. fences and gates). A principal shared path (PSP) will also be constructed alongside the railway (outside the railway corridor fencing) to provide transport facilities for pedestrians and cyclists.

2.2 Key environmental factors

In its decision to assess the proposal, the EPA has advised there are eight key environmental factors that are relevant to the proposal (EPA 2018a). In June 2018 and after the level of assessment was set, the EPA merged the Inland Waters Environmental Quality factor and the Hydrological Processes factor. The following key environmental factors relevant to the construction phase are addressed within this CEMP:

- Flora and Vegetation
- Terrestrial Fauna
- Subterranean Fauna
- Landforms
- Terrestrial Environmental Quality
- Social Surroundings
- Inland Waters.

Bushfire, an aspect of the preliminary key environmental factor Social Surroundings, is addressed separately in the Bushfire Management Strategy (PTA 2017) and is therefore excluded from this CEMP.

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The EPA advised in 'Further explanation of decision on Level of Assessment' (EPA 2018b) that the key environmental issues relevant to the proposal are:

- Clearing of native vegetation, including areas of Threatened Ecological Community (TEC) 26a
- Loss of threatened fauna habitat
- Fragmentation of the Lot 200 Alkimos Drive 'Parks and Recreation' reservation that provides an east-west ecological linkage.

All potential impacts of the proposal are outlined in **Table 2-1**. This includes both direct and indirect potential impacts.

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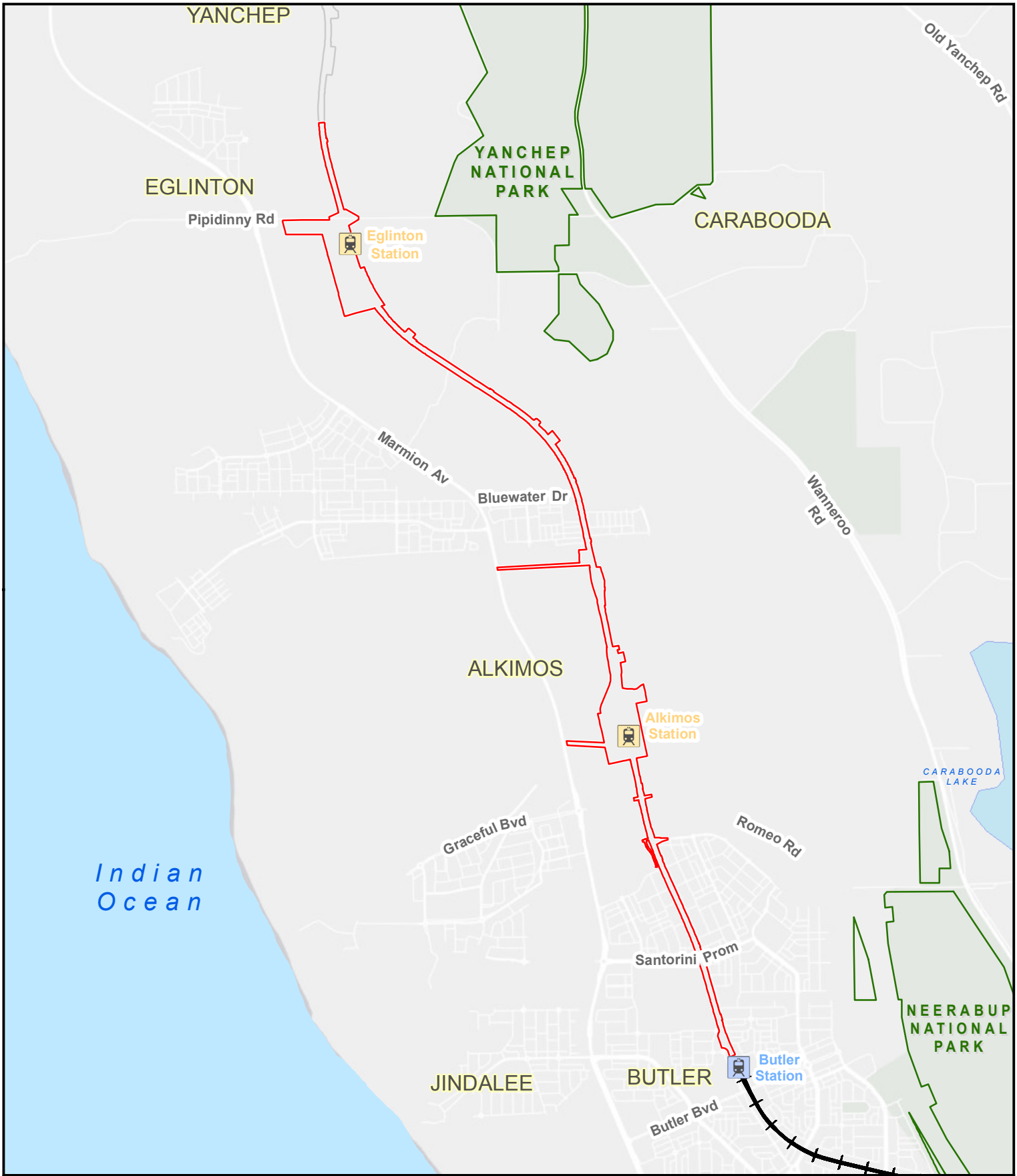

Yanchep Rail Extension (Part 1)
Figure 2-1 Project location

Public Transport Authority

Legend

- YRE Part 1 Development Envelope
- YRE Part 2
- National Park
- Surface Water Feature
- Proposed Station
- Existing Station
- Existing Railway

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Table 2-1: Environmental aspects of the proposal

Key environmental factor	Environmental aspect of the proposal	Affected environmental values	Potential impacts	Activity or threatening process
Flora and Vegetation	Clearing of native vegetation	Native vegetation Threatened and Priority Ecological communities (TEC and PECs)	Clearing of 37.72 ha of native vegetation in Pristine to Degraded condition, including areas of PECs and up to 0.53 ha of TEC 26a Indirect impacts to an additional 0.41 ha of TEC 26a Fragmentation of contiguous vegetation of Lot 200 Alkimos Drive 'Parks and Recreation' reservation (Alkimos PRR)	Clearing of native vegetation Severance of ecological linkages
	Vehicle and machinery movement	Native vegetation TECs and PECs Bush Forever Sites	Degradation of vegetation adjacent to the development envelope	Introduction and spread of *Phytophthora* dieback and weeds Unauthorised access to adjacent vegetation by vehicles or on foot Dust deposition and emissions
Terrestrial Fauna	Clearing of native vegetation	Fauna habitat Fauna species (including Threatened and Priority species)	Loss of fauna habitat (48.10 ha high value, 6.87 ha medium value and 8.36 ha low value) Mortality/injury of fauna Fragmentation of habitat	Vehicle and machinery movement Clearing of fauna habitat Severance of ecological linkages
	Vehicle and machinery movement	Fauna habitat Fauna species (including Threatened and Priority species)	Degradation of fauna habitat adjacent to the development envelope Mortality/injury of fauna Disturbance and disruption	Introduction and spread of *Phytophthora* dieback and weeds Unauthorised access to adjacent vegetation Noise and vehicle/dust emissions

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Key environmental factor	Environmental aspect of the proposal	Affected environmental values	Potential impacts	Activity or threatening process
Landforms	Earthworks	Alkimos Dune System within Lot 200 Alkimos Drive 'Parks and Recreation' Reservation	Destabilisation and erosion of the parabolic dune formation within Lot 200 Alkimos Drive 'Parks and Recreation' Reservation	Alteration of the shape of the parabolic dune formation.
Subterranean Fauna	Earthworks - cutting	Subterranean fauna species and habitat	Loss of potential or actual habitat Mortality of troglofauna species (if present)	Disturbance or destruction of small voids close to the surface
	Use and storage of fuel/chemicals for vehicle and machinery use	Stygofauna species and habitat	Mortality of stygofauna species (if present), degradation of habitat	Contamination from spills such as from refuelling and plant and vehicle fluid leaks during earthworks
Terrestrial Environmental Quality	Vegetation clearing and earthworks	Soils	Contamination of soil	Contamination from exposure or disturbance of unexpected finds, e.g. historical illegal dumping of household rubbish, UXO, etc.
	Use and storage of fuel/chemicals for vehicle and machinery use	Soils	Contamination of soil	Contamination from uncontained spills such as from refuelling and plant and vehicle fluid leaks during earthworks
Inland Waters	Use and storage of fuel/chemicals for vehicle and machinery use	Groundwater quality	Reduction in the quality of the superficial aquifer	Contamination from uncontained spills such as from refuelling and plant and vehicle fluid leaks
	Vegetation clearing and earthworks	Hydrological processes	Alteration of surface water flow paths and recharge locations	Alteration of the shape of the landscape
	Dust suppression	Groundwater (superficial aquifer)	Reduction in groundwater levels	Extraction of groundwater for dust suppression and other construction uses

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Key environmental factor	Environmental aspect of the proposal	Affected environmental values	Potential impacts	Activity or threatening process
Social Surroundings	Vegetation clearing and earthworks Vehicle and machinery movement	Aboriginal heritage	Damage or destruction to sites of Aboriginal heritage value or previously unidentified Aboriginal objects	New Aboriginal objects unearthed or identified during vegetation clearing and earthworks or unauthorised vehicle and personnel access Relocation of registered Aboriginal heritage sites
	Vegetation clearing and earthworks Vehicle movement Stockpiles and cleared land	Amenity (air quality)	Elevated dust levels in adjacent residential areas could irritate the public and reduce visibility	Dust generated from stockpiles/cleared areas and during vehicle movements
	Vegetation clearing and earthworks Vehicle movement Use of power tools and machinery	Amenity (noise and vibration)	Noise and vibration may act as a nuisance to adjacent residential areas	Noise and vibration generated by construction activities. (Noise and vibration impacts from operations are addressed in a separate Noise and Vibration Management Plan.)

2.3 Rationale and approach

The results of the baseline environmental assessments and a number of assumptions based on anticipated project activities inform the management approach for meeting the management provisions outlined in **Section 3.2** and **Schedule 1**. The identified management actions, management targets and proposed review and revision of management actions are aligned with the overall management approach and are designed to ensure that the environmental objectives for each key environmental factor, can be met.

To supplement the management approach identified in this CEMP, a Contractor CEMP will be developed and implemented, and will include more detailed instruction on day to day management.

2.3.1 Findings from studies and surveys

Numerous environmental studies of the eight preliminary key environmental factors have been undertaken within the development envelope. The key findings of these studies are outlined in **Table 2-2.**

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Table 2-2: Key environmental studies undertaken for the proposal.

Key environmental factor	Report	Key findings
Flora and Vegetation	Northern Suburbs Railway, Alkimos to Yanchep, *Phytophthora cinnamomi* occurrence assessment (Glevan Consulting 2011)	Reconnaissance and Detailed surveys were undertaken to assess the native flora and vegetation values present. Vegetation condition varied from Pristine to Completely Degraded. No conservation listed flora species were observed. One Declared Pest species was recorded. Four State listed PECs, one State listed TEC and a Federally listed TEC are present within the development envelope. There are no Bush Forever Sites within the development envelope. Two dieback assessments have been undertaken; no dieback was recorded. In Glevan (2017), 33% of the project area that was interpretable was disease-free. More than half of the project area (57%) was uninterpretable. All uninfested and uninterpretable areas are considered protectable and have very low likelihood of dieback presence due to presence of calcareous soils and limestone.
	Yanchep Rail Extension, *Phytophthora* dieback Occurrence Assessment (Glevan Consulting 2017)	
	Northern Suburbs Railway Alignment Butler to Yanchep Environmental Investigation (GHD 2012)	
	Yanchep Rail Extension Biological Assessment (GHD 2018)	
	Yanchep Rail Extension Part 1 Biological Factors – Context and Impact Assessment (GHD 2019)	
Terrestrial Fauna	Report for Northern Suburbs Railway Alignment from Romeo Road (Alkimos) to Yanchep, Graceful Sun-moth Survey (GHD 2011)	Level 1 and targeted Black Cockatoo surveys were undertaken to assess the native fauna and habitat values present. Eight fauna habitats, ranging from low to high value, were mapped in the development envelope. Four conservation listed fauna species were recorded, with a further six considered likely to occur.
	Northern Suburbs Railway Alignment Butler to Yanchep Environmental Investigation (GHD 2012)	
	Yanchep Rail Extension Biological Assessment (GHD 2018)	
	Yanchep Rail Extension Part 1 Biological Factors – Context and Impact Assessment (GHD 2019)	
	Draft: Desktop Review and Risk Assessment of Short Range Endemic Invertebrates for the Yanchep Rail Extension, Western Australia (Invertebrate Solutions 2018a)	A desktop review was undertaken of previous SRE invertebrate fauna assessments, suitable habitats, direct and indirect impacts and significance of impacts. This review identified one confirmed SRE as having a high likelihood of occurrence in the development envelope. Seven likely SRE have a moderate likelihood of occurrence and two possible SRE have a moderate and high likelihood of

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Key environmental factor	Report	Key findings
		occurrence. The only direct impact is to the one confirmed SRE millipede.
Landforms	Yanchep Rail Extension, Geotechnical Investigation Report (Advisian 2017)	The assessment described the geological profile and provided an interpretation of the geotechnical engineering implications for construction. Parabolic and nested parabolic dunes intersected the development envelope in five areas. The impact assessment for the parabolic dunes (RPS 2018) has been limited to the portions of the development footprint reserved for 'Parks and Recreation' in the MRS (e.g. Lot 200 Alkimos Drive 'Parks and Recreation' reservation), as the remaining areas are contained within the approved LSPs.
Subterranean Fauna	Northern Suburbs Railway Alignment Butler to Yanchep Environmental Investigation (GHD 2012)	The study assessed the likelihood of subterranean fauna, subterranean fauna habitat or karst formations being present. No significant habitat resources for subterranean fauna were identified, and it was considered that there was a low risk that subterranean fauna were present in smaller voids.
	Draft: Desktop Review and Risk Assessment of Subterranean Fauna for the Yanchep Rail Extension, Western Australia (Invertebrate Solutions 2018b)	A desktop review of subterranean fauna has been undertaken to assess the likelihood of subterranean fauna occurring in the development envelope and to consider the potential impacts of the proposal to subterranean fauna. The proposal intersects areas of low value habitat to subterranean fauna.
Terrestrial Environmental Quality	Yanchep Rail Extension, Preliminary Site Investigation (Golder Associates 2017)	The report assessed the likelihood of current or former site land uses to have caused or contributed to contamination. The development envelope was found to not be at risk of Acid Sulfate Soils (ASS), however there was a risk of Unexploded Ordnance (UXO) within the Eglinton Range Area.
	Post Activity Report for Unexploded Ordnance Assessment Survey Yanchep Rail Extension (Milsearch 2018)	The survey located no items of actual unexploded or explosive ordnance within the boundary of the surveyed area, however, a single impact point where a World War II mortar bomb has historically detonated was found in the western extremity of the proposed Eglinton Station site. The report recommended that the area where the mortar impact was located be subject to a remediation search to ensure that no further items of actual UXO remain undetected.

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Key environmental factor	Report	Key findings
Social Surroundings	Desk-top Aboriginal Heritage Study of Proposed Northern Suburbs Railway Route (R. & E. O'Connor Pty Ltd 2012)	A desktop assessment and two archaeological surveys have been undertaken within the development envelope to identify if any Aboriginal heritage sites or isolated artefacts were present. These assessments identified a site of potential heritage value, referred to as the Romeo Road Pinnacles. This site does overlap the development envelope. There are no listed natural or historic (non-Aboriginal) heritage places within the development envelope. Dust, noise and vibrations are likely to be generated during construction activities.
	Report on an Archaeological Survey of the Butler to Yanchep Railway Alignment (John Cecchi Heritage Management Consulting (JCHMC) 2013)	
	Northern Suburbs Railway Extension Alignment (R. & E. O'Connor Pty Ltd 2017a)	
	Addendum to report on the Aboriginal Heritage Survey of the Northern Suburbs Railway Extension (R. & E. O'Connor Pty Ltd 2017b)	
	Transportation Noise and Vibration Assessment – METRONET Yanchep Rail Extension (Lloyd George Acoustics 2018)	An assessment has been undertaken to quantify the noise and vibration emissions of the extension from Butler to Yanchep. The report indicated that the noise target will be exceeded at a number of sensitive premises during rail operation and noise walls are recommended at all existing noise sensitive premises. The vibration criterion is predicted to be marginally exceeded at a number of locations along the railway alignment during rail operation. Ballast matting is recommended to be installed adjacent to all existing and future residential developments adjacent to the railway alignment.
Inland Waters	A desktop assessment was undertaken as part of Environmental Impact Assessment Yanchep Rail Extension: Part 1 – Butler Station to Eglinton Station (RPS 2018)	The desktop study assessed the ground and surface water within the development envelope. The development envelope is located in the Perth Basin, with the Superficial, Leederville and Yarragadee North aquifers underlying the development envelope. Average depth to groundwater is 31 m. The development envelope is within the Priority 3 Perth Coastal Underground Water Pollution Control Area; the land uses 'Railway' and 'Railway Station' are considered to be 'Acceptable' and 'Compatible with Conditions' within Priority 3 areas respectively. The wellhead protection zone of an existing production bore intersects the existing Butler Station and the

Key environmental factor	Report	Key findings
		most southern portion of the development footprint. Railway infrastructure is located upstream of future production bores. There are no surface water features within the development envelope.

2.3.2 **Management approach**

The management approach has been informed by best practice and recent experience on similar linear infrastructure projects in Western Australia. The hierarchical approach taken focuses first on avoiding impacts to the key preliminary environmental factors, with focus on the three key environmental issues that were identified in 'Further explanation of decision on Level of Assessment' (EPA 2018b), where possible. Where impacts are unavoidable, management aims to minimise the duration, intensity and/or extent of impacts on key preliminary environmental factors during construction.

2.3.3 **Rationale for choice of provisions**

There are several existing EP Act and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) environmental approvals and management plans that are relevant to the proposal. Management provisions considered relevant to the construction phase of the proposal have been considered during the preparation of this CEMP, to ensure consistency between these documents. These existing approvals and management plans include:

- Ministerial Statement No. 722 – Alkimos-Eglinton Metropolitan Region Scheme Amendment 1029/33
- EPBC 2008/4601 – Mixed Commercial and Residential Development, Lot 3 Romeo Road, Alkimos, WA
- EPBC 2008/4638 – Residential Development, Lots 1005 & 1006, Alkimos, WA
- EPBC 2010/5777 – Eglinton Estates Residential Development, Lot 1007 & Part Lot 1008, Pipidinny Road, Eglinton, WA, including:
    - Eglinton Estates Clearing and Revegetation Management Plan 2015
    - Eglinton Estates Conservation Management Plan 2014
- EPBC 2011/6021 – LandCorp – Eglinton/South Yanchep Residential Development – 45 km North-West of Perth, WA, including:
    - Eglinton/South Yanchep Clearing and Revegetation Management Plan 2014
    - Eglinton/South Yanchep Conservation Management Plan 2015
- EPBC 2015/7561 – Alkimos City Centre and Central Development, Alkimos, Western Australia, including:
    - Alkimos City Centre and Central Construction Environmental Management Plan (Strategen 2017)
    - Parks and Recreation Reserve Management Plan for the Lot 200 Alkimos Drive 'Parks and Recreation' reservation.

The management provisions detailed in this document align with the mitigation measures outlined in the *Environmental Impact Assessment, Yanchep Rail Extension: Part 1 – Butler Station to Eglinton Station* report (RPS 2018) submitted to the Department of Water and Environmental Regulation (DWER) EPA Services when the proposal was referred under Section 38 of the EP Act in February 2018. These

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mitigation measures also align generally with the existing EP Act and EPBC Act approvals and management plans.

Six Water Quality Protection Notes (WQPN) published by the former Department of Water have been considered to ensure that relevant water quality management measures are incorporated into the CEMP to manage potential contamination risks:

- WQPN 10: Contaminant spills – emergency response (DoW 2006a)
- WQPN 44: Roads near sensitive water resources (DoW 2006b)
- WQPN 51: Industrial wastewater management and disposal (DoW 2009)
- WQPN 60: Tanks for mobile fuel storage in Public Drinking Water Source Areas (DoW 2013a)
- WQPN 68: Mechanical equipment was down (DoW 2013b)
- WQPN 83: Infrastructure corridors near sensitive water resources (DoW 2007).

2.3.4 **Key assumptions**

The key assumptions within this plan include:

- Key environmental factors Flora and Vegetation and Terrestrial Fauna have the greatest risk of significant environmental impacts; thus, the management of the potential impacts from the proposal have been prioritised.
- Developments within the Alkimos Eglinton District Structure Plan area have previously been referred to the Department of the Environment and Energy (DoEE) for consideration under the EPBC Act and have now all been approved. The DoEE has advised that the impacts of the railway-related action have been considered through the approval processes applicable to these adjacent developments. The PTA has committed to adhering to all relevant management plans and/or conditions applied to these developments under the EPBC Act, when conducting the rail related works within the referred areas. The provisions detailed in **Section 3.2** and **Schedule 1** are broadly consistent with these management plans and conditions, where relevant. A small portion of the proposal is not covered by any existing EPBC Act approval, however the potential impacts to MNES in this section were not considered significant (due to the low value nature of the habitat in this portion of the proposal) and therefore did not require referral.
- The proposal will result in some areas of the development footprint being planted with vegetation. This will typically be for targeted purposes such as landscaping around stations, stabilisation of batters around cuttings, and in association with drainage structures such as drainage basins. While these vegetation works may include native species and result in the revegetation of areas cleared during construction, they are not attempting to restore the vegetation communities that existed prior to clearing but rather establish plantings sympathetic to the surrounding vegetation and landform. The embankments of the railway reserve resulting from the cut into the parabolic dune formation are subject to detailed engineering design following further geotechnical investigations. Where embankments are of a suitable material and angle and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species and/or bioengineering controls.
- The proposal does not include rehabilitation of the 17.93 ha construction and access area (i.e. the remainder of the development envelope outside the development footprint) as these are wholly within areas intended for future urban development (done so to avoid unnecessary additional impacts). See **Section 2.3.3** for a discussion of approvals relating to future development surrounding the development footprint.
- In relation to timeframes for management actions or monitoring, the term ‘construction’ is used to refer to the period from which construction works and/or ground disturbance are substantially commenced (i.e. not including preliminary site investigative works, for example) until the

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substantial completion of such works. The term 'substantial completion' recognises that the change from construction to operations is a transition over a period of time and may occur at different times in different places within the development envelope, requiring interpretation on a case by case basis with respect to the provisions in this plan.

- If there is any inconsistency between Schedule 1 and any other part of this document, Schedule 1 prevails to the extent of the inconsistency.

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3 CEMP provisions

This section of the CEMP sets out the provisions that will be implemented as part of this plan.

3.1 Outcome-based provisions

No outcome-based provisions are proposed.

3.2 Management-based provisions

The CEMP provisions for each of the key environmental factors that form the key component of this CEMP are identified in **Sections 3.2.1** to **3.2.6** below and in **Schedule 1** attached. The potential direct and indirect impacts from the proposal will be managed as described in the management-based provisions.

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3.2.1 Flora and Vegetation

Table 3-1: Management-based provisions for Flora and Vegetation

Activity	Management actions	Management targets	Monitoring	Reporting
Flora and Vegetation *EPA's objective: to protect flora and vegetation so that biological diversity and ecological integrity are maintained*				
Vegetation clearing	• Provide GPS co-ordinates of areas approved to be cleared to the contractor to prevent unapproved clearing. • Demarcate the development envelope (e.g. via installation of temporary fencing) to prevent clearing outside of approved areas. • Identify trees to be kept, where applicable.	• No clearing of vegetation to occur outside of the development envelope during and attributable to construction • Clearing of native vegetation within the development envelope will not exceed 37.72 ha, and not include more than 0.53 ha of TEC 26a (direct impact), during and attributable to construction.	• Daily inspection during clearing activities of the condition of boundary demarcation and the location of the vegetation cleared to confirm no clearing outside of the development envelope • Daily inspection of clearing extents to confirm that total area of native vegetation cleared does not exceed the identified targets.	• Report unauthorised clearing to DWER as soon as practicable Annual reporting of the area and location of vegetation cleared to the PTA.
Weeds	• Develop and implement clean on entry/exit procedures. This would include a requirement to inspect all vehicles entering and exiting the development envelope and implementation of washdown as required. • Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed control measures.	• No introduction of new weed species into the development envelope during and attributable to construction • No introduction or spread of weed species into surrounding native vegetation (including adjacent areas of	• Weekly visual inspections for evidence of unauthorised access, attributable to construction to the surrounding native vegetation from the development envelope, e.g. observations of vehicles or machinery, damage to fencing • Weekly spot checks of vehicle compliance with clean on entry/exit procedures throughout the duration	• Report increase in weed species, density and/or numbers from pre-construction monitoring observations within the development envelope and surrounding native vegetation monthly/annually

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Activity	Management actions	Management targets	Monitoring	Reporting
	• As far as practicable, inspect imported fill, limestone, gravel and topsoil or other materials for visible evidence of weeds. • For fill, limestone, gravel and topsoil or other materials infested with weed or weed seed, either treat prior to use, reuse at least 1.5 m under fill, or dispose of appropriately offsite. • Manage One-Leaf Cape Tulip (*Moraea flaccida*) and any other newly identified declared weeds within the development envelope in accordance with the *Biosecurity and Agriculture Management Act 2007* and subsidiary regulations. • Undertake regular weed spraying in areas of weed infestation along the edge of the development envelope and within cleared areas. • Require all personnel to complete a site induction that will include hygiene training with regards to weed management requirements. • Restrict unauthorised access to and from the development envelope by installing temporary fencing or barriers and signage as required.	TEC 26a) during and attributable to construction	of construction of activities at each entry and exit point • Monthly visual inspections for weeds along the clearing edge, adjacent to native vegetation, commencing at the commencement of clearing activities, and to continue for the duration of construction	• Maintain records of all weed inspections of vehicles, machinery, equipment, fill and other weed mediums • Report results of spot checks of vehicle compliance with clean on entry/exit procedures
Phytophthora dieback	• Inspect and verify all vehicles and machinery to be free of weeds and soil	• *Phytophthora* dieback is not introduced to vegetation surrounding the	• Conduct annual spring dieback assessments in identified uninfested areas of native	• Report identified incidences of *Phytophthora* dieback

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Activity	Management actions	Management targets	Monitoring	Reporting
	prior to entering the development envelope. • Avoid topsoil movement from uninterpretable areas to uninfested areas. • Require that imported materials are certified dieback free. • Install a temporary fence or appropriate buffer to prevent access to surrounding vegetation. • Require all personnel to complete a site induction that will include hygiene training with regards to dieback hygiene management requirements, the environmental implications of the introduction and spread of dieback and obligations to follow this CEMP.	development envelope attributable to construction activities as observed within five years from the commencement of construction.	vegetation adjacent to the development envelope (0-10 m from the boundary) and in established vegetation monitoring quadrats with interpretable remnant native vegetation in the development envelope prior to the commencement of clearing and construction to enable assessment baseline. • The assessment will include dieback occurrence mapping, conducted by an accredited person in accordance with DBCA's Manual for detecting *Phytophthora* dieback disease (Procedures for DPAW managed lands) (2013) including: o Identifying visible symptoms of disease in species susceptible to *Phytophthora* dieback. o Confirming disease presence through laboratory analysis of soil and plant tissues.	introduced to vegetation surrounding the development envelope attributable to construction activities to PTA monthly and regulators, when required. • Maintain records of all weed inspections of vehicles, machinery, equipment, fill and other weed mediums. • Compliance with these measures to be documented and reported annually.
Dieback and weeds	• Undertake dieback and weed hygiene measures and pest management within the development envelope as listed above.	• No evidence of vegetation decline from significant weeds, pests and plant pathogens at Lot 200 Alkimos Drive "Parks and Recreation" reservation as a result of the proposal	• Establish vegetation monitoring quadrats within interpretable remnant native vegetation with the Lot 200 Alkimos Drive 'Parks and Recreation' reservation within 10 m of the development envelope prior to the commencement of clearing	• Compliance with these measures to be documented and reported annually.

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Activity	Management actions	Management targets	Monitoring	Reporting
		within five years from the commencement of construction	and construction to enable assessment of baseline and: ○ quarterly levels of weed abundance and density ○ annual presence of *Phytophthora* dieback for the duration of construction activities.	
Topsoil	• Following vegetation clearing, topsoil will be salvaged from weed free and dieback free areas. Topsoil will be stripped to a depth of approximately 50 mm and no greater than 100 mm to prevent dilution of the topsoil seed bank. • Salvaged topsoil will be directly transferred to an identified receiving site if there are such sites available at time of stripping. If direct transfer is not possible, topsoil will be stockpiled in a dieback free area to a maximum height of 1.5 m.	• Topsoil from areas of known dieback infestation will not be reused in construction • Any topsoil known to be dieback infested may be buried onsite in a suitable location or disposed of at landfill, in accordance with regulatory requirements.	• Weekly visual monitoring of topsoil salvage during clearing activities, to confirm compliance with the relevant management actions • Weekly visual monitoring of topsoil handling during revegetation activities, to confirm that topsoil is spread in accordance with the relevant management actions.	• Document topsoil salvage including date of salvage, area cleared (ha), volume of topsoil, location of salvage, duration of storage and end use of topsoil • A summary of topsoil salvage, storage and spreading will be reported monthly and annually.
Seed collection	• Staged collection of seed from areas of Carnaby's Black cockatoo foraging habitat within the development envelope including Eucalyptus woodland, *Banksia sessilis* woodland, mixed Banksia woodland and mixed tall shrubland. Harvesting will be undertaken in accordance with the ten Florabank (2018) guidelines on seed collecting, and will occur prior to clearing,	• Collect seed from Carnaby's Black Cockatoo foraging habitat prior to clearing • Provide collected seed to DBCA, for offsite land rehabilitation.	• Visual monitoring of seed harvest, to confirm that harvest is in accordance with the identified seed harvest management actions.	• Document seed collection including date of collection, volume, location and allocate an identifier. • Document and report the provision of seed to PTA and DBCA.

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Activity	Management actions	Management targets	Monitoring	Reporting
	and/or from felled vegetation by collecting fruit and drying and/or soaking/burning as required for each species, to release the seed. • Harvested seed will be placed in labelled containers indicating species name, date of collection, location of source and number of plants collected. • Seed will be heat sealed into suitable bags and, where required, treated with CO_2. • Seed not required on site will be provided to DBCA for offsite land rehabilitation.			
Revegetation	• Should batters be of a suitable gradient and material and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species where possible and/or bioengineering controls. • Revegetation measures to include: ○ Preparation of the site to ease compaction. ○ Sourcing of reused topsoil from the same area where consistent with dieback and weed control objectives. ○ Spreading of topsoil to a desired depth of 20 mm to 50 mm where achievable.	• Any revegetation works adjacent to the Lot 200 Alkimos Drive 'Parks and Recreation' reservation are compatible with adjacent remnant vegetation: ○ Native plant species are used. ○ Reused topsoil is sourced from same area where consistent with dieback and weed control objectives.	• Confirmation of native species in planting lists and/or seed sources used in revegetation works • Documentation of topsoil stripping and reuse locations • Visually monitor and document revegetation success and survival rates at Lot 200 Alkimos Drive "Parks and Recreation" reservation.	• Report revegetation measures and success and survival rates to PTA via monthly and annual report.

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Activity	Management actions	Management targets	Monitoring	Reporting
	○ Potential application of soil stabilisers to revegetation areas to improve vegetation success. • Prior to topsoil spreading in areas intended for revegetation, the site will be prepared to ease compaction. • Topsoil for use in revegetation works will be spread to a maximum depth of 100 mm, with a desired depth of 20 mm to 50 mm where achievable. • Soil stabilisers may be applied to revegetation areas following spreading of topsoil and planting to improve revegetation success.			

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3.2.2 Terrestrial Fauna

Table 3-2: Management-based provisions for Terrestrial Fauna

Activity	Management actions	Management targets	Monitoring	Reporting
Terrestrial Fauna *EPA's objective: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained*				
Vegetation clearing	• Undertake progressive clearing to allow fauna to move away from clearing activities. • Require that within seven days prior to clearing of native vegetation, a qualified fauna expert undertakes a trapping and relocation program for conservation significant vertebrate fauna in accordance with a licence to take fauna for education or public purpose issued under Part 4 of the *Biodiversity Conservation Act 2016*. • Conduct fauna trapping and relocation in accordance with DBCA's Standard Operating Procedures (SOPs) or permit conditions. • Contact DBCA prior to the trapping and relocation program to assist with the identifying suitable relocation sites. • Implement the trapping and relocation for five consecutive nights prior to clearing activities in areas containing native vegetation. • Within seven days following clearing activities, install fences between cleared areas and adjacent native vegetation to limit	• No avoidable deaths of fauna during vegetation clearing for construction.	• Conduct walkover inspection for native fauna species during vegetation clearing activities (minimum daily frequency) • Twice daily inspections of trenches in the morning and afternoon to identify trapped fauna and to enable capture and relocation • All staff to report if non-avian native vertebrate fauna are observed within the development envelope during construction activities.	• Record known injuries to, or deaths of fauna species in a Native Fauna Interaction Register as soon as practicable after the injury or death is identified (preferably on the same day) and provide to PTA/regulators in monthly report. • Prepare a report on the trapping program, providing details of the methods used, number of animals caught and relocated, and location of where they were released. • Monthly reporting compliance with above measures and the adaptive management measures implemented.

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Activity	Management actions	Management targets	Monitoring	Reporting
	opportunities for fauna to return to the cleared area. • Require that fauna spotters are present during clearing of native vegetation to supervise dispersal/relocation of any remnant fauna, and identification of any potential injured fauna. • Select fauna individuals injured during fauna habitat clearing will be rehabilitated by a wildlife carer. • Undertake vegetation clearing commencing from a disturbed edge, where practicable, to encourage remaining mobile fauna to naturally relocate to areas of adjacent vegetation. • Visually inspect fencing and trenches within the development envelope during clearing activities for isolated or trapped macrofauna (Western Brush Wallaby, Emus etc.) and reptiles in temporary construction infrastructure. Facilitate the relocation of trapped fauna. • Require that all personnel complete a site induction that will cover fauna values within and adjacent to the development envelope.			
Disturbance to Black Cockatoos breeding trees	• Require that an appropriately qualified person will inspect potential Black Cockatoo breeding trees no more than seven days prior to vegetation clearing during the Black	• No disturbance of active Black Cockatoo nests (if found) during and	• Monthly visual observations of marked breeding tree hollows (if found) for signs of disturbance and breeding activity.	Report monthly and annually to the PTA on • Results of the potential breeding tree

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Activity	Management actions	Management targets	Monitoring	Reporting
	Cockatoo breeding season (July to December). • If breeding activity is identified, demarcate trees with active nests (eggs, chicks or fledglings) and apply a 10 m buffer around the tree using temporary fencing. • Postpone clearing within 10 m of active nests until DBCA advises it is suitable to continue.	attributable to construction.	• Conduct walkover inspection of applied 10 m buffers around marked breeding trees for signs of disturbance, such as temporary fence moved, prematurely vacated nests, broken eggs, and dead fledglings. • If breeding activity is observed, regularly inspect the tree until fledglings leave the nest.	assessment, including the qualifications of the inspector • Number of trees with active nests (if any) • Outcome e.g. clearing postponed if found and area avoided until fledglings left the nest • Any signs of disturbance to active nests.

3.2.3 **Subterranean Fauna**

Table 3-3: Management-based provisions for Subterranean Fauna

Activity	Management actions	Management targets	Monitoring	Reporting
Subterranean Fauna *EPA's objective: to protect subterranean fauna so that biological diversity and ecological integrity are maintained*				
Subterranean Fauna	• Groundwater abstracted from the superficial aquifer is subject to licence and regulated under the *Rights in Water and Irrigation Act 1914* (RiWI Act) to avoid significant reduction in regional or local groundwater levels. Groundwater abstraction during the construction phase will be minimised to less than 1 m drawdown. • Conduct a detailed geotechnical investigation prior to construction. Review	• Groundwater abstraction to comply with requirements of the RiWI Act and licence/permit conditions during construction • Avoid impact to significant caves or voids where practicable	• Monitoring of groundwater abstraction in accordance with regulatory requirements • Weekly visual inspection of hazardous materials storage use and disposal to confirm compliance with safe use practices.	• Groundwater abstraction volumes and locations to be documented and reported in accordance with licence requirements • Maintain an inventory of the type and volumes of hazardous materials stored and Material Safety Data Sheets for

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Activity	Management actions	Management targets	Monitoring	Reporting
	the geotechnical investigation results to identify previously unidentified karst or cave formations which may provide suitable subterranean fauna habitat, and to inform detailed design of key project elements. • Temporarily suspend construction activities if significant caves or voids are encountered during construction to assess potential impacts and appropriate mitigations to be applied. • If significant caves or voids cannot be avoided, collection of specimens and genetic material for deposition into the WA Museum (WAM) collections should be undertaken by a suitably qualified person. • Fuel and other chemicals will be stored in correctly labelled containers and used in designated areas only (see Inland Waters for further detail). • Disposal of hazardous materials to be in accordance with regulatory requirements. • Provision of spill kits at the designated storage and use areas. • Provision of training where required, in the safe use, handling and disposal of hazardous materials.	• No spills of hazardous materials within the development envelope • Compliance with AS 1940:2017 The storage and handling of flammable and combustible liquids.		all hazardous materials stored • Maintain a register of hazardous material spills and leaks including location of spillage, name of chemical, volume spilt, and remedial action taken • Detail hazardous materials incidents including records of spills and leaks • Above items to be reported to the PTA in a monthly report. •

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3.2.4 **Landforms**

Table 3-4: Management-based provisions for Landforms

Activity	Management actions	Management targets	Monitoring	Reporting
Landforms *EPA's objective: to maintain the variety and integrity of distinctive physical landforms so that environmental values are protected*				
Stabilisation and revegetation	• Prior to the commencement of construction activities, undertake a detailed geotechnical investigation to supplement and validate the initial findings of the Advisian (2017) investigation and enable detailed design of key structural elements. • Implement structural controls to stabilise the landform, including battering the excavation or using retaining walls, informed by the geotechnical investigation and detailed engineering design • Should batters be of a suitable gradient and material and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species where possible and/or bioengineering controls. • Revegetation measures include: o Prepare of the site to ease compaction. o Source reused topsoil from the same area where consistent with dieback and weed control objectives.	• Final landform is stable at completion of construction • No alteration to the parabolic dune's morphology, beyond that currently proposed, at completion of construction.	• Monthly visual inspections for evidence of erosion of parabolic dune formation outside the development envelope (inspections of first 10 m outside development envelope) • Inspection of landforms following large rainfall events to assess erosion impacts.	• Maintain inspection records • Monthly and annual reporting to the PTA on the success of the stabilisation controls.

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Activity	Management actions	Management targets	Monitoring	Reporting
	○ Spread topsoil to a desired depth of 20 mm to 50 mm where achievable. ○ Potentially apply soil stabilisers to revegetation areas to improve vegetation success.			

3.2.5 **Terrestrial Environmental Quality**

Table 3-5: Management-based provisions for Terrestrial Environmental Quality

Activity	Management actions	Management targets	Monitoring	Reporting
Terrestrial Environmental Quality *EPA's objective: to maintain the quality of land and soils so that environmental values are protected*				
Contaminated sites	• Remove illegally dumped material in the development envelope prior to the commencement of vegetation clearing activities. • Manage contaminated (or suspected contaminated) material or soil disturbed during construction activities and report and remediate in compliance with the *Contaminated Sites Act 2003* and in accordance with the unexpected finds procedure. • Implement the following procedures as recommended by Milsearch (2018) should UXO be identified during construction: ○ If a suspicious Item is found, do not touch it. This includes making any	• Manage contamination on site in accordance with the *Contaminated Sites Act 2003* • No breaches of the *Contaminated Sites Act 2003* identified.	• Daily visual monitoring during construction to confirm that potential source of contamination is identified and managed.	• Disturbed contamination will be managed and reported in accordance with the *Contaminated Sites Act* • Disturbance of contamination will be reported to the PTA.

Activity	Management actions	Management targets	Monitoring	Reporting
	attempt to move the item to a "safe" location. ○ Take action, where appropriate, to prevent it being disturbed by others. ○ Mark its location so that it can be found later. Coloured tape or paint make an easily recognized marker material. ○ Note its approximate dimensions and general appearance. ○ Note the route to its location. ○ Where applicable, inform the property owner, park ranger, prime contractor, site foreman or site supervisor of the find. ○ Advise the Police as soon as possible. They will instigate a request for Defence personnel to attend and dispose of the item. • Remediation search to be conducted in the area where the mortar impact was located to ensure that no further items of actual UXO remain undetected.			

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3.2.6 Social Surroundings

Table 3-6: Management-based provisions for Social Surroundings

Activity	Management actions	Management targets	Monitoring	Reporting
Social Surroundings *EPA's objective: to protect social surroundings from significant harm*				

Dust	• Implement dust suppression measures on unsealed roads and access tracks, cleared areas and at locations and times of high dust risk, including:
	  ○ Use water carts on unsealed roads and tracks.
	  ○ Use water-assisted dust sweeper(s) on access and local roads to remove material, as necessary.
	• Enforce speed limits in construction areas.
	• Apply hydromulch or similar soil stabiliser if stockpiles will remain for extended periods.
	• Install wind break fencing to prevent dust spreading in high-risk areas.
	• Review daily weather forecasts, and limit, and if practicable prohibit, construction activities during high wind conditions.
	• Limestone crushing to be operated in accordance with a Part V Licence should limestone crushing be required onsite.
		No fugitive dust emissions outside of the development envelope.	• Daily visual monitoring of airborne dust to confirm no offsite dust impacts and efficacy of dust control measures.
			• Regular visual monitoring of dust will be undertaken at established reference sites to monitor dust impacts outside of the development envelope. Monitoring locations will be established in response to prevailing weather conditions and the location of potentially sensitive receptors.
				• Establish a complaint register and record details of the complaint including date, time, location, nature of complaint and complainant details
				• All registered complaints will be investigated, and complainants contacted within seven days of complaint
				• The outcomes of the investigation will be recorded in the register
				• Document and report dust-related complaints and summarise the outcome of the investigation and resolution of complaints, including the management measures implemented monthly to the PTA.

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Activity	Management actions	Management targets	Monitoring	Reporting
Aboriginal heritage	• Only clear within the approved limits of impact to minimise disturbance of the Romeo Road Pinnacles potential heritage site. • Existing tracks will be used and widened where required (within development envelope) to support construction vehicles. • Designate the Romeo Road Pinnacles site a no-go area by all personnel, with the exception of access to the development envelope. • Comply with Section 18 Notices under the *Aboriginal Heritage Act 1972*. • Ensure monitors are onsite for clearance and initial groundworks at the Alkimos and Eglinton station sites to assist with the identification and management of any Aboriginal objects identified or unearthed during construction. • Stop construction as soon as practicable if any Aboriginal objects are identified or unearthed in the absence of monitors and report the findings to the Department of Planning, Lands and Heritage (DPLH).	• Disturbance to the Romeo Road Pinnacles potential heritage site does not exceed approved limits • No avoidable disturbance to Aboriginal objects identified or unearthed during construction activities.	• Record and describe Aboriginal objects identified during construction activities. • Weekly inspection of the Romeo Road Pinnacles potential heritage site to confirm no disturbance as a result of the proposal outside of the approved development envelope. Implement adaptive management measures if it is determined that the construction of the proposal is facilitating unauthorised disturbance.	• Report new Aboriginal objects identified during construction activities to the DPLH • Report to DPLH in accordance with conditions of the Section 18 consent(s) • Compliance with these measures to be documented and reported monthly/annually.
Noise and vibration	• Unless otherwise approved by the City of Wanneroo, under a Noise and Vibration Management Plan (NVMP), undertake all construction works during standard construction hours only, defined as 7 a.m. to	• No exceedance of construction noise limits in accordance with Environmental Protection (Noise) Regulations 1987.	• Observe noise volumes during approved out-of-hours work, to confirm compliance with the NVMP.	• Establish a complaint register to record noise and vibration complaints, including location, date,

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Activity	Management actions	Management targets	Monitoring	Reporting
	7 p.m. on days other than Sundays and public holidays. • Prepare an out-of-hours NVMP if works are required outside of standard construction hours. The NVMP shall be approved by the City of Wanneroo and will include information on: o The need and reasons for the construction work to be done. o Types and durations of activity likely to result in noise emissions above assigned noise levels. o Predictions of noise emissions. o Control measures for noise emissions, including vibration. o Monitoring of noise emissions, including vibration. o A protocol for receiving, handling and resolving complaints. • Implement noise and vibration controls in accordance with AS 2436-2010 (R2016) *Guide to noise and vibration control on construction, demolition and maintenance sites.*	• No unauthorised out of hours noise work.	• Noise monitoring as per NVMP for works outside of standard construction hours (if required).	time, nature of complaint and complainant details • Complaints will be investigated, and the complainant contacted within seven days • The outcomes of the investigation to be recorded in the complaints register • Include a summary of noise and vibration complaints and a summary of the outcomes of investigations and resolution of any complaints, including management measures implemented • Summarise the above in a monthly report to the PTA.
Fire	• Comply with all the management actions and targets outlined in a Bushfire Risk Management Plan (BRMP) to be prepared as per requirements of SPP 3.7 and the Guidelines for high-risk land uses.	• Consistent with the BRMP management targets (to be developed).	• Consistent with the BRMP monitoring requirements (to be developed).	• Compliance with these measures to be reported consistent with requirements of the BRMP.

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3.2.7 **Inland Waters**

Table 3-7: Management-based provisions for Inland Waters

Activity	Management actions	Management targets	Monitoring	Reporting
Inland Waters				
EPA's objective: to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected				
Contamination and spills	• Install drainage diversion around chemical storage areas. • Implement drainage controls to prevent offsite discharge of runoff. • Implement sediment control measures to prevent offsite sedimentation. • Ensure all relevant employees and contractors are trained on safe handling procedures and incident response • No fuel or chemical storage in well head protection zones unless approved by the Water Corporation. • Establish fuel and chemical storage tanks on stable soil in an area not subject to flooding. • Unless otherwise approved, all fuel or chemical supply lines shall be above ground, so leaks are detectable. • Place fuel or chemicals in bunds capable of storing at least 110% of the capacity of the largest storage tank as per AS 1940:2014: The storage and handling of flammable and combustible liquids.	• No unintentional spills or leaks of hazardous materials in the development envelope during construction.	• Weekly visual inspections of hazardous materials storage, handling, and disposal to confirm compliance with safe use practices. In the event that a major spill occurs, undertake groundwater and/or surface water monitoring in consultation with the relevant agencies.	• Maintain an inventory of hazardous materials storage including type of material, volume stored, and Material Safety Data Sheets • Maintain a register of spills and leaks including location, date, nature of material spilt, and remedial action taken • A summary of spills and leaks to be reported to the PTA monthly.

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Activity	Management actions	Management targets	Monitoring	Reporting
	• Secondary spill containment around tanks (with a perimeter bund) should have sufficient freeboard capacity to contain all captured rainwater from a 20-year average return interval, 72-hour storm. • Report significant fuel or other chemical spill to the environment to DWER within 24 hours. • The site operator should inspect spill containment compounds as soon as practicable after any rainfall and following tank refuelling. Any liquids including rainwater captured within the tank containment compound should be professionally tested for the presence of petroleum hydrocarbons. If no petroleum hydrocarbons (or other toxic materials) are present, then the stormwater may be discharged to soakage. If petroleum hydrocarbons or other potentially harmful fluids are detected, all liquid within the compound should be transferred by a licensed waste disposal contractor. • Implement a spill response procedure, which may include groundwater or surface water monitoring or soil testing as required. • Spill kits to be located in storage and refuelling areas.			

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Activity	Management actions	Management targets	Monitoring	Reporting
Water abstraction and discharge	• Groundwater abstraction from the superficial aquifer will be regulated under the *Rights in Water and Irrigation Act 1914.* Groundwater abstraction during the construction phase will be minimised to less than 1 m drawdown. • Stormwater and surface water management measures and controls will be implemented during construction to minimise/prevent unauthorised offsite discharges occurring during construction. These measures will consider best practice water sensitive urban design principles., e.g.: o Diversion of surface water around laydown or chemical / hazardous material storage areas. o Facilitate infiltration at-source rather than directing to large drainage basins. o Control of offsite sedimentation from runoff. o Prevent unauthorised discharges offsite.	• No significant reduction to local groundwater levels attributable to construction activities identified one year following completion of construction • No unauthorised offsite discharges • No breach of licence conditions under RIWI Act.	• Monitoring of groundwater abstraction in accordance with licence requirements • Visual inspection of offsite discharges following rainfall events.	• Groundwater abstraction volumes and locations to be documented and reported to PTA monthly.

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3.3 Monitoring

To assess whether the management actions and the EPA's objectives for each key environmental factor are being met, monitoring is proposed as set out in **Schedule 1**.

Table 3-8 is a summary of monitoring requirements from **Schedule 1** and is not intended to be exhaustive.

Table 3-8: Summary of monitoring provisions

Monitoring basis	Summary of monitoring provisions as a minimum
Daily	• Inspection of clearing front/extents to confirm no clearing outside of the approved development envelope or in excess of identified clearing targets. • Walkover inspection for native fauna ahead of and during vegetation clearing activities (such that further fauna relocation can be undertaken where appropriate using qualified personal as per pre-clearing management action). • Record any known injuries or mortalities of native fauna. • Visual monitoring of airborne dust. • Visual monitoring during construction to identify any potential disturbed contamination. • Twice daily inspections (morning and afternoon) of trenches to identify trapped fauna.
Weekly	• Visual inspection for evidence of unauthorised access attributable to construction, to areas of native vegetation surrounding the development envelope. • Spot checks of compliance with vehicle clean on entry procedures. • Visual monitoring of topsoil salvage to confirm compliance with the topsoil salvage procedures. • Visual monitoring of topsoil handling to confirm compliance with topsoil salvage procedures. • Visual inspection of active Black Cockatoo breeding trees until fledglings leave the nest. • Visual inspection of any identified heritage sites to confirm no disturbance by contractor outside of the approved development footprint. • Visual inspection of hazardous material, storage use and disposal. • Inspections of the Romeo Road Pinnacles potential heritage site to confirm no disturbance outside of approved development envelope.
Monthly	• Visual inspections for weeds along the clearing edge adjacent to retained native vegetation. • Assessment of vegetation quadrats within Lot 200 Alkimos Drive Parks and Recreation for weeds and trampling. • Visual inspection for evidence of erosion. • Visual observations of marked breeding tree hollows for signs of disturbance and breeding activity.

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Monitoring basis	Summary of monitoring provisions as a minimum
Annually	• Dieback assessments in established vegetation quadrats. • Monitoring of dieback uninfested areas of native vegetation adjacent to the development envelope. • Visual monitoring of seed harvest and storage to confirm compliance with the seed harvesting procedures. • Visual monitoring of revegetation works 12 months following the completion of construction.
Ad hoc or irregular	• Groundwater abstraction in accordance with licence requirements. • Monitoring of groundwater and/or surface water monitoring following a major spill, in consultation with relevant agencies. • Visual inspection of offsite discharges following rainfall events.

Note: if there is any consistency between **Table 3-8** and **Schedule 1**, the monitoring provisions in **Schedule 1** prevail to the extent of the inconsistency.

3.4 Reporting

Throughout the duration of construction activities, potential non-compliances or significant findings, will be documented and reported to the relevant authority, as required. This will include, but is not necessarily limited to:

- Unauthorised clearing
- Deaths of, or injuries to, conservation significant fauna
- Conservation significant fauna trapping and translocation activity
- Aboriginal objects identified in the development envelope
- Disturbed, previously unidentified contamination in the development envelope
- Groundwater abstraction volumes
- Hazardous materials spills and leaks.

The full suite of reporting commitments is identified in **Schedule 1**.

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4 Adaptive management and review

4.1 Adaptive management

The PTA will implement adaptive management to respond to any issues identified in implementation of management measures, monitoring and evaluation against the management targets, to more effectively meet the environmental objective. Example potential adaptive management actions are outlined in **Table 4-1** for the preliminary key environmental factors of Flora and Vegetation and Terrestrial Fauna, as the proposal represents the highest risk to these factors.

Table 4-1: Potential adaptive management measures for flora and vegetation and terrestrial fauna

Management target	Potential adaptive management measures if target not met
Flora and vegetation	
No clearing of vegetation will occur outside of the development envelope, attributable to construction.	• Cease clearing activities • Review clearing boundaries • Investigate cause and extent of over clearing • Report over clearing to regulators • Determine mitigation of impact in consultation with regulators • Confirm all areas to be retained are clearly flagged • Review training of personnel involved in clearing to avoid clearing outside of approved limits.
Clearing of native vegetation within the development envelope will not exceed 37.73 ha and will not include more than 0.53 ha of TEC 26a.	
No introduction of new weed species in development envelope during and attributable to construction.	• Quarantine affected areas • Restrict access to quarantined areas • Investigate cause or source of infestation and extent of vegetation decline • Inspect surrounding area to assess extent of infestation • Review weed hygiene measures for efficacy • Review training and implementation of, weed hygiene measures • Implement control (e.g. spraying, removal) • Monitor success of control actions.
No evidence of vegetation decline from introduction or spread of weed and pest species into surrounding native vegetation during and attributable to construction.	
No evidence of vegetation decline from the introduction of Phytophthora dieback to vegetation surrounding the development envelope attributable to construction.	• Quarantine affected areas • Restrict access to affected areas • Investigate cause of infestation and extent of vegetation decline • Inspect/survey surrounding area to assess extent of infestation • Update mapped distribution of dieback affected areas • Review dieback management measures for efficacy • Review training and implementation of dieback management measures • Implement control measures such as application of phosphite, in consultation with regulators • Implement revegetation if applicable

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Management target	Potential adaptive management measures if target not met
	• Monitor success of dieback control measures.
No evidence of vegetation decline from significant weeds, pests and plant pathogens at Lot 200 Alkimos Drive parks and Recreation reserve as a result of the proposal within five years from commencement of construction.	• Quarantine affected areas • Restrict access to affected areas. • Investigate cause and extent of vegetation decline (pest, weed, pathogen) • Review vegetation management measures • Implement control and remedial measures in consultation with regulators, including weed spraying, rabbit control, phosphite application, as required • Monitor success of control and remedial measures.
Terrestrial fauna	
No avoidable deaths of native fauna confirmed during vegetation clearing or construction.	• Investigate cause • Report to regulators as required • Enforce construction site speed limits • Review training and update as required • Undertake targeted trapping and relocation if animals cannot egress fenced development envelope • Inspect and repair any damaged or ineffective fauna fencing • Review management measures and update as required.
No disturbance of active Black Cockatoo nests (if found) during construction.	• Investigate cause • Report to regulators as required • Review training on avoiding disturbance to active nests and amend training procedures as required • Increase buffer distance around breeding trees • Assess the efficacy of temporary fencing around breeding trees and adjust as required.

4.2 Review of this CEMP

This plan will be reviewed:

- After the first twelve months of implementation
- If one or more management targets are not being met
- If adaptive management is required
- As required by DWER, if directed to do so.

The management actions and associated provisions in this plan may be required to be altered, due to:

- Changes to construction methods and timing
- Trends being observed in monitoring data that might indicate an issue
- New or revised information becoming available
- Other triggers of adaptive management.

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The CEMP will be revised if the outcome of a review requires amendments to be made to the provisions in **Schedule 1**. It will also be revised if DWER directs the PTA to amend it. Revised versions of the plan will be submitted to DWER for assessment and approval. The most recently approved version of the plan will be implemented until either a new version has been approved by DWER or DWER advises that the plan no is no longer required to be implemented.

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5 Stakeholder consultation

The PTA has consulted with various stakeholders in the development of the proposal, this CEMP and the wider YRE project, including fortnightly meetings with the EPA Services Unit. **Table 5-1** provides a summary of consultation and the PTA's response. A Communications and Stakeholder Engagement Plan has also been developed by the PTA to guide the community relations activities for the various phases of the proposal.

Table 5-1: Summary of stakeholder consultation

Stakeholder	Date	Issues/topics raised	PTA response / outcomes
Rail construction industry	13 September 2017	Briefing provided to the Rail Construction Industry on METRONET, including the YRE Project.	Nil.
Quinns Rocks Environmental Group (QREG)	17 November 2017 21 September 2018 25 March 2019	Review of the environmental context of the YRE project. Concerns related to Lot 200 Alkimos Drive "Parks and Recreation" reservation, which relates to Part 1 and fragmentation of Bush Forever Site No. 289: Ningana Bushland, Yanchep/Eglinton, which is included in Part 2 of the YRE project.	PTA committed to undertaking additional consultation with the Quinns Rocks Environmental Group to inform detailed design for the YRE project. PTA notes that concerns relating to Ningana Bushland will be considered separately as part of the YRE Part 2 proposal and assessment.
Whadjuk working group	2017	Aboriginal heritage consultation and survey in consultation with Rory O'Connor.	The Whadjuk representatives nominated by SWALSC pursuant to the Noongar Standard Heritage Agreement provided support for the Rail Extension, subject to conditions.
	23 October 2017	Additional inspection by the Whadjuk Working Group of the proposed YRE station sites and associated facilities in consultation with Rory O'Connor.	The Whadjuk representatives supported the development and recommended that monitors should be present both for scrub clearance and for initial ground disturbance at the station sites.
Water Corporation	December 2017	Advice on Water Corporation production bores and wellhead protection zones that could be impacted by the proposal.	Water Corporation provided spatial data and advice and requested consultation is ongoing as the YRE Project progresses.

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Stakeholder	Date	Issues/topics raised	PTA response / outcomes
Urban Bushland Council (UBC)	07 December 2017 14 February 2018 22 November 2018	Review of the environmental context of the YRE project. Key consideration related to clearing of native vegetation within Bush Forever Site No. 289: Ningana Bushland, Yanchep/Eglinton which relates to Part 2 of the YRE project. Additional METRONET briefing also delivered at the Urban Bushland Council's general meeting on 14 February 2018.	PTA committed to undertaking additional consultation with the Urban Bushland Council to inform detailed design for the YRE project. PTA notes that concerns relating to Ningana Bushland will be considered separately as part of the YRE Part 2 proposal and assessment.
Industry briefing – 309 attendees	18 July 2018	Employment and supply opportunities.	Nil.
Community Information Session - Oldham Park Clubrooms, 91 Lagoon Drive, Yanchep – 190 stakeholders	21 July 2018	General presentation on METRONET and the YRE Project.	Local community generally supportive of the proposal.
Community Information Session - Pop-up Library, Turnstone Street, Alkimos 49 stakeholders attended.	31 July 2018	General presentation on METRONET and the YRE Project.	Local community generally supportive of the proposal.
Community Information Session - Alkimos Showcase Event - at the Lighthouse Play Centre, Alkimos. 400 to 450 stakeholders attended.	19 August 2018	General presentation on METRONET and the YRE Project.	Local community generally supportive of the proposal.
South West Aboriginal Land and Sea Council (SWALSC)	5 October 2018	Briefed SWALSC on METRONET and the draft METRONET Aboriginal Engagement Strategy (MAES).	PTA to further consult with SWALSC to seek general acceptance of the MAES. METRONET to present the MAES to the Whadjuk Working Party.

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Schedule 1 CEMP provisions

Activity	Management actions	Management targets	Monitoring	Reporting
Flora and Vegetation *EPA's objective: to protect flora and vegetation so that biological diversity and ecological integrity are maintained*				
Vegetation clearing	• Provide GPS co-ordinates of areas approved to be cleared to the contractor to prevent unapproved clearing. • Demarcate the development envelope (e.g. via installation of temporary fencing) to prevent clearing outside of approved areas. • Identify trees to be kept, where applicable.	• No clearing of vegetation to occur outside of the development envelope during and attributable to construction • Clearing of native vegetation within the development envelope will not exceed 37.73 ha, and not include more than 0.53 ha of TEC 26a (direct impact), during and attributable to construction.	• Daily inspection during clearing activities of the condition of boundary demarcation and the location of the vegetation cleared to confirm no clearing outside of the development envelope • Daily inspection of clearing extents to confirm that total area of native vegetation cleared does not exceed the identified targets.	• Report unauthorised clearing to DWER as soon as practicable Annual reporting of the area and location of vegetation cleared to the PTA.
Weeds	• Develop and implement clean on entry/exit procedures. This would include a requirement to inspect all vehicles entering and exiting the development envelope and implementation of washdown as required. • Source clean fill, limestone, gravel and topsoil or other materials from suppliers with appropriate weed control measures.	• No introduction of new weed species into the development envelope during and attributable to construction • No introduction or spread of weed species into surrounding native vegetation (including	• Weekly visual inspections for evidence of unauthorised access, attributable to construction to the surrounding native vegetation from the development envelope, e.g. observations of vehicles or machinery, damage to fencing • Weekly spot checks of vehicle compliance with clean on entry/exit	• Report increase in weed species, density and/or numbers from pre-construction monitoring observations within the development envelope and surrounding native vegetation monthly/annually

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Activity	Management actions	Management targets	Monitoring	Reporting
	• As far as practicable, inspect imported fill, limestone, gravel and topsoil or other materials for visible evidence of weeds. • For fill, limestone, gravel and topsoil or other materials infested with weed or weed seed, either treat prior to use, reuse at least 1.5 m under fill, or dispose of appropriately offsite. • Manage One-Leaf Cape Tulip (*Moraea flaccida*) and any other newly identified declared weeds within the development envelope in accordance with the *Biosecurity and Agriculture Management Act 2007* and subsidiary regulations. • Undertake regular weed spraying in areas of weed infestation along the edge of the development envelope and within cleared areas. • Require all personnel to complete a site induction that will include hygiene training with regards to weed management requirements. • Restrict unauthorised access to and from the development envelope by installing temporary fencing or barriers and signage as required.	adjacent areas of TEC 26a) during and attributable to construction.	procedures throughout the duration of construction of activities at each entry and exit point • Monthly visual inspections for weeds along the clearing edge, adjacent to native vegetation, commencing at the commencement of clearing activities, and to continue for the duration of construction.	• Maintain records of all weed inspections of vehicles, machinery, equipment, fill and other weed mediums • Report results of spot checks of vehicle compliance with clean on entry/exit procedures.
Phytophthora dieback	• Inspect and verify all vehicles and machinery to be free of weeds and soil prior to entering the development envelope. • Avoid topsoil movement from uninterpretable areas to uninfested areas.	• *Phytophthora* dieback is not introduced to vegetation surrounding the development envelope attributable to construction activities as observed	• Conduct annual spring dieback assessments in identified uninfested areas of native vegetation adjacent to the development envelope (0-10 m from the boundary) and in	• Report identified incidences of Phytophthora dieback introduced to vegetation surrounding the development envelope

Activity	Management actions	Management targets	Monitoring	Reporting
	• Require that imported materials are certified dieback free. • Install a temporary fence or appropriate buffer to prevent access to surrounding vegetation. • Require all personnel to complete a site induction that will include hygiene training with regards to dieback hygiene management requirements, the environmental implications of the introduction and spread of dieback and obligations to follow this CEMP.	within five years from the commencement of construction.	established vegetation monitoring quadrats with interpretable remnant native vegetation in the development envelope prior to the commencement of clearing and construction to enable assessment baseline. • The assessment will include dieback occurrence mapping, conducted by an accredited person in accordance with DBCA's Manual for detecting *Phytophthora* dieback disease (Procedures for DPAW managed lands) (2013) including: o Identifying visible symptoms of disease in species susceptible to *Phytophthora* dieback. o Confirming disease presence through laboratory analysis of soil and plant tissues.	attributable to construction activities to PTA monthly and regulators, when required. • Maintain records of all weed inspections of vehicles, machinery, equipment, fill and other weed mediums. • Compliance with these measures to be documented and reported
Dieback and weeds	• Undertake dieback and weed hygiene measures and pest management within the development envelope as listed above.	• No evidence of vegetation decline from significant weeds, pests and plant pathogens at Lot 200 Alkimos Drive "Parks and Recreation" reservation as a result of the proposal within five years from the commencement of construction.	• Establish vegetation monitoring quadrats within interpretable remnant native vegetation with the Lot 200 Alkimos Drive 'Parks and Recreation' reservation within 10 m of the development envelope prior to the commencement of clearing and construction to enable assessment of baseline and:	• Compliance with these measures to be documented and reported annually.

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Activity	Management actions	Management targets	Monitoring	Reporting
			○ quarterly levels of weed abundance and density ○ annual presence of *Phytophthora* dieback for the duration of construction activities.	
Topsoil	• Following vegetation clearing, topsoil will be salvaged from weed free and dieback free areas. Topsoil will be stripped to a depth of approximately 50 mm and no greater than 100 mm to prevent dilution of the topsoil seed bank. • Salvaged topsoil will be directly transferred to an identified receiving site if there are such sites available at time of stripping. If direct transfer is not possible, topsoil will be stockpiled in a dieback free area to a maximum height of 1.5 m.	• Topsoil from areas of known dieback infestation will not be reused in construction • Any topsoil known to be dieback infested may be buried onsite in a suitable location or disposed of at landfill, in accordance with regulatory requirements.	• Weekly visual monitoring of topsoil salvage during clearing activities, to confirm compliance with the relevant management actions • Weekly visual monitoring of topsoil handling during revegetation activities, to confirm that topsoil is spread in accordance with the relevant management actions.	• Document topsoil salvage including date of salvage, area cleared (ha), volume of topsoil, location of salvage, duration of storage and end use of topsoil • A summary of topsoil salvage, storage and spreading will be reported monthly and annually.
Seed collection	• Staged collection of seed from areas of Carnaby's Black cockatoo foraging habitat within the development envelope including Eucalyptus woodland, *Banksia sessilis* woodland, mixed Banksia woodland and mixed tall shrubland. Harvesting will be undertaken in accordance with the ten Florabank (2018) guidelines on seed collecting, and will occur prior to clearing, and/or from felled vegetation by collecting fruit	• Collect seed from Carnaby's Black Cockatoo foraging habitat prior to clearing • Provide collected seed to DBCA, for offsite land rehabilitation.	• Visual monitoring of seed harvest, to confirm that harvest is in accordance with the identified seed harvest management actions.	• Document seed collection including date of collection, volume, location and allocate an identifier. • Document and report on provision of seed to PTA and DBCA.

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Activity	Management actions	Management targets	Monitoring	Reporting
	and drying and/or soaking/burning as required for each species, to release the seed. • Harvested seed will be placed in labelled containers indicating species name, date of collection, location of source and number of plants collected. • Seed will be heat sealed into suitable bags and, where required, treated with CO_2. • Seed not required on site will be provided to DBCA for offsite land rehabilitation.			
Stabilisation and revegetation	• Should batters be of a suitable gradient and material and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species where possible and/or bioengineering controls. • Revegetation measures to include: ○ Preparation of the site to ease compaction. ○ Sourcing of reused topsoil from the same area where consistent with dieback and weed control objectives. ○ Spreading of topsoil to a desired depth of 20 mm to 50 mm where achievable. ○ Potential application of soil stabilisers to revegetation areas to improve vegetation success.	• Any revegetation works adjacent to the Lot 200 Alkimos Drive 'Parks and Recreation' reservation are compatible with adjacent remnant vegetation: ○ Native plant species are used. ○ Reused topsoil is sourced from same area where consistent with dieback and weed control objectives.	• Confirmation of native species in planting lists and/or seed sources used in revegetation works • Documentation of topsoil stripping and reuse locations • Visually monitor and document revegetation success and survival rates at Lot 200 Alkimos Drive "Parks and Recreation" reservation.	• Report revegetation measures and success and survival rates to PTA via monthly and annual report.

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Activity	Management actions	Management targets	Monitoring	Reporting
	• Prior to topsoil spreading in areas intended for revegetation, the site will be prepared to ease compaction. • Topsoil for use in revegetation works will be spread to a maximum depth of 100 mm, with a desired depth of 20 mm to 50 mm where achievable. • Soil stabilisers may be applied to revegetation areas following spreading of topsoil and planting to improve revegetation success.			
Terrestrial Fauna *EPA's objective: to protect terrestrial fauna so that biological diversity and ecological integrity are maintained*				
Vegetation clearing	• Undertake progressive clearing to allow fauna to move away from clearing activities. • Require that within seven days prior to clearing of native vegetation, a qualified fauna expert undertakes a trapping and relocation program for conservation significant vertebrate fauna in accordance with a licence to take fauna for education or public purpose issued under Part 4 of the *Biodiversity Conservation Act 2016*. • Conduct fauna trapping and relocation in accordance with DBCA's Standard Operating Procedures (SOPs) or permit conditions. • Contact DBCA prior to the trapping and relocation program to assist with the identifying suitable relocation sites.	• No avoidable deaths of native fauna during vegetation clearing for construction.	• Conduct walkover inspection for native fauna species during vegetation clearing activities (minimum daily frequency) • Twice daily inspections of trenches in the morning and afternoon to identify trapped fauna and to enable capture and relocation • All staff to report if non-avian native vertebrate fauna are observed within the development envelope during construction activities.	• Record known injuries to, or deaths of native fauna species in a Native Fauna Interaction Register as soon as practicable after as the injury or death is identified (preferably on the same day) and provide to PTA/regulators in monthly report • Prepare a report on the trapping program, providing details of the methods used, number of animals caught and

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Activity	Management actions	Management targets	Monitoring	Reporting
	• Implement the trapping and relocation for five consecutive nights prior to clearing activities in areas containing native vegetation. • Within seven days following clearing activities, install fences between cleared areas and adjacent native vegetation to limit opportunities for fauna to return to the cleared area. • Require that fauna spotters are present during clearing of native vegetation to supervise dispersal/relocation of any remnant fauna, and identification of any potential injured fauna. • Select fauna individuals injured during fauna habitat clearing will be rehabilitated by a wildlife carer. • Undertake vegetation clearing commencing from a disturbed edge, where practicable, to encourage remaining mobile fauna to naturally relocate to areas of adjacent vegetation. • Visually inspect fencing and trenches within the development envelope during clearing activities for isolated or trapped macrofauna (Western Brush Wallaby, Emus etc.) and reptiles in temporary construction infrastructure. Facilitate the relocation of trapped fauna. • Require that all personnel complete a site induction that will cover fauna values within and adjacent to the development envelope.			relocated, and location of where they were released. • Monthly reporting compliance with above measures and the adaptive management measures implemented.

Activity	Management actions	Management targets	Monitoring	Reporting
Disturbance to Black Cockatoo breeding trees	• Require that an appropriately qualified person will inspect potential Black Cockatoo breeding trees no more than seven days prior to vegetation clearing during the Black Cockatoo breeding season (July to December). • If breeding activity is identified, demarcate trees with active nests (eggs, chicks or fledglings) and apply a 10 m buffer around the tree using temporary fencing. • Postpone clearing within 10 m of active nests until DBCA advises it is suitable to continue.	• No disturbance of active Black Cockatoo nests (if found) during and attributable to construction.	• Monthly visual observations of marked breeding tree hollows (if found) for signs of disturbance and breeding activity • Conduct walkover inspection of applied 10 m buffers around marked breeding trees for signs of disturbance, such as temporary fence moved, prematurely vacated nests, broken eggs, and dead fledglings • If breeding activity is observed, regularly inspect the tree until fledglings leave the nest.	Report monthly and annually to the PTA on: • Results of the potential breeding tree assessment, including the qualifications of the inspector • Number of trees with active nests (if any) • Outcome e.g. clearing postponed if found and area avoided until fledglings left the nest • Any signs of disturbance to active nests.
Subterranean Fauna *EPA's objective: to protect subterranean fauna so that biological diversity and ecological integrity are maintained*				
Disturbance to Subterranean Fauna habitat	• Groundwater abstracted from the superficial aquifer is subject to licence and regulated under the *Rights in Water and Irrigation Act 1914* (RiWI Act) to avoid significant reduction in regional or local groundwater levels. Groundwater abstraction during the construction phase will be minimised to less than 1 m drawdown. • Conduct a detailed geotechnical investigation prior to construction. Review the geotechnical investigation results to identify previously	• Groundwater abstraction to comply with requirements of the RiWI Act and licence/permit conditions during construction • Avoid impact to significant caves or voids where practicable	• Monitoring of groundwater abstraction in accordance with regulatory requirements • Weekly visual inspection of hazardous materials storage use and disposal to confirm compliance with safe use practices.	• Groundwater abstraction volumes and locations to be documented and reported in accordance with licence requirements • Maintain an inventory of the type and volumes of hazardous materials stored and Material Safety Data Sheets for

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Activity	Management actions	Management targets	Monitoring	Reporting
	unidentified karst or cave formations which may provide suitable subterranean fauna habitat, and to inform detailed design of key project elements. • Temporarily suspend construction activities if significant caves or voids are encountered during construction to assess potential impacts and appropriate mitigations to be applied. • If significant caves or voids cannot be avoided, collection of specimens and genetic material for deposition into the WA Museum (WAM) collections should be undertaken by a suitably qualified person. • Fuel and other chemicals will be stored in correctly labelled containers and used in designated areas only (see Inland Waters for further detail). • Disposal of hazardous materials to be in accordance with regulatory requirements. • Provision of spill kits at the designated storage and use areas. • Provision of training where required, in the safe use, handling and disposal of hazardous materials.	• No spills of hazardous materials within the development envelope • Compliance with AS 1940:2017 The storage and handling of flammable and combustible liquids.		all hazardous materials stored • Maintain a register of hazardous material spills and leaks including location of spillage, name of chemical, volume spilt, and remedial action taken • Detail hazardous materials incidents including records of spills and leaks • Above items to be reported to the PTA in a monthly report. •

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Activity	Management actions	Management targets	Monitoring	Reporting
Landforms				
EPA's objective: to maintain the variety and integrity of distinctive physical landforms so that environmental values are protected				
Stabilisation and revegetation	• Prior to the commencement of construction activities, undertake a detailed geotechnical investigation to supplement and validate the initial findings of the Advisian (2017) investigation and enable detailed design of key structural elements. • Implement structural controls to stabilise the landform, including battering the excavation or using retaining walls, informed by the geotechnical investigation and detailed engineering design • Should batters be of a suitable gradient and material and not required for operational infrastructure purposes, they will be stabilised with planting of locally endemic species where possible and/or bioengineering controls. • Revegetation measures include: o Prepare of the site to ease compaction. o Source reused topsoil from the same area where consistent with dieback and weed control objectives. o Spread topsoil to a desired depth of 20 mm to 50 mm where achievable.	• Final landform is stable at completion of construction • No alteration to the parabolic dune's morphology, beyond that currently proposed, at completion of construction.	• Monthly visual inspections for evidence of erosion of parabolic dune formation outside the development envelope (inspections of first 10 m outside development envelope). • Inspection of landforms following large rainfall events to assess erosion impacts.	• Maintain inspection records • Monthly and annual reporting to the PTA on the success of the stabilisation controls.

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Activity	Management actions	Management targets	Monitoring	Reporting
	○ Potentially apply soil stabilisers to revegetation areas to improve vegetation success.			
Terrestrial Environmental Quality *EPA's objective: to maintain the quality of land and soils so that environmental values are protected*				
Contaminated sites	• Remove illegally dumped material in the development envelope prior to the commencement of vegetation clearing activities. • Manage contaminated (or suspected contaminated) material or soil disturbed during construction activities and report and remediate in compliance with the *Contaminated Sites Act 2003* and in accordance with the unexpected finds procedure. • Implement the following procedures as recommended by Milsearch (2018) should UXO be identified during construction: ○ If a suspicious Item is found, do not touch it. This includes making any attempt to move the item to a "safe" location. ○ Take action, where appropriate, to prevent it being disturbed by others. ○ Mark its location so that it can be found later. Coloured tape or paint make an easily recognized marker material.	• Manage contamination on site in accordance with the *Contaminated Sites Act 2003.* • No breaches of the *Contaminated Sites Act 2003* identified.	• Daily visual monitoring during construction to confirm that potential source of contamination is identified and managed.	• Disturbed contamination will be managed and reported in accordance with the *Contaminated Sites Act.* • Disturbance of contamination will be reported to the PTA.

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Activity	Management actions	Management targets	Monitoring	Reporting
	○ Note its approximate dimensions and general appearance. ○ Note the route to its location. ○ Where applicable, inform the property owner, park ranger, prime contractor, site foreman or site supervisor of the find. ○ Advise the Police as soon as possible. They will instigate a request for Defence personnel to attend and dispose of the item. • Remediation search to be conducted in the area where the mortar impact was located to ensure that no further items of actual UXO remain undetected.			
Inland Waters *EPA's objective: to maintain the hydrological regimes and quality of groundwater and surface water so that environmental values are protected*				
Contamination and spills	• Install drainage diversion around chemical storage areas. • Implement drainage controls to prevent offsite discharge of runoff. • Implement sediment control measures to prevent offsite sedimentation. • Ensure all relevant employees and contractors are trained on safe handling procedures, incident response.	• No unintentional spills or leaks of hazardous materials in the development envelope during construction.	• Weekly visual inspections of hazardous materials storage, handling, and disposal to confirm compliance with safe use practices. In the event that a major spill occurs, undertake groundwater and/or surface water monitoring in consultation with the relevant agencies.	• Maintain an inventory of hazardous materials storage including type of material, volume stored, and Material Safety Data Sheets • Maintain a register of spills and leaks including location, date, nature of material spilt, and remedial action taken

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Activity	Management actions	Management targets	Monitoring	Reporting
	• No fuel or chemical storage in well head protection zones unless approved by the Water Corporation. • Establish fuel and chemical storage tanks on stable soil in an area not subject to flooding. • Unless otherwise approved, all fuel or chemical supply lines shall be above ground, so leaks are detectable. • Place fuel or chemicals in bunds capable of storing at least 110% of the capacity of the largest storage tank as per AS 1940:2014: The storage and handling of flammable and combustible liquids. • Secondary spill containment around tanks (with a perimeter bund) should have sufficient freeboard capacity to contain all captured rainwater from a 20-year average return interval, 72-hour storm. • Report significant fuel or other chemical spill to the environment to DWER within 24 hours. • The site operator should inspect spill containment compounds as soon as practicable after any rainfall and following tank refuelling. Any liquids including rainwater captured within the tank containment compound should be professionally tested for the presence of petroleum hydrocarbons. If no petroleum hydrocarbons (or other toxic materials) are present, then the stormwater may be discharged to soakage. If petroleum			• A summary of spills and leaks to be reported to the PTA monthly.

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Activity	Management actions	Management targets	Monitoring	Reporting
	hydrocarbons or other potentially harmful fluids are detected, all liquid within the compound should be transferred by a licensed waste disposal contractor. • Implement a spill response procedure, , which may include groundwater or surface water monitoring or soil testing as required. • Spill kits to be located in storage and refuelling areas.			
Water abstraction and discharge	• Groundwater abstraction from the superficial aquifer will be regulated under the *Rights in Water and Irrigation Act 1914.* Groundwater abstraction during the construction phase will be minimised to less than 1 m drawdown. • Stormwater and surface water management measures and controls will be implemented during construction minimise/prevent unauthorised offsite discharges occurring during construction. These measures will consider best practice water sensitive urban design principles., e.g.: o Diversion of surface water around laydown or chemical / hazardous material storage areas. o Facilitate infiltration at-source rather than directing to large drainage basins. o Control of offsite sedimentation from runoff. o Prevent unauthorised discharges offsite.	• No significant reduction to local groundwater levels attributable to construction activities identified one year following completion of construction • No unauthorised offsite discharges • No breach of licence conditions under RIWI Act.	• Monitoring of groundwater abstraction in accordance with licence requirements • Visual inspection of offsite discharges following rainfall events.	• Groundwater abstraction volumes and locations to be documented and reported to the PTA monthly.

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Activity	Management actions	Management targets	Monitoring	Reporting
Social Surroundings *EPA's objective: to protect social surroundings from significant harm*				
Dust	Implement dust suppression measures on unsealed roads and access tracks, cleared areas and at locations and times of high dust risk, including: • Use water carts on unsealed roads and tracks. • Use water-assisted dust sweeper(s) on access and local roads to remove material, as necessary. • Enforce speed limits in construction areas. • Apply hydromulch or similar soil stabiliser if stockpiles will remain for extended periods. • Install wind break fencing to prevent dust spreading in high-risk areas. • Review daily weather forecasts, and limit, and if practicable prohibit, construction activities during high wind conditions. • Limestone crushing to be operated in accordance with a Part V Licence should limestone crushing be required onsite.	No fugitive dust emissions outside of the development envelope.	• Daily visual monitoring of airborne dust to manage offsite dust impacts and efficacy of dust control measures. • Regular visual monitoring of dust will be undertaken at established reference sites to monitor dust impacts outside of the development envelope. Monitoring locations will be established in response to prevailing weather conditions and the location of potentially sensitive receptors.	• Establish a complaint register and record details of the complaint including date, time, location, nature of complaint and complainant details • All registered complaints will be investigated, and complainants contacted within seven days of complaint • The outcomes of the investigation will be recorded in the register • Document and report dust-related complaints and summarise the outcome of the investigation and resolution of complaints, including the management measures implemented monthly to the PTA. •

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Activity	Management actions	Management targets	Monitoring	Reporting
Aboriginal heritage	• Only clear within the approved limits of impact to minimise disturbance of the Romeo Road Pinnacles potential heritage site. • Existing tracks will be used and widened where required (within development envelope) to support construction vehicles. • Designate the Romeo Road Pinnacles site a no-go area by all personnel, with the exception of access to the development envelope. • Comply with Section 18 Notices under the *Aboriginal Heritage Act 1972*. • Ensure monitors are onsite for clearance and initial groundworks at the Alkimos and Eglinton station sites to assist with the identification and management of any Aboriginal objects identified or unearthed during construction. • Stop construction as soon as practicable if any Aboriginal objects are identified or unearthed in the absence of monitors and report the findings to the Department of Planning, Lands and Heritage (DPLH).	• Disturbance to the Romeo Road Pinnacles potential heritage site does not exceed approved limits • No avoidable disturbance to Aboriginal objects identified or unearthed during construction activities.	• Record and describe Aboriginal objects identified during construction activities. • Weekly inspection of the Romeo Road Pinnacles potential heritage site to confirm no disturbance as a result of the proposal outside of the approved development envelope. Implement adaptive management measures if it is determined that the construction of the proposal is facilitating unauthorised disturbance.	• Report new Aboriginal objects identified during construction activities to the DPLH • Report to DPLH in accordance with conditions of the Section 18 consent(s) • Compliance with these measures to be documented and reported monthly/annually.
Noise	• Unless otherwise approved by the City of Wanneroo, under a Noise and Vibration Management Plan (NVMP) undertake all construction works during standard construction hours only, defined as 7 a.m. to	• No exceedance of construction noise limits in accordance with Environmental Protection (Noise) Regulations 1987.	• Observe noise volumes during approved out-of-hours work, to confirm compliance with the NVMP • Noise monitoring as per NVMP for works outside of standard construction hours (if required).	• Establish a complaint register to record noise and vibration complaints, including location, date, time, nature of complaint and complainant details

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Activity	Management actions	Management targets	Monitoring	Reporting
	7 p.m. on days other than Sundays and public holidays. • Prepare an out-of-hours NVMP if works are required outside of standard construction hours. The NVMP shall be approved by the City of Wanneroo and will include information on: o The need and reasons for the construction work to be done. o Types and durations of activity likely to result in noise emissions above assigned noise levels. o Predictions of noise emissions. o Control measures for noise emissions, including vibration. o Monitoring of noise emissions, including vibration. o A protocol for receiving, handling and resolving complaints. • Implement noise and vibration controls in accordance with AS 2436-2010 (R2016) *Guide to noise and vibration control on construction, demolition and maintenance sites.*	• No unauthorised out of hours noise work.		• Complaints will be investigated, and the complainant contacted within seven days • The outcomes of the investigation to be recorded in the complaints register • Include a summary of noise and vibration complaints and a summary of the outcomes of investigations and resolution of any complaints, including management measures implemented • Summarise the above in a monthly report to the PTA. •
Fire	• Comply with all the management actions and targets outlined in a Bushfire Risk Management Plan (BRMP) to be prepared as per requirements of SPP 3.7 and the Guidelines for high-risk land uses.	• Consistent with the BRMP management targets (to be developed).	• Consistent with the BRMP monitoring requirements (to be developed).	• Compliance with these measures to be reported consistent with requirements of the BRMP.

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ISO 14001 Environmental Management

AS/NZS 4801:2001 Occupational Health and Safety Management

ISO 9001 Quality Management

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