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Armadale Road to North Lake Road Bridge: Annual Project Sustainability Report 2020

This annual report covers the period from 1/07/2019 to 30/06/2020. This is the first annual sustainability report prepared for this Project.

The Projects Sustainability Lead & Communications Lead can be contacted at: enquiries@mainroads.wa.gov.au or 138 138

About this Report

This report has been prepared by the Armadale Road to North Lake Road Bridge (ARNLR) project team on behalf of Main Roads Western Australia. This report forms part of Main Roads' annual sustainability reporting which is integrated into its Annual Report. The report content is prepared in accordance with GRI principals. Material topics reported in this report have been determined through a materiality process that adheres to ISCA.

The Project has adopted Infrastructure Sustainability Council of Australia (ISCA) Sustainability framework based on version 2.0 of the Rating Tool. This report includes information which will be used as part of the ISCA Rating Submission.

This Report includes information relating to environmental approvals obtained as part of Project Planning, Design and Construction phases.

The Armadale Road to North Lake Road Bridge will provide a direct link between Armadale and North Lake roads, improve access to Kwinana Freeway and support residential and commercial expansion in Cockburn and Armadale.

The Project team is committed to the delivery of the Armadale Road to North Lake Road Bridge Project in a way which seeks to improve the overall road-based transport system by ensuring the social, environmental and economic aspects of the project are delivered in the most sustainable and practicable manner possible.

The Main Roads WA strategic direction Keeping WA Moving provides objectives and guiding principles that will form the basis for the behaviours driving the ARNLR Project team.

Among other considerations, the Project team is committed to seeking opportunities during design and construction to minimise impact to the Environment including wetlands, Banksia Woodlands and Black Cockatoo foraging habitat, as well as to continue the improvement of efficient use of resources, energy and water on the project and reduction of waste in both construction and operation.

Highlights

Sustainability Metric	Highlight
Circular Economy - Re-use and Re-Cycle of on-site and off-site materials	<ul style="list-style-type: none"> • Use of crushed recycled concrete as a subbase material for some pavement areas (Estimated 16,000 tonne of CRC will be generated from on-site demolition concrete materials and imported recycled materials) • Use of on-site demolition materials as deep fill in embankments • Reclaimed Asphalt Pavement (RAP) increased up to 25% - pending MRWA acceptance • Use of Recycled materials (Eco Blocks - local recycled construction waste that has been crushed and graded) for Retaining Walls construction
Reuse of assets from previous projects	<ul style="list-style-type: none"> • MRIA assets being reused on the Project • Traffic barriers purchased (first portion) • Project offices purchased

	<ul style="list-style-type: none"> • Temporary fencing purchased • VMS Boards and Lighting Towers pending • Vehicles pending
Groundwater & sensitive urban water design	<ul style="list-style-type: none"> • Every opportunity has been sought to discharge to swales where possible. • The wetland area between Kentucky Court and the North Lake Road northbound entry ramp has largely been left untouched other than the earthworks for the PSP. Runoff will be discharged to this area after first passing through a water quality device and permit existing vegetation to further treat runoff prior to infiltration back to groundwater.
Aboriginal employment opportunities	<ul style="list-style-type: none"> • Target of \$5 million contract value set for Aboriginal business procurement. To date, kea awarded packages at circa \$5.0 million – Fencing, Earthworks (various), Site Waste and Asbestos, Heritage Monitoring, Retaining Wall Supply and Install, Traffic Management, Aboriginal Artwork.
Aboriginal Trainees	<ul style="list-style-type: none"> • 5 trainees sourced and selected via NUDGE
Community Involvement	<ul style="list-style-type: none"> • Three quarterly meeting with the Construction Reference Group held • Community Sentiment Survey conducted with 106 people responded and 87% of people receiving sufficient project information • Deadly Sista Girls Partnership - currently on hold due to Covid-19
Construction and Operations Water	<ul style="list-style-type: none"> • Design includes 100% native plantings across the project • Removal of reticulated irrigation for all Feature Landscape areas • Dustex (Dust Suppressant) is being used for temporary Access Tracks and Crane pads

Overview

On 7 May 2017, the State and Commonwealth Governments announced a \$2.3 billion package of road and rail infrastructure works, which will reduce congestion and lead to smarter, safer and more efficient journeys around Perth Southern Suburbs.

The Project will see:

- Construction of a new bridge over Kwinana Freeway connecting Armadale Road and North Lake Road.
- Additional lanes and turning capacity added to the intersection of Armadale Road and Ghostgum Avenue to support ongoing residential growth in the suburbs of Calleya and Treeby.
- New north facing on/off ramps connecting to the new bridge over Kwinana Freeway and collector distributor roads on both sides of the Kwinana Freeway from Berrigan Drive to Armadale Road, enabling safer and more efficient merging conditions
- 2.85km Armadale Road upgraded from Tapper Road to Kwinana Freeway, passing over the intersection of Tapper Road with a new bridge, and under the intersection of Solomon Road via a trench structure

- Local roads reconfigured with two new roundabouts to maintain connectivity

The Armadale Road to North Lake Road Bridge project was allocated \$237 million as part of the \$2.3 billion road and rail infrastructure works package, jointly funded by the Australian (\$189.6 million) and State (\$47.4 million) governments.

The Armadale Access Alliance – a consortium comprising Laing O’Rourke and BG&E in partnership with Main Roads will design and construct the project following a competitive tendering process in early 2019.

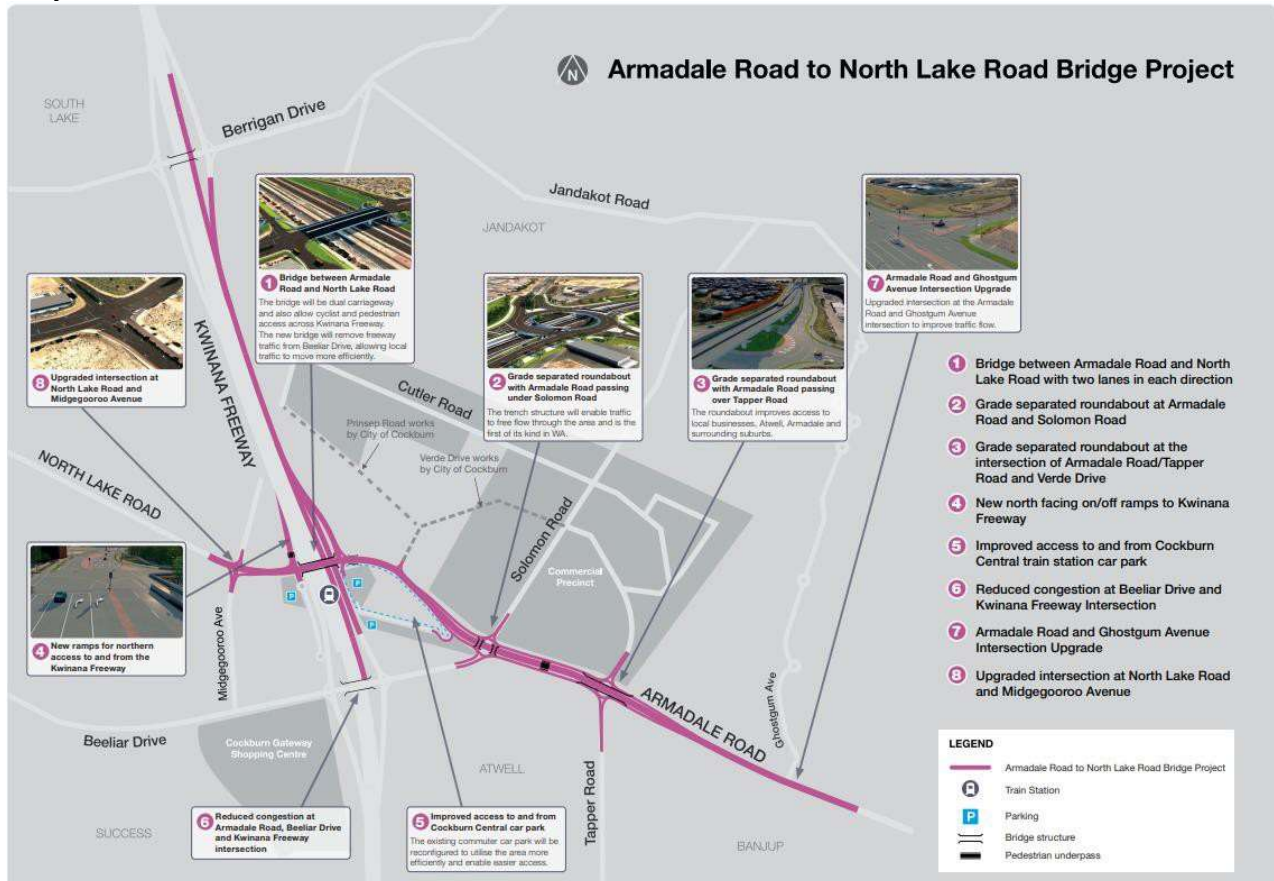


Figure 1: Armadale Road to North Lake Road Bridge Project overview map © Main Roads WA

Armadale Road is a strategic freight route and one of the main east-west links within Perth’s metropolitan transport network. This link forms part of the route to Fremantle Port with approximately 27,000 vehicles using Armadale Road daily between Tapper and Warton Roads. This congestion is preventing the full implementation of the Cockburn Central Activity Centre Strategy and the achievement of its vision and key strategic objectives.

Upon completion in late 2021, the Project will help to address significant congestion in the Cockburn Central area resulting from the growth of the Cockburn Gateway Shopping Centre, surrounding commercial, retail and residential development and traffic passing through the area to access Cockburn Central Station, Kwinana Freeway and other destinations west of Kwinana Freeway.

For users of public transport, the project will improve access to and from Cockburn Central Train Station by alleviating heavy congestion around the station car park during peak times.

Once delivered, the Project will benefit the Activity Centre by providing a supporting road network that feeds traffic to ‘by-pass’ the heart of the Activity Centre.

Cockburn Central Activity Centre Strategy

The Strategy confirms the vision for Cockburn Central and details objectives to support the maturity of the centre. It provides a framework to guide future growth in a logical and sustainable way and guide investment in and around the activity centre. The Strategy includes a number of key actions to manage and support the growth of the area, including important road network improvements such as the Armadale Road to North Lake Road Bridge Interchange Project.



The Project website can be found at:

<https://project.mainroads.wa.gov.au/home/armadaleroadbridge/Pages/default.aspx>

Overall approach to Sustainability

The Project has been registered to achieve an Infrastructure Sustainability Council of Australia (ISCA) Design and As-Built rating using version 2.0 of the Rating Tool, with a minimum of 50 points. Currently, the project has a tracked score of just over 50 points, placing it at the Silver rating (on-target). Design Rating was submitted in June 2020 and is currently undergoing verification. As-Built score tracking will begin in late 2020, with submission of the As-Built rating expected in 2021.

The key Project Sustainability Priorities are identified in the Sustainability Management Plan and reflected in the Sustainability Position Statement which is available on the Supply Chain Sustainability School Project Landing Page: <https://www.supplychainschool.org.au/learn/partner-landing-pages/armadale-road/>.

Project Sustainability Objectives and Initiatives are in line with Main Roads Sustainability Policy dated July 2016 which is underpinned by six key aspects: Sustainable Transport, Climate Change, Environmental Footprint, Behaviour, Governance and Performance; and Funding and Financing.

Material Sustainability Issues

Materiality assessment was undertaken during ISCA Kick-off Workshop with key Project Stakeholders attending. The GRI Process was followed during Materiality Assessment which reflected stakeholder value and impact of the Project on the economy, environment and society for the whole-of-life of the asset.

As per graph below, Sustainability Leadership (Lea) and Management of Supply Chain (Spr) as well as Diversity and Inclusion (Wsf) categories received prioritised ranking.

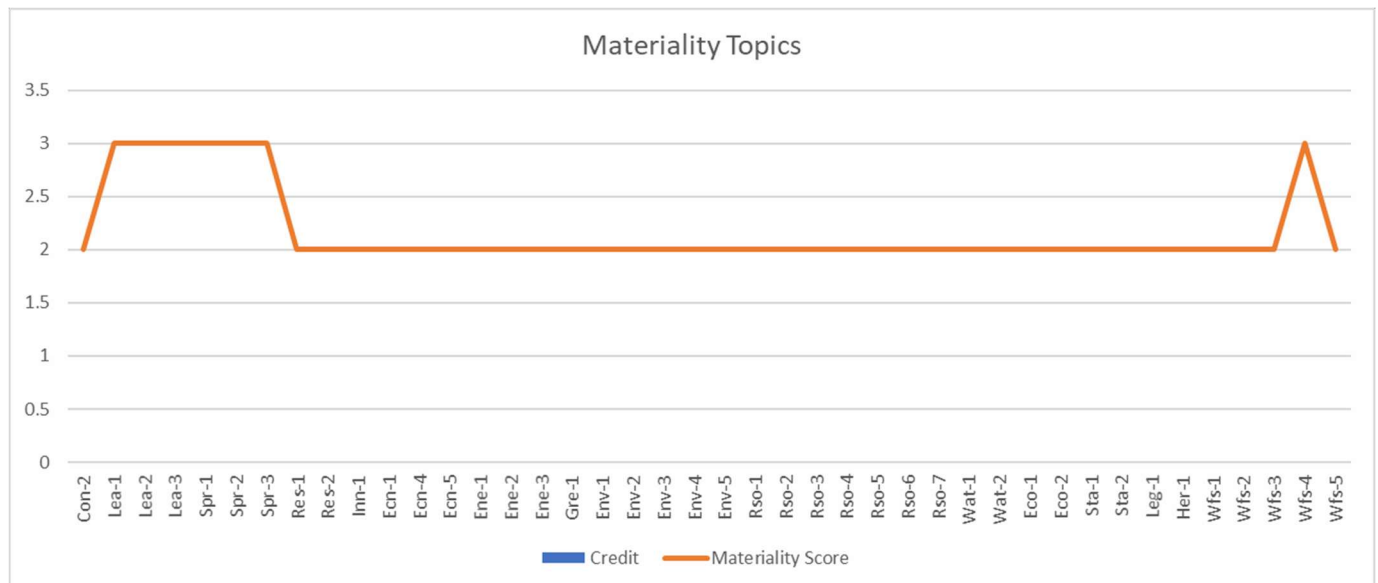


Figure 2: Materiality Assessment of Sustainability Topics for the Project

Environmental Aspects Performance

At a glance

Aspect	Year to 30 June	Total for Project
Forecast Clearing (ha)	14.24	14.24
Clearing permit allowance (ha)	14.74	14.74
Actual clearing to date (ha)	14.24	14.24
Rehabilitation/revegetation planned (ha)	0	0
Actual rehabilitation/revegetation to date (ha)	0	0
Environmental offset via Monetary contribution actual (\$)	\$197,657	\$197,657
Total Water Consumption to date (kL)	50,170.3	50,170.3
Total water licence allowance (kL)	396,000kL/annum	396,000kL/annum
Total GHG emissions (scope 1, 2 & 3) to date (t CO ₂ -e)	Circa 3,500 t CO ₂ -e	Circa 3,500 t CO ₂ -e
Total energy consumption to date (mj)	2476kWh – purchased at site compound 6,784,973 mj – total energy consumption to date which includes energy from fuel use and electricity	6,784,973
Total quantity of recycled content used in project (t)	TBD*	TBD
Total imported materials used in project (t)	44,973	44,973
Total waste generated by project (t) – includes recycled waste	7,187	7,187

* For this reporting period, recycled content was not calculated due to the early stages of construction.

Recycled Content will be reported in the reporting period of years 2020-2021.

Environmental context

Environmental Management

The project was referred to the Environmental Protection Authority (EPA) on 22 August 2018. The EPA determined the proposal does not warrant formal assessment. The referral documentation and decision on whether to assess this proposal can be found under link below:

<http://www.epa.wa.gov.au/proposals/armadale-road-north-lake-road-bridge>

The Project was referred to the Department of the Environment and Energy (DotEE) on 24 August 2018 under the Environment Protection and Biodiversity Conservation Act (EPBC Act). The DotEE has determined that the project is not considered a controlled action and can therefore progress without further reference to this legislation.

As part of the due diligence undertaken for the wider ARNLR Project, appropriate environmental investigations were undertaken to determine potential impacts of the Project. These included detailed studies of flora and vegetation, fauna, acid sulfate soils (ASS), contamination, hydrogeology and dewatering, noise and vibration and Aboriginal heritage. The outcomes of these studies informed the Project's Environmental Impact Assessment and referral of the Project to the Environmental Protection Authority (EPA).

The following sections provide a brief description of the existing environmental factors which may be present within or adjacent to the Project alignment.

Declared Rare and Priority Flora

A detailed flora and vegetation assessment was undertaken for the Armadale Road to North Lake Road Bridge project and recorded no species listed as Declared Rare Flora or Threatened under the WC Act or as Threatened under the EPBC Act.

Six native vegetation types were mapped including three Banksia Woodlands, one Marri Woodland, and two Wetlands; all of which have been impacted from weed invasion and urban development.

Threatened Ecological Communities (TEC)

Vegetation and Flora surveys completed for the Project identified one TEC within and adjacent to the Project alignment. Banksia Woodland type BmEpEc (5.87ha), inferred FCT23a, was confirmed to represent the Banksia Woodland TEC and Priority 3 PEC.

Wetlands

A number of geomorphic wetlands were mapped in the vicinity of the Project area. These wetlands have been previously categorized as Multiple Use or Resource Enhancement wetlands, based on their hydrological and ecological qualities.

Development over the past 30 years has modified most of the land nearby the Project with remnant wetlands present to the north and southeast, and two modified wetlands within urban housing to the south. The Project area intersects the following wetlands and associated vegetation:

- Two multiple use wetlands (6655 and 6652)
- One resource enhancement wetland (15297)

- Paperbark wetland (MpAsHr): locally and regionally significant for its hydrological and habitat refuge functions. Represents FCT4 Melaleuca preissiana damplands (not a TEC or PEC)
- Wetland vegetation isolated *E. rudis* over *Agonis flexuosa* over weeds (degraded).

Acid Sulfate Soils

An assessment of the Department of Water and Environmental Regulation's (DWER) ASS mapping indicated that the risk of ASS occurring along the Project alignment as 'moderate to low risk of ASS occurring within 3m of the natural soil surface'. Based on the moderate to low risk of ASS, the location away from sensitive areas, the lack of ongoing groundwater drainage or dewatering during operations, and the lack of excavation below the groundwater table, the Project is not expected to cause significant impacts to the quality of land and soils.

Terrestrial Fauna

The fauna survey indicated impact on habitat for conservation significant species, including:

- 8.4 ha (2.0 ha of 'high quality', 3.2 ha of 'quality' and 3.2 ha of 'low quality') foraging/roosting habitat for Carnaby's Cockatoo (*Calyptorhynchus latirostris*) including 17 potential breeding trees (no suitable hollows)
- limited habitat (0.1 ha) for Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*).
- 8.4 ha of habitat for Quenda (*Isodon obesulus fusciventer*)
- 13.8 ha of habitat for Perth Lined Skink (*Lerista lineata*)

Water Management

Groundwater and surface water monitoring is conducted at adjacent surface water bodies and monitoring wells along the Project alignment. It is not anticipated that construction activities associated with the ARNLRB Project will have significant impacts on underlying groundwater quality or quality of nearby surface waters. However, the described monitoring programs are being undertaken for the early detection of any changes in water quality and assurance purposes for environmental compliance. If adverse impacts are identified following a monitoring event, further mitigation measures and potential remedial program will be implemented (if required). Results from recent monitoring events show no changes in water quality of groundwater or surface water.

Hydrogeology

The project lies within the Jandakot groundwater system (DoW, 2015) which comprises:

- The shallow unconfined Superficial (water table) aquifer known as the Jandakot mound;
- The deep, partially-confined Leederville aquifer;
- The deep, mostly-confined Yarragadee aquifer.

The Jandakot mound is a source of water for open space, horticulture, industry and gardens and contributes to Perth's public water supply (DoW, 2015).

A majority of the Jandakot Mound is separated from the deeper Leederville aquifer by a confining layer of Kardinya Shale. As a result, potential for inter-aquifer impacts across most of the mound is limited. The confining nature of the shales means that abstraction from the Superficial aquifer has a greater impact on wetlands on the Jandakot Mound than abstraction from the deep aquifers (DoW, 2015).

Water Demand Assessment and Management of Impacts

The water demand for the construction and operations phase is modelled considering water required for:

- Soil conditioning and compaction;
- Dust suppression;
- Landscaping establishment and
- Water used for toilet flushing and cleaning in staff compounds and offices

During the construction phase of the Project, there are number of activities that require use of potable water on water quality grounds, such as preference of potable water use for mechanically stabilised earth walls where steel straps are placed behind the face of the wall. Construction of road pavements, particularly basecourse, have strict water quality requirements limiting use of groundwater due to the salt and alkali content hence making potable water more compatible with the bituminous asphalt surfacing.

During Operational phase, there will only be a requirement for irrigation for a brief landscaping establishment period. Landscaping utilises local drought tolerant species and will not require irrigation after it's established.

One Water Corporation hydrant standpipe is currently in use where use of potable water is required by law (such as ablutions) or on water quality grounds.

On 20 March 2020, 5C Licence was granted to the Project to use groundwater for majority of construction water requirements such as dust suppression, soil compaction and conditioning. One production bore at Knock Place and one monitoring well were installed and operated under approved Groundwater Operating Strategy.

Environmental investigations identified a significant risk of drawdown in the shallow aquifer through dewatering and similar abstractions. Abstracting large volumes of groundwater could impact sensitive environmental receptors including ecological communities and wetlands that rely on the shallow groundwater for year-round replenishment.

Potential drawdown resulting from the groundwater bore is being reduced through the installation of a turkey's nest adjacent to the groundwater bore. The construction of this turkey's nest included a High Density Polyethylene plastic liner, installation of sufficient fauna egress and cut-off switches and adequate freeboard to prevent overflow. The capacity of this water storage area is 3ML, sufficient for 4.3 days' worth of abstraction. This will allow the Project team to have greater control over the volume of water that is extracted and effectively manage the abstraction rate.

Utilising water from the groundwater bore in addition to scheme water will reduce the potential for adverse environmental impacts from drawdown on the adjacent TEC and wetlands as well as reduce the risk for oxidation of PASS. This in turn will reduce the direct or indirect impacts to sensitive environmental receptors, as well as nearby bore users and structures.

While there may be some temporary and localized drawdown as a result of the groundwater bore, no significant impacts are expected at any of the wetlands, artificial lakes, or groundwater dependent ecosystems (GDE) near the project site.

The Alliance has also taken over the licence of an additional production bore to allow for sustainable water sourcing across the project site. A third production bore will be installed on the western side of Kwinana Freeway to support construction works in this area.

Water Reduction Initiatives:

- Water savings were realised by targeting 100% native plantings across the project site for the

revegetation and rehabilitation program, as well as targeting seed spread and planting of

tubestock and mature trees during the wet winter months to ensure there was minimal water needed for the vegetation establishment phase. During detailed design, reticulated irrigation for all Feature Landscape areas has been eliminated, and there will be a once off application of water for all newly planted trees across the Project site. This approach reduces water requirements for landscape establishment by circa 53% and for landscape maintenance over 100 year Design Life of the Project by 100%.

- There are some savings realised by optimising water used for dust suppression. Alliance will apply dust suppressants (Dustex) for areas of temporary access tracks and crane pads only, not permanent earthworks. This will equal 6.97% water savings on the modelled water required for dust suppression by applying dust suppressants.
- Alliance will also optimise the spread of mulch throughout the alignment at the earliest opportunity. By applying mulch to the maximum area at the optimal time, Alliance will be able to increase modelled water savings across the construction phase to 8.52%.
- Strict Groundwater monitoring of the production bore is aligned with the Groundwater Operating Strategy with measures in place to minimise abstraction of water such as:
 - The abstraction and storage system are fully automated with cut-offs
 - Pumped groundwater volumes being continuously metered
 - Inspections and maintenance are regularly carried out on the equipment. Daily visual inspections are undertaken by a nominated supervisor to monitor water storage levels.

Source	Year to 30 June	Total for Project
Water purchased from the scheme in litres	7,119,500	7,119,500
Water pumped from bores in litres	43,050,800	43,050,800
Water pumped from rivers, lakes or harvested in litres	N/A	N/A
Recycled or waste water use (typically from another industry) in litres	N/A	N/A

Carbon Emissions & Energy

Energy and Carbon Emissions Reduction and Renewable Energy Feasibility Study was undertaken for the whole-of-life carbon footprint of Armada Road to North Lake Road Bridge Project.

The following emissions reduction and renewable energy initiatives were assessed for operation: LED luminaires, Solar PV, GreenPower (25%), GreenPower (100%), Wind – Horizontal-axis Wind Turbine (HAWT) and Wind – Vertical-axis Wind Turbine (VAWT).

The use of LED bulbs for the project's street lighting was adopted as a cost-effective mechanism to reduce the emissions of the project through the operational phase due to lowered power consumption to provide similar luminescence. Additionally, LEDs have significantly longer design lives than conventional bulbs, meaning that the maintenance and capital costs are likely to be lowered by comparison. Based on modelling, there is a 49% reduction in annual consumption from street lighting resulting from use of LED bulbs over traditional HPS solution.

The following renewable energy initiatives were assessed for construction: Biodiesel, GreenPower (25%), GreenPower (100%), Solar PV, however further analysis determined that none were feasible for implementation.

Most energy savings came from design optimisation and reduction of quantities which led to reduced plant burn hours to perform land clearing, bulk earthworks, road building and surfacing,

as well as electrical, ITS and drainage installation. However, majority of GHG emissions are derived during operation phase from emissions attributed to street lighting, traffic lighting, light and heavy vehicle traffic users.

Total construction emissions were calculated at 8,637 tCO₂e, while total operational emissions for the 100 year Design Life were calculated at 96,616,293 tCO₂e. Total GHG Reduction of 7% is currently calculated for the Project whole of life, mainly based on implementing LED bulbs street lighting over HPS.

Source	Year to 30 June	Total for Project
Energy usage by source in mega joules	6,784,973	6,784,973
From fuel use (mj) <i>note: (excl. Scope 3 emissions during operations due to traffic)</i>	6,776,059	6,776,059
From electricity (mj) <i>note: (excl. Scope 3 emissions during operations due to traffic)</i>	8,913.6	8,913.6
Energy saved (mj)	0	0

Materials & Recycling

Resource Efficiency Strategy has been developed for the Project. Based on the guidance provided by Main Roads WA, overview of regulatory approvals related to resource re-use, disposal, stockpiling and transportation on- or off-site, design, procurement and construction methodology considerations, the following opportunities were considered, and targets were developed.

Resource Efficiency Opportunity Areas and Goals	• Opportunity specific for the ARNLR Project	• SMART Targets
Minimisation of resource output generation (including towards cut-and-fill balance)	<ul style="list-style-type: none"> • Maximise Retention of existing pavement (including asphalt) • Maximise Re-surfacing of pavements where proposed design levels are consistent with existing levels • Optimise Vertical Alignment for cut-and-fill balance • Maximise size of drainage basins 	<ul style="list-style-type: none"> • Min 5 % reduction in materials' lifecycle impacts compared to a Base Case footprint (<i>currently on target for submission ISCA Design Rating Materials Calculator</i>)
Maximise onsite reuse of reusable resource outputs material including contaminated material and acid sulfate soil	<ul style="list-style-type: none"> • Reuse site won fill on site • Reuse existing asphalt as part of RAP • Reuse existing pavement as temporary hardstands • Reuse existing pavement in embankment construction • Reuse existing on site unsuitable materials in verges and deep embankment fill • Reuse topsoil from clearing in verges, embankment construction and landscaping • Reuse existing vegetation as mulch for landscaping • Delete bedding sand requirement and cement stabilised sand requirement and use existing material for backfill 	<ul style="list-style-type: none"> • 100% site won fill diverted from landfill (reuse on site; or send for recycling) • 100% asphalt removed from site is recycled • 100% vegetation and overburden from clearing, excavation, earthworks is reused onsite
Maximise offsite reuse of reusable resources where onsite solutions cannot be identified (including contaminated material)	<ul style="list-style-type: none"> • Reuse and Recycle construction and demolition waste (concrete, scrap metal, timber, plastics packaging etc.) externally • Reuse asphalt as part of RAP • Reuse concrete kerbs and barriers (crushed for rubble / backfill) • Recycle paper / organic waste / plastics / metal / timber 	<ul style="list-style-type: none"> • >80% C&D waste diverted from landfill (reuse on site; or send for recycling) • 100% asphalt removed from site is recycled • 80% reuse / recycling of concrete removed from site (including reinforced concrete) • 70% office waste diverted from landfill (reuse or recycled) • 100% recycling of metal • >80% timber and delivery plastics diverted from landfill (reuse or recycle)
Beneficial re-use of existing onsite resources	<ul style="list-style-type: none"> • Reuse gantries, signs, noise walls and street light poles that are proposed to be removed as part of this project, where technically feasible 	<ul style="list-style-type: none"> • Reuse 100% of gantries and signs within the footprint of the project that are fit for purpose.

	<ul style="list-style-type: none"> Reuse of existing pavement aggregates for temporary access tracks and crane pads 	<ul style="list-style-type: none"> Reuse 100% of road light poles within the footprint of the project that are fit for purpose. Min 30% reduction in materials required for access tracks and temporary crane pads
Beneficial re-use of resource outputs by nearby projects / assets	<ul style="list-style-type: none"> Re-use fill won from BMD adjacent project Re-use Crushed Recycled Concrete from Subiaco Oval Re-use column formwork from previous North Link Stage 2 Project Re-use site compound facilities from adjacent MRIA Project Re-use site vehicles from adjacent MRIA Project 	<ul style="list-style-type: none"> Min 5 % reduction in materials' lifecycle impacts compared to a Base Case footprint (reference ISCA Materials Calculator)
Optimisation of overall resource use (including striving towards cut-and-fill balance)	<ul style="list-style-type: none"> Maximise Retention of existing pavement (including asphalt) Maximise Re-surfacing of pavements where proposed design levels are consistent with existing levels Optimise Vertical Alignment for cut-and-fill balance Maximise size of drainage basins Incorporate Bridge 1828 tied walls to use MSE Fill Optimise concrete mixes from S50 to S40 where possible (bridge decks and substructure) 	<ul style="list-style-type: none"> Min 5 % reduction in materials' lifecycle impacts compared to a Base Case footprint (reference ISCA Materials Calculator)
Minimise use of virgin resources	<ul style="list-style-type: none"> Use recycled quarry material (recycled glass cullet and recycled sand) where possible Implementation of RAP in asphalt mix 	<ul style="list-style-type: none"> Use min 5% RAP in lower asphalt layers (up to 10% allowed in MRWA specs) Use 10% recycled quarry material where the material is structurally suitable to meet design requirements.
Maximise use of local resources	<ul style="list-style-type: none"> Drive use of resources by local / state industries Use recycled products from local suppliers 	<ul style="list-style-type: none"> 100% sourcing of concrete from local suppliers (within 25 km radius of the project) 100% sourcing of quarry material from local suppliers (within 25 km from the project site)
Maximise use of resources that can be re-used / recycled	<ul style="list-style-type: none"> Reuse of C&D waste fill on site Reuse asphalt as part of RAP 	<ul style="list-style-type: none"> Use 5-10% RAP in lower asphalt layers

		<ul style="list-style-type: none"> • Use 10% recycled quarry material where the material is structurally suitable to meet design requirements. • >80% C&D waste diverted from landfill (reuse on site; or send for recycling)
Beneficial re-use of resource outputs from nearby projects / assets	<ul style="list-style-type: none"> • Re-use fill won from BMD adjacent project • Re-use Crushed Recycled Concrete from Subiaco Oval • Re-use column formwork from previous North Link Stage 2 Project • Re-use site compound facilities from adjacent MRIA Project • Re-use site vehicles from adjacent MRIA Project 	<ul style="list-style-type: none"> • Install MRIA site offices for ARNLR offices for use. •
Maximised use of resource inputs (materials) with recycled waste content	<ul style="list-style-type: none"> • Using RAP in asphalt • Use CRC (Crushed Recycled Concrete) as subbase for FDA (Full Depth Asphalt) • Use of recycled lightweight noisewalls (example – Permacast AIL Soundall) vs. precast concrete noise walls • Use of recycled components in structural and non-structural concrete mixes • Use of recycled materials like Recycled Glass Cullet and Recycled Sand in embankment construction • Use of Crumb rubber asphalt in Open Graded Asphalt • Use of recycled plastic fiber reinforced concrete like Emesh in lieu of steel mesh for footpaths, cycle paths – <i>considered but not implemented</i> • Use of recycled aggregate in retaining walls (example – Eco blocks) – <i>implemented for the Project</i> 	<ul style="list-style-type: none"> • Use 5-10% RAP in lower asphalt layers. • 100% use of CRC as subbase under FDA where environmentally applicable • >30% SCM in non-structural concrete • >30% SCM in structural concrete • >20% recycled materials in import quarry materials • >50% recycled aggregate in retaining walls •
Minimised environmental and social impact of logistics (transport and handling)	<ul style="list-style-type: none"> • Use local suppliers where possible • Promote previously disadvantaged workforce • Use sustainable labelled products (products with Environmental Product Declarations - EPDs etc.) 	<ul style="list-style-type: none"> • Meet local supplier project KRAs. • Meet project workforce KRAs. • 2% of the overall value of material used must have sustainable labelled labels. 5% - stretch target based on value • Use of >50% SCM in foot paths (non-structural concrete)

Identify circular economy options and include required outcomes in targets	<ul style="list-style-type: none"> • Use RAP in asphalt • Spoil Reuse on site 	<ul style="list-style-type: none"> • All targets are included above.
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Resource Efficiency Initiatives currently underway:

- Pavement design
 - Reference Design detailed the use of a combination of concrete pavement and full depth asphalt on Armadale Road where it passes beneath Solomon Road, i.e. the trench structure. The understanding for the requirement for concrete and full depth pavement was due to the proximity of the subgrade level to the design ground water level (DGWL). During the RFP period the vertical geometry of Armadale Road was amended from the reference design, along with some amendments to the horizontal curvature. Following refinements of the structural depth of Bridges 1826 and 1827 (Solomon Rd.), and a reduced requirement for overhead clearance, it enabled the profile of Armadale Road to be raised by approximately 850mm through the Solomon Road sag. This resulted in an increased clearance from the DGWL. The granular pavement was developed during the RFP period and used in the Final Design which contributed to decreased asphalt quantities comparing to initial design.
 - The existing pavements comprise asphalt surfacing, crushed rock, bitumen stabilised limestone or gravel base course, and limestone sub-base. The asphalt surfacing can be potentially planed and returned to an asphalt supplier for use as Reclaimed Asphalt Pavement (RAP). The SWTC [Clause 4.6(e)(ii)(E)] requires that at least 5% of RAP be used in the full depth asphalt intermediate courses.
Proposal to increase maximum % of Reclaimed Asphalt Pavement (RAP) by mass of total aggregate in the Intermediate Course layers from 10% (current practice) to up to 25% was discussed with Main Roads WA Materials Engineering Branch (MEB) and is currently pending approval. This will reduce the use of virgin aggregate on the project by reuse and recycling of materials from an existing pavement structure containing bituminous binder.
- Proposal to reuse approx. 13% of major signs on the Project is pending approval by Main Roads WA. This will minimise the duration of works adjacent to high speed roads therefore decreasing the risk to construction personnel as well as reduce the use of virgin materials.
- The need for the pump station was eliminated in favour of a gravity flow piped network designed to drain the dive structure. A high level, whole of life cost assessment has been undertaken based on a design life of 100 years. Although a gravity pipe outfall has increased upfront capital costs, it produced savings to Main Roads over the life of the structure as well as demonstrated improved social, environmental and stakeholder benefits.
- The following recycled aggregates are being procured with quantities yet to be finalised based on supply availability:
 - General Fill - alternative fill: sand 80% / glass sand 20% mix – 10,000 t
 - Crushed Recycled Concrete Subbase – 16,000 t
- Demolition materials are being used as deep fill in embankments as follows:
 - Redundant Demolition concrete from footpaths, kerbs, drainage structures and limestone blocks is broken up on site, stockpiled and then used in the embankment construction > 1m below finished level



Figure 1: Material broken down in demolition process and carted to fill area.



Figure 3: 300mm lift track rolled 4 passes.

- Existing asphalt is “ripped” with grader, blended with sand and gravel and used for deep fill below 1m finished level
- Up to 5,000 cm of surplus fill from other construction project will be brought into site annually in lieu of importing virgin fill (2019/2020: 4,000m³ of surplus fill received from Solomon Road)
- Topsoil reuse – topsoil from site clearing is reused on site; the surplus is taken offsite by a local building materials supplier free of charge
- Low Heat Cement mix S40LH is included in structural design for cast in-situ elements with thickness greater than 500mm (circa 2,300 m³). Type LH cement shall be a mixture of Type GP cement and ground blast furnace slag with approximate ratio 35%:65%, or mixture of Type GP cement and fly ash with approximate ratio 60%:40%. This contributes to % use of Supplementary Cementitious Materials (SCMs) on the Project.
- Reduction in concrete quantities in comparison to the Base Case Reference Design:
 - For the full Armadale Road trench structure, including Bridge No’s. 1826 and 1827 abutments, the reference design proposed ground retention by 800mm thick diaphragm wall in combination with permanent soil anchors. During the tender process, raising of the vertical alignment of Armadale Road has been possible through an overall geometric re-design and a reduction of the required vertical clearance over Armadale Road. This raising of Armadale Road, in combination with a consideration of geometric constraints, traffic staging and services coordination has confirmed that construction of a retaining solution in an open cut is feasible. MSE has been selected as the proposed structural solution for both Bridge No’s. 1826 and 1827 abutments, in addition to the majority of the remaining extent of trench wall. Hence Diaphragm Walls were replaced with precast L shaped Retaining Walls
 - Deck Slab depth reduction
 - Precast T-Roff Beams reduction due to revised beam depth, lengths and total number of beams
- The Final design has managed to make significant drainage savings over the reference design by replacing pit and pipe with kerb openings whenever possible, refining the drainage network configuration and using innovative ways of retaining basins without affecting storage requirements
- Eco-Blocks (recycled crushed concrete/masonry product) are being used for construction of retaining walls in lieu of limestone.
- Use of sustainable labelled products (products with Environmental Product Declarations – EPDs). Procurement is underway for steel, concrete, precast concrete, plastic items with opportunities of products covered under EPDs being explored.

Material and Waste Statistics

Imported Materials	Year to 30 June	Total for Project
Sand (t)	18,319	18,319
Gravel (t) – <i>Laterite Gravel</i>	0	0
Clay (t)	N/A	N/A
Limestone (including crushed) (t)	19,205	19,205
Crushed Rock (t)	1,012	1,012
Crusher Dust (t)	N/A	N/A
Aggregate (t)	0	0
Asphalt (t)	275	275
Concrete (t)	1,958	1,958
Steel (t) includes reinforcement steel and noise wall steel posts	220	220
Precast concrete (t)	3,984	3,984
Emulsion (t)	0	
Bitumen cutter (t)	0	
Bitumen (t)	0	
Glass (t)	0	
Paint (t)	0	
Topsoil (t)	0	
Mulch (t)	0	
Other (t)	0	

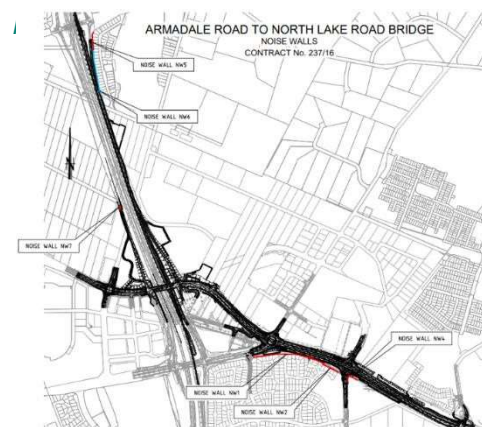
Waste to Landfill	Year to 30 June	Total for Project
Unsuitable material (t)	0	0
Existing seal / asphalt (t)	0	0
Roadside litter / municipal solid waste (t)	0.95	0.95
Commercial / industrial waste (t)	0	0
Green waste (t)	18	18
Concrete / kerbing (t)	0	0
Construction / demolition waste (t)	0	0
Contaminated material (t)	0	0
Asbestos (t)	3779	3779
General/Green Waste (t)	0	0
Other (t) – mixed builders waste (20% sent to landfill)	193.34	193.34
Waste Recycled		
Sand (t)	0	0
Road base (t)	0	0
Asphalt (t)	0	0
Timber (t)	0	0
General waste (site office / roadside litter) (t)	0.53	0.53
Steel (t)	17	17
Concrete (t)	1306	1306
Green waste / mulch (t)	2	2
Plastic (t)	0	0
Other (t) – mixed builders waste (80% recycled)	1099.06	1099.06

Imported recycled content *	Year to 30 June	Total for Project
------------------------------------	------------------------	--------------------------

Sand (t)	0	0
Road Base (t) – <i>Crushed Recycled Concrete Subbase</i>	0	0
Crumbed Rubber (t)	0	0
Recycled asphalt (t)	0	0
Steel (t)	0	0
Concrete (t)	0	0
Crushed Glass / beads	0	0
Limestone (t)	0	0
Plastic (t)	0	0
Green waste / mulch (t)	0	0
Topsoil (t)	0	0
Unsuitable material (t)	0	0
Other (t)	0	0

** For this reporting period, recycled content was not calculated due to the early stages of construction. Recycled Content will be reported in the reporting period of years 2020-2021.*

Noise (from construction and future operation)



The Project has been grouped into eight (8) Noise Catchment Areas (NCA) and noise measurements and modelling have been undertaken. Three scenarios have been modelled: existing noise levels, forecast 2041 (no mitigation scenario) noise levels and forecast 2041 (with noise walls) noise levels. The criteria for this project are for noise at all existing noise sensitive premises to be no more than the limit of 60 dB LAeq(Day). The existing traffic scenario resulted in several receivers being above the limit. The noise reduction treatments adopted for the Project include construction of new noise walls on the residential boundaries, extension to the existing noise walls and at-property treatments to some individual dwellings in the area.

boundaries, extension to the existing noise walls and at-property treatments to some individual dwellings in the area.



The ARNLR Project is in close proximity to major roads, a variety of planning zones, and standalone sensitive receptors. Noise sensitive receptors include:

- Residential properties between Kwinana Freeway and Tapper Road to the south of Armadale Road as well as those to the east and west of Kwinana Freeway between Armadale Road and Berrigan Drive
 - Atwell Primary School located to the south of the alignment and Early Start Childcare Centre at 12
 - Solomon Road
 - Fiona Stanley Hospital and a number of medical centres located to the North and East of the alignment
 - Success Library located to the East of the alignment
- Noise and vibration generated by construction activities is managed in accordance to Construction Noise and

Figure 4: Extent of Noise Wall Construction for the Project.

Vibration Management Plan (CNVMP) and Consolidated Out of Hours Noise and Vibration Management Plan (COHNVMP). Both plans are available at the project website:

<https://project.mainroads.wa.gov.au/home/armadaleroadbridge/Pages/default.aspx>

Noise levels are being monitored with the aim to understand noise generated as a result of ARNLR construction activities. This includes monitoring data collected from noise monitoring stations situated in the vicinity of sensitive receptors along the Project alignment, together with public complaints arising from construction noise. Intervention and Action targets are presented in Table 1.

Table 1 – Noise Intervention and Action target levels

Noise Criteria	Intervention target (investigate source and implement mitigation)	Action target (stop works and investigate source)
Qualitative	Up to 2 complaints within 24 hours from a stakeholder, local community member or business.	Multiple (>2) complaints within 24 hours from a stakeholder, local community member or business.
Quantitative	N/A	LAeq, 8 hours of 85dB(A)

Air Quality and Dust

Air pollution is not predicted to increase as a result of the Project works. There will be temporary impacts during construction due to potential dust lift and construction traffic contributing to increased pollutant emissions during construction.

The main air pollution and amenity issues during the construction phase of the Project are:

- Annoyance due to dust deposition (soiling of surfaces) and visible dust plumes
- Elevated PM10 concentrations due to dust-generating activities
- Exhaust emissions from diesel-powered construction equipment

The identification and control of construction-related air quality is addressed in the Construction Environmental Management Plan

Some of the controls currently implemented on the Project are listed below:

- Dust Management Plan for Site Compound has been prepared and approved by the City of Cockburn
- Street sweepers available for cleaning of roads and removal of excess dust
- Water trucks conduct dust suppression where required across the project
- Dust suppression techniques including the use of surfactants have been used during high risk works
- Dustex and hydromulch have been used on exposed areas
- Four permanent dust monitoring stations have been installed across the alignment to confirm compliance, with two mobile monitors to be located where high risk works are being undertaken
- Dust monitoring data is reviewed monthly for compliance, or when the predetermined trigger level is exceeded

- A few dust complaints have been received (usually along with other complaints e.g. noise, vibration etc.) and are responded to within 24 hours of complaints being received
- Following complaints, dust data is reviewed to confirm compliance
- Speed limits are enforced to minimise dust
- Dust is addressed in the Project induction

Discharges & Spills

No unauthorised discharges or reportable spills have occurred on the Project to date. All stormwater has been retained and managed within the site boundary, with no impacts to adjacent sensitive receptors. Some minor spills have resulted from construction operations, none of which occurred within protected groundwater areas.

Vibration

The project is situated in close proximity to a number of sensitive receivers, residential premises and heritage areas. Receptors existing within 100m of the PDE boundary have been identified as potential receivers of vibration. Residential properties dominate the volume of expected receptors and are distributed closer than other receptors. Commercial businesses operate to the north of Armadale Road, although those that are vibration sensitive fall outside of the 100m buffer zone.

A number of Aboriginal (largely artefact scatter and mythological sites) and European heritage sites have been identified in the vicinity of the Project area. However, none of these occur within 100m of the PDE boundary and are unlikely to be impacted by vibration generating construction activities.

Existing infrastructure within and adjacent to the corridor may also be subject to vibration impacts; these items include the gas and Water Corporation pipelines (Asbestos and Cement and Mild Steel Concrete Lined). Avoidance of impact to underground services will be managed through permits.

The Project team will aim to complete all construction works which require vibration intensive activities within 100m of sensitive receivers during specific (less sensitive) times of the day in attempt to limit the impact on human comfort. Should vibration intensive works be conducted within 100m of sensitive receptors, project team will notify the affected receivers and monitor vibration levels against the target levels in Table 2.

Table 2 – Project vibration criteria

Vibration Sensitive Receptor	SITE CONTROL CRITERIA (PPV IN ANY ORTHOGONAL DIRECTION) MM/S		
	Intervention target (investigate source and implement mitigation)	Action target (stop works and investigate source)	
Residential and occupiable buildings	3	5	
PTA Infrastructure	12	15	
Buried pipes (not gas)	20	25	
Electrical and Communication Cables	40	50	
Gas pipelines*	4	5	
Residential (Human Comfort)	N/A	0.2	
Commercial (Human Comfort)	N/A	0.4	

Vibration Sensitive Receptor	SITE CONTROL CRITERIA (PPV IN ANY ORTHOGONAL DIRECTION) MM/S	
	Intervention target (investigate source and implement mitigation)	Action target (stop works and investigate source)
Industrial (Human Comfort)	N/A	0.8

Five (5) static noise and vibration monitors are established at nominated locations which will be operational 24/7 for the duration of the project.

Light spill

The existing lighting system to Armadale Road utilized high-pressure sodium lighting with no effect light control.

As part of the electrical design, LED based street lights have been included to sections of the Kwinana Freeway and the new Armadale Road. The proposed solution especially along Armadale Road offers a compliant lighting installation, which has a reduced energy consumption and requires less maintenance. The proposed LED solution will emit no direct lighting above the horizontal plane in reference to the luminaire mounting position. Glare shielding will be installed where spill light issues have been identified based on computer modelling.

Acid Sulphate Soils

An Acid Sulphate Soils (ASS) sample analysis plan (SAP) and detailed site investigation (DSI) was undertaken for the Project. The report identified that the Project area is located within a Moderate to Low ASS area. However, it should be noted that High to Moderate ASS zones are noted to the north and south of the alignment.

The risk of encountering ASS was mainly predicted for the Dive Structure for excavation below 24 mAHD. Due to value engineering and additional geotechnical investigations, DGWL was confirmed at RL 27.45 mAHD and lowest road surface level in the trench structure has been raised to RL 28.46 mAHD. Therefore, risk of encountering ASS was out designed and reduced to very low.

ASS is not likely to be encountered on the Project. One of the initiatives currently being discussed is to have additional field investigation for ASS when certain levels of excavation for Dive structure are reached to rule out further risk.

Clearing

Three Native Vegetation Clearing Permits (NVCP) under Part V of the Environmental Protection Act (EP Act) have been submitted and approved (CPS 7623, 7992, 8233/1) to allow for clearing of native vegetation within the project area.

CPS 7623 and CPS 1992 were granted to the Duplication of Armadale Road and managed as part of that Project.

Under Clearing Permit CPS 8233/1 granted to this Project, clearing will result in the following significant residual impacts:

- 3.7 hectares of foraging habitat for black cockatoos;

- 1.9 hectares of Banksia Woodlands of the Swan Coastal Plain threatened ecological community; and
- 2.8 hectares of vegetation growing in association with a multiple use wetland.



Reductions in the clearing footprint as a result of the detailed design include:

- A compact ramp arrangement has been used for the western ramp terminal on the North Lake Road interchange. This is to mitigate against clearing of native vegetation in Lot 9500;
- Steepening of batter slopes in environmentally sensitive areas and providing retaining walls where required reduces the earthworks footprint reducing the clearing of native vegetation; and
- Optimising vertical grades and heights to follow existing topography reduces the requirement of earthworks and interference with groundwater.
- Main Roads WA had strong preference that the existing wetland area between Kentucky Court and Ramp H380 will not be cleared other than for the footprint of roads and paths. During detailed design, the wetland area between Kentucky Court and the North Lake Road northbound entry ramp has largely

been left untouched other than the earthworks for the PSP. Runoff will be discharged to this area after first passing through a water quality device and permit existing vegetation to further treat runoff prior to infiltration back to groundwater.

- During construction phase, prior to the start of any ground disturbance or construction activities, clearing is strictly monitored in accordance with Clearing and Grubbing Inspection and Test Plan, Ground Disturbance Permit and Fauna Management Procedure.

Contaminated sites

No known confirmed contamination sources identified within the vicinity of the Project Area. However, Areas of Potential Environmental Concern (APECs) that have the potential to cause contamination based on their past or current land use have been identified in the vicinity of the Project Area, including:

- T & M Powder Coating
- Caltex Service Station
- Car Giant
- Puma Service Station

The Project area is largely within the road reserve; however, illegal dumping was identified during the flora and vegetation assessment near Cockburn Central. Therefore, further asbestos and stockpile contamination investigation was carried out to determine the extent of contamination

resulting from historical land use and fly-tipping.

The investigation undertaken within Lot 44 Knock Place, in addition to a Project wide inspection, confirmed the presence of asbestos containing material (ACM) in surface soil at three (3) locations within Lot 39, 40, and 44 Knock Place.

A fourth location (adjacent to the Kwinana Freeway, off Imlah Court which did not form part of the environmental investigation is yet to be investigated and has been identified as potentially containing ACM. In this case, the presence of ACM relates to asbestos cement sheeting within old shed structures on residential properties. It is noted that the buildings or structures do not constitute contamination for the purposes of the Contaminated Sites Act 2003, however, can lead to contamination if not managed appropriately.

Based on these investigations and the history of fly-tipping in the area, it is likely that ACM will continue to be discovered in surface soils or as fly-tipped material as the Project progresses.

This Asbestos Management Plan was prepared for the Project and outlines the requirements and management of these finds and how project team will remediate the areas which have been identified. As part of asbestos management, Unexpected Finds Procedure has been implemented prior to major earthworks and clearing activities.

The high level Project targets relating specifically to asbestos management objectives adopted for this Project are:

- Zero incidents involving uncontrolled distribution of asbestos containing material, asbestos fines or free asbestos
- No unacceptable exposure to respirable asbestos fibres.

Dieback

The Project Dieback assessment found one uninfested area, with a total area of 0.7ha (4% of the assessment area), to the north of Cockburn Station (east of the Kwinana Fwy). Excluded areas, totalling 17.0ha, comprise the majority of the assessment area (96.0%). Excluded areas included roads, verges, cleared parkland areas and disturbed areas. It is likely that excluded areas are infested. As all areas within the assessment area are to be managed as infested, there are no Dieback risks to biodiversity as a result of ground disturbance activities within the defined project area. However, infested material is managed to ensure that the pathogen is not vectored off site where it may potentially impact biodiversity values.

Case Study – Increased quantity of Crushed Recycled Concrete (CRC)

In an effort to improve sustainability outcomes and increase the use of recycled products on the ARNLR Bridge Project, the Armadale Access Alliance challenged restrictions on the use of crushed recycled concrete (CRC). Limitations stated within the Basis for Design and Construction (BDC) meant that the use of CRC subbase was not permitted in a number of highly modified wetland areas along Kwinana Freeway.

Following initial investigations, the Alliance liaised with the Department of Water and Environmental Regulation (DWER) regarding increasing the use of CRC across the Project area with an environmentally sensitive approach.

The wetland areas where CRC was not permitted were categorised as 'multiple use' which are described by the Department of Biodiversity, Conservation and Attractions (DBCA) as "wetlands with few remaining important attributes and functions". These wetland areas have been subject to extensive development, and in some cases have been 100% modified due to urban development and road construction. As a result, these wetlands are considered to have low conservation value. The DWER agreed that the proposed use of CRC in the 'multiple use' wetland areas represented a low and acceptable risk.

As a result, the Alliance will now use CRC subbase in 3 additional areas, saving around 15,000t of virgin material.

Economic Aspects Performance

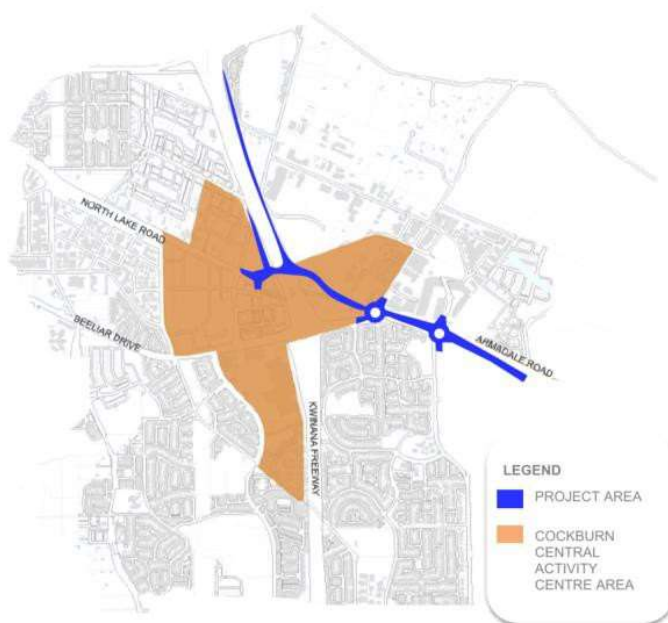
At a glance

Economic Aspect	Year to 30 June	Total for Project
Funding	\$237 million	\$237 million
No. of vehicles per day	22,400	22,400
Travel Time Saving	TBD	TBD
Increase of vehicle capacity	TBD	TBD
Increase in cycling and pedestrian facilities (i.e. increase in PSP length)	TBD	TBD
<i>Workforce and Supply Chain</i>		
Number of people employed by supply chain at various stages of project	537 supply chain employees completed project induction to date	537
Total number of suppliers engaged	74 Suppliers and 59 Subcontractors	74 Suppliers and 59 Subcontractors
Total number of Indigenous Enterprise	16 Subcontractors/ minor suppliers and Consultants engaged but not all started	16
Total number of Disability Enterprise	0	0
Buy Local Spend (to date)	\$22,080,022	\$22,080,022

Economic context

The project area is located at the Cockburn Activity Centre, an area that has undergone major transformation over the past 20 years from low density and undeveloped land into a largely urbanized area. Cockburn Central is recognized as an important regional transport node. It includes the Cockburn Train Station and connecting bus services but is suffering from the pull of regional traffic into the Core Area to access the Kwinana Freeway. The upgrading of the road network in the area is a priority of Main Roads and the Cockburn City Council.

Armadale Road is a Primary Regional Road in the Metropolitan Region Scheme, which currently carries ~22,400 vehicles per day (vpd). Armadale Road is projected to become heavily congested in



- Meet future traffic demands and alleviate congestion
- Improve accessibility by all modes of transport within the Cockburn Central Activity Centre Area
- Improve the road network into and out of the Activity Centre for regional traffic

Figure 5: Project Area in relationship with Cockburn Activity Centre and surrounding area.

- Enhance access to public transport and
- Minimise community issues

There has been more than 20 years of lobbying and advocacy in favour of this project, most recently between 2015 and 2017 via the Community Connect South (CCS) campaign, funded by the Cities of Cockburn and Armadale respectively. The campaign called for funding to “link North Lake Road with Armadale Road and the Kwinana Freeway via a bridge and freeway interchange”.

The Armadale Road to North Lake Road Bridge was a WA Labour commitment at the March 2017 State Election and was subsequently funded in May 2017 following a landmark infrastructure funding agreement between the Commonwealth and State Governments.

The Project is considered a catalyst for the implementation of the Cockburn Central Activity Centre Structure Plan. The constrained and congested road network is preventing the full implementation of the Cockburn Central Activity Centre Structure Plan (2015), which will create new development, investment and job opportunities.

A bridge connecting Armadale Road and North Lake Road will segregate local traffic by dividing heavy regional traffic from local traffic, and diverting through-traffic around the periphery of the Cockburn Central Activity Centre.

The Project effectively creates a bypass around Cockburn Central Train Station and the Cockburn Gateway shopping centre.

the near future, and the current design is progressing a solution to improve traffic operations, particularly around the Freeway intersection. Upgrades from a single lane carriageway to a dual lane carriageway are also progressing east of the project area. Armadale Road is projected to carry ~56,000 – 58,000 vehicles per day in the long term as is anticipated to include a triple-lane divided carriageway design.

Key Economic Outcomes

Expected Economic Outcomes of the Project:

- Improved road safety for all users
- Additional freeway connectivity

Sustainable Procurement and Buy local

The Project has committed to work constructively with Australian industry to identify and develop

options for maximising local content in performing the work and delivering the Project. Main Roads has developed an over-arching Industry Participation Plan (IPP) to help achieve this objective and to ensure consistency with the State Government's Building Local Industry Policy. The Industry Participation Plan details the strategies that will be undertaken to ensure Australian industry is provided a full, fair and reasonable opportunity to participate in all aspects of the Works.

A Project Industry Participation Plan (Local Content Management Plan) & Aboriginal Participation Plan have been prepared by the Alliance Management Team taking into account the requirements of Main Roads Industry Participation Plan, the government's requirements in relation to the Buy Local Policy and the Building Local Industry Policy.

While value for money is the underlining principle of procurement policies and processes, the Project Procurement Management Plan will endeavour to maximise opportunities to Western Australia, in the first instance, and then country wide. All suppliers and subcontractors are required to subscribe to the relevant strategies in the IPP and cascade them to all tiers of their supply chains.

Furthermore, the Participants have agreed to use their best endeavours to provide employment to Aboriginal People and must provide opportunities for Aboriginal Enterprises to tender for subcontract works to provide goods and/or services to the Project.

Sustainable considerations are integrated into the procurement process at the early stage via:

- Main Roads WA contract documentation such as BDC and SWTC sustainability requirements and initiatives;
- Design Value Engineering and Innovation Process;
- Design Reports including Sustainability considerations;
- Sustainability Impact Scoring of procurement packages;
- Communication of Project sustainability commitments early on to potential suppliers and subcontractors;
- Inclusion of specific sustainability requirements in specifications and scope of works for packages identified as having high sustainability risk/impact;
- Supplier acknowledgement of Project's sustainability expectations by signing Supplier Code of Conduct;
- Non-commercial evaluation of shortlisted tenderers which includes quality, environment, sustainability, previous experience, safety, local and aboriginal participation considerations;
- Early engagement with the key suppliers; and
- Sustainability commitments and compliance management written into contracts and measured via Monthly Reporting



Figure 6: 20% DCT Target to procure from smaller contracting companies

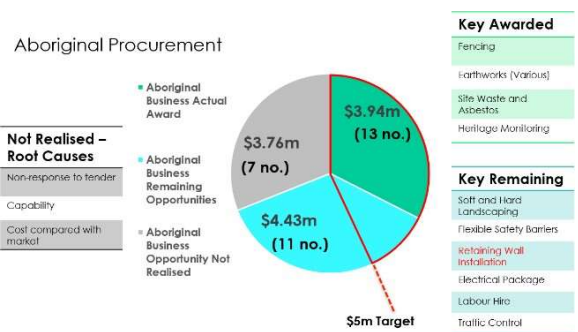


Figure 7: \$5m Target for Aboriginal Owned Businesses

Local Contractors

The Project committed to allow opportunities for smaller contracting companies to participate in the Project and to award separate packages of work to a range of contractors who are prequalified with Main Roads. The aggregate value of these packages must be a minimum of 20% of the Direct Cost Target (DCT).

Aboriginal Procurement

The Project team committed to provide employment opportunities to Aboriginal Persons and subcontract and supply opportunities for Aboriginal businesses throughout the Project.

The following Key Performance Indicators (KPIs) have been adopted:

- To drive Aboriginal employment towards the target of 10% of construction man hours worked

- To drive progress towards a target spend of \$5 million on engagement of Aboriginal Owned Businesses
- To drive Aboriginal training across the project to contribute to long term sustainable skill building and employment
- To drive Cultural Awareness activities during the project on site.

Climate Change Assessments

Climate Change Adaptation Plan was developed for the Project to understand the direct and indirect impacts of natural hazards and climate change on the ARNLR project.

Table 3: Summary of key climate projections for the ARNLR project.

Maximum Temperature	↑↑
Frequency and duration of warm spells	↑↑
Precipitation intensity	↑
Time in drought	↑↑
Sea level rise	↑↑
Fire weather	↑↑
Wind speed in winter	↓↓
Wind speed in summer	↑
Confidence level	
Low	High

The key historical natural hazards in the Perth region include storms (including cyclones), heavy rain and flooding, heatwaves, bushfires, earthquakes and tsunamis. Climate change is likely to exacerbate many of the climate-related hazards into the future. A summary of the projected changes to the climate is provided in Table 3.

The risk assessment process identified and assessed 53 risks, most of which are related to the implications of increasingly variable rainfall on local and regional flooding, as well as temperature-related climate variables. The flooding category has the highest number of risks to the project.

Table 4: Summary of climate and natural hazard risks to ARNLR.

Key impact elements of the asset associated with the highest number of climate risks include:

Climate Variable	Low	Moderate	High	Very High
Hot days	1	8	1	0
Heatwaves	0	6	0	0
Average temperature	0	1	0	0
Droughts	0	1	0	0
Flooding	4	15	1	0
Storms and wind	0	6	0	0
Hailstorms	1	3	0	0
Bushfire weather	0	3	0	0
Earthquakes	0	1	0	0
Tsunamis	0	1	0	0

Structures

Adaptation Controls:

- Provision of asset management plans incorporating control and observation measures for the client
- Increase in servicing and maintenance needs for asset

structural elements

- Replacement with higher thermally ranged materials at end of asset life.
- Ensuring the noise wall posts (free ends) need to be designed appropriately for increasing climate change related intensity of storms and wind.

Pit and pipe infrastructure

Adaptation Controls:

- The latest version of basin design software PC Sump (v6.0) allows for the implementation of increased rainfall per Australian Rainfall & Runoff Interim Climate Change Guidelines (2016) using a simplification process. The effective service life for the drainage basins is based on the minimum design life for pavement, which is 40 years. The consequences of impact on performance and exposure risk to climate change for drainage basins have been judged to be medium, and therefore a 5% increase to design rainfalls has been applied due to climate change.

Sustainable Transport

The project includes a principle shared path (PSP) on both sides of the carriageway which will improve cyclist and pedestrian safety. However, one of the major Project concerns is safety for vulnerable off-road users at the two roundabouts at Solomon Road and Tapper Road with commercial, residential estates and train/bus stations being within the immediate vicinity of the intersections. A Trauma Review Group was formed to specifically consider pedestrians and other Vulnerable Road Users (VRU's) at intersections of Solomon Road and Tapper Road. The final agreed pedestrian facilities can be summarised as:

- A 4.0m wide PSP on the north side of Armadale Road with at-grade crossings of side roads, linking the Kwinana Freeway PSP with the PSP to Armadale, with connecting paths to the Cockburn Central rail station.
- A shared path on the south side of Armadale Road from Tapper Road to Beeliar Drive.
- A signalised pedestrian crossing roughly midway between Solomon Road and Tapper Road with an underpass under the main carriageways of Armadale Road, providing the main movement corridor between the commercial area to the north and the residential area to the south.
- An uncontrolled crossing on the west side of Solomon Road roundabout.

The Project also includes a separate principal shared path along the Freeway for cyclists and pedestrians.

For users of public transport, the Project will improve access to/from Cockburn Central Train Station and alleviate heavy congestion around the station car park during peak times. Better, more

reliable access to the train station will support the growth of Cockburn Central as a transit oriented hub and complement construction of the Thornlie-Cockburn Link as part of METRONET.

Population in the City of Cockburn is forecast to grow to over 170,000 residents by 2031, from 106,000 in 2015, which will increase pressure on the road network. Provision of key transport infrastructure is considered critical to the ongoing, sustainable development of the corridor.

Benefits Realisation

Benefits are managed on the Project via Risk & Opportunity Assessment Process. A standalone Benefits Realisation Plan was not developed for the Project.

Technology and Innovation

Value workshops have been held during the design development stage to ensure that the design optimises innovation and maximises value including time and cost benefits over the whole of life for the Project. Design and Construction Interface Manager and design partners further interrogated the design solutions during detailed design and reviewed functional analysis of design against contract requirements. Items for Value Engineering included the aspects of geometric, drainage and structural design including a number innovations that will be included as part of the ISCA Design Rating submission.

Equity and Distributional Impacts

There is no significant equity or distributional impact from the Project.

Case Study – Supply Chain Day

Supply Chain Day was held on the Project at the early procurement stage to educate potential suppliers on Project Sustainability Requirements and on Main Roads WA key sustainability issues, as well as some evolving sustainability topics like circular economy and modern slavery. Presentation was led by Supply Chain School and had circa 50 potential suppliers in attendance. Supplier Workshop presentation is available at:

<https://www.supplychainschool.org.au/learn/partner-landing-pages/armadale-road/>

Social Aspects Performance

At a glance

Social Aspect	Year to 30 June	Total for Project
Community Satisfaction to Project	Varies based on the results of Community Sentiment Survey – available upon request	Varies based on the results of Community Sentiment Survey – available upon request
No. of Stakeholders engaged with during project development	See Appendix 3	See Appendix 3
No. of complaints	143	143
No. of legacy commitments	0	0
No. of heritage sites in project vicinity	0	0
No. of heritage sites significantly impacted	0	0
No. of traffic safety incidents within project boundary	0	0

Percent of women in workforce	N/A	N/A
Percent Indigenous in workforce	6.7%	6.7%
LTIFR	0	0
No. of hours training during project	350	350
No. of development employees and apprentices on the project	24	24
No. of employees (FTEs) sourced from local community	N/A	N/A

Social context

Key stakeholders involved in the Project are summarised in the map below and further detailed in the Appendix 3.



Figure 8: Key Stakeholders map

The key community and stakeholder impacts resulting from project design, planning and construction include:

- Noise walls
- Accommodation works
- Property access
- Visual amenity
- PTA car park
- Intelligent Transport Systems (ITS)
- Local Government Access (LGA) roads

These are managed by a dedicated community and stakeholder engagement team that works closely with all interested and affected residents, businesses and stakeholder groups. A construction reference group (CRG), consisting of members of the local community, government and stakeholder groups, has been formed and was meeting with the project team and Main Roads every three months to be updated on issues that may be of particular interest to community and stakeholder groups such as design of noise walls, landscaping, urban aesthetics and the PSP. To date, three CRG meetings were held and summaries can be found on project website:

<https://project.mainroads.wa.gov.au/home/armadaleroadbridge/Pages/default.aspx>

Social aspects performance is recognised as a key in achieving superior, above business as usual performance for the Project with five out of nine Key Result Areas (KRA) having social context (H, N, R, A, M) and three social KRAs being incentivised (N, R, A). Refer Table 5 and Table 6 below for further breakdown.

Table 5: KRA Relative Weightings for All Round Performance Score

KRA	% Relative Weighting
Health and Safety (H)	10.0%
Quality (Q)	12.5%
Timeliness (T)	10.0%
Environment and Sustainability (E)	10.0%
Cost (C)	10.0%
Network User Satisfaction (N)	12.5%
Reputation / Community and Stakeholder Engagement (R)	12.5%
Aboriginal Participation (A)	12.5%
Mental Health and Wellbeing (M)	10.0%
	100.0%

Table 6: Incentivised social performance KRAs and Associated KPIs

KRA	KPI Measures	% KPI	Current year 2020 to 30 June	Target Total for Project
Network User Satisfaction (N)	Reliability of journeys through the Kwinana Freeway southbound site during construction and installation (% time increase over pre-works time) (N1)	40%		+10% to 19% is Good
	Reliability of journeys through the Armadale Road works Westbound (% time increase over pre-works time) (N2)	20%		+10% to 19% is Good
	Reliability of journeys through the Armadale Road works Eastbound (% time increase over pre-works time) (N3)	20%		+10% to 19% is Good
	Minimise Closure Time of Kwinana Freeway PSP (N4)	20%	TBD	0 to 10 days early re-opening is Good
	Total KPIs	100%		
Reputation/Community and Stakeholder Engagement (R)	Positive Community Sentiment (R1)	50%		70% of survey respondents satisfied is Good
	Respond to All Community Queries and Complaints in Alignment with Main Roads	50%		Within 8 business days is Good

	Customer Service Policy of 10 Business Days (R2)			
	Total KPIs	100%		
Aboriginal Participation (A)	Aboriginal Employment (A1)	30%	5.98% total Project aboriginal hours	10% aboriginal hours
	Aboriginal Business Engagement (A2)	30%		\$5.5m
	Training (A3)	30%	7 Nudge Trainees	5-7 Nudge Trainees
	Cultural Awareness (A4)	10%	One Cultural Awareness training session	8-11 Cultural Training Sessions
	Total KPIs	100%		

Indigenous Opportunities – Public Art

As part of the community engagement, public art was identified as an opportunity for Aboriginal Participation on the Project, to increase both Aboriginal Participation, and provide local community ownership within elements of the project. Two emerging, Noongar artists Seantelle Walsh and Rohin Kickett, have been selected to produce digital works for the two Underpasses, roundabout treatments and Bridge 1828 Visual Screen.

As part of the Project Legacy, a number of interpretative nodes will be developed and integrated in the locations accessible to pedestrians. These nodes will include interpretative signage and a "Q Reader" that will direct people to a MRWA website containing the original artwork and narrative behind the artwork.



Figure 9: Underpass 9454 Artwork developed by Seantelle Walsh a local Noongar artist, to reflect the 'Noongar seasons' and 'layout of country'.

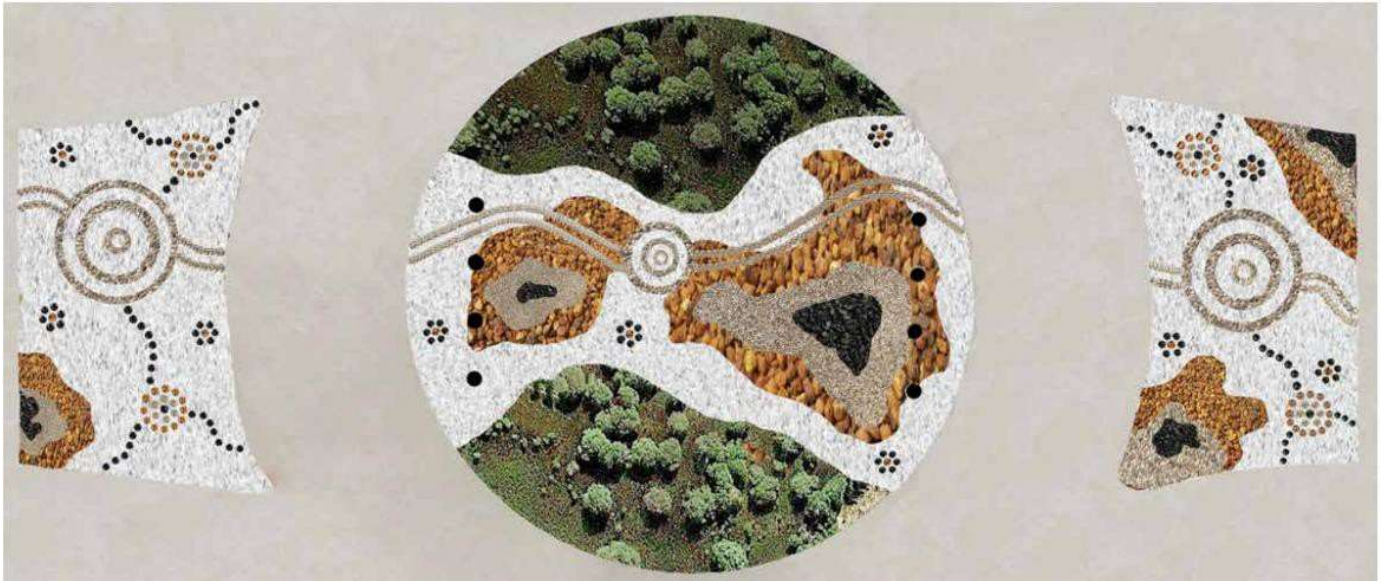


Figure 10: Original artwork by Rohin Kickett, a local Noongar artist, to reflect the wetland forms and layout of country. Bonded aggregate treatments based on this artwork will be used for the roundabouts at Bridges 1826, 1827 & 1828.

Community & Stakeholder Engagement (CSE)

The Community and Stakeholder Engagement team (CSET) is integrated within the project delivery team and responsible for the delivery of a comprehensive engagement program with the community and stakeholders throughout the Project. The Project will align with the Main Roads Armadale Road North Lake Road Project Communication and Stakeholder Engagement Strategy and will be managed based on Community and Stakeholder Engagement plan developed for the Project as well as dedicated CSE strategies for key construction elements that have high CSE risk.

CSE Case Study – Noise Walls

Noise wall design and construction is one of the key community impacts by the Project. There are twenty-two homes along Armadale Road that will have a noise wall installed adjacent to the current estate wall.

Extensive noise impact assessment and noise modelling was conducted during the Project design phase. Directly affected properties received an information pack in the letterbox about noise wall design and construction, and a series of invitation-only Q & A sessions were held. Many residents attended these sessions and asked questions about the noise wall design and construction stages.

Overwhelmingly the delivery and acceptance of noise wall information to these affected residents

were positive and well-received. Residents were advised about the elements of design which could have been influenced and which were non-negotiable. In this case, all residents understood the colour of the property-facing side of the noise wall was to be determined in part by the colour preferences registered by residents. Conversely, the 'Queenslander' style of the noise wall was a non-negotiable aspect of





noise wall design – this was widely accepted by residents and known to all early in the engagement process.

Figure 11: Noise Walls render images presented to residents during information sessions

Addressing community concerns

The Construction Reference Group (CRG) is a key forum to engage at an 'Involve' or 'Consult' level with stakeholders throughout the Project lifecycle. CRG meetings are held quarterly or at project milestones where required.

Additional avenues to manage community concerns employed by the Project are:

- Noise Management Plan developed in consultation with and approval from Main Roads and the City of Cockburn for all out of hours works
- Traffic disruptions and detour notices released to the public at least 21 days prior to scheduled works
- Dedicated CSE strategies developed for key elements
- Visual amenity including digitally engineered renders and 3D models utilised
- Local Government Authorities (LGAs) consulted at each stage of the Project where required
- PTA consulted with regards to the commuter car park at Cockburn Central train station and rail possessions
- Property Condition Surveys carried out by an independent, qualified assessors within the extent of the area that may be affected by the Project activity
- Access disruptions to residential and business properties managed as high priority and communicated to those directly affected in advance of implementation with adequate information and visual aids provided
- Qualified archaeologists engaged to identify and be present to supervise any excavations of buried European or Aboriginal material
- All communication about changes to the pathway network and access for pedestrians and cyclists communicated to the public at least 21 days prior to scheduled works

Heritage

An Aboriginal Heritage Survey undertaken for the Project recommended that Main Roads was allowed to proceed with the proposed Project without undue risk of breaching Section 17 of the AHA in relation to ethnographic Aboriginal heritage sites.

It was also recommended that Main Roads and the contractor gives due consideration to the Whadjuk WC2011/009 Native Title Claim group representatives' requests that:

- Aboriginal archaeological monitors be present during any ground disturbing works in order to observe any artefacts which may be uncovered as a result of the works

- Main Roads consults with the Whadjuk Working Party in regards to the process of salvaging and relocating artefacts pertaining from Aboriginal occupation of the land

Aboriginal monitors from a Noongar owned business are being present on site during ground disturbance works in certain areas to observe any artefacts which may be uncovered as a result of the works.

Case Study – Heritage Artefact Find

A number of Aboriginal heritage artefacts were discovered on site in January 2020 during clearing works. The site was secured following identification and works ceased in the immediate area. A Heritage Consultant from Terra Rosa attended site to assess the artefacts and record their location. A total of four items were identified including quarts and fossiliferous chert flakes and chips.

It was agreed amongst the Aboriginal heritage monitors that the artefacts should be removed from site and taken to the Terra Rosa office for storage. The artefacts will be stored there until a decision is made regarding whether they will be returned to their original location following project completion. The artefacts and fencing have now been removed from site and works have resumed in the area.



Refer

Figure 12 for Artefact A. This angular fragment of crystal quartz was identified by the Whadjuk Noongar monitors during ground disturbance works within the project area. The artefact is likely non-flake debitage i.e. a piece detached from a core, which is a tool with

flakes removed from its surface. It is likely that an artefact such as this

Figure 12: Artefact A

is associated with ceremonial and mythological locations, meeting places or camps in the wider area

Road Safety

The ROSMA (Main Roads WA Road Safety Management System) reduction target tool has been used to determine the required reduction in KSI (Killed and/or. Seriously Injured) crashes associated with the project.

Armadale Road to North Lake Road including Local Roads

The assessment was carried out for Year 2031 & 2060. The intersections Trauma Reduction Targets were met for 2031 and 2060. The road section Target was met for 2031 but not for 2060.

The Trauma Reduction Target is 70.2% for the intersections. The four existing KSI crashes are Head on, Rear End, Right Angle and Right Turn Through. The Project is to grade separate the existing at grade intersections at Tapper Road and Solomon Road, conversion of the existing traffic signal as roundabout and reduces the posted speed from 70 km/h to 60 km/h on the CD roads connecting to the roundabouts. The combination of the above treatments is likely to substantially exceed the target CRF. Therefore, it is recommended that no further safe system treatment selection or development is required.

The Trauma Reduction Target is 68% for the road section. It has not been determined at this stage whether or not the project can achieve this. It is recommended that the process moves to the

Treatment Selection stage where it will be determined whether or not the project is likely to

achieve the target. If the target is unlikely to be achieved the Project will be enhanced with other treatments so that the target is met.

Kwinana Freeway H015 Southbound SLK 15.90 to 20.60 including CD roads and ramps

The KSI crash reduction target this Project is 74%. The Project does not have the scope to fully address this, and achieves a KSI crash reduction of 53% based on the base case treatment (i.e provision of CD road, safety barriers, VMS, etc). However, implementation of ramp metering and point to point average speed cameras would enable the KSI crash reduction target to be met. A total KSI crash saving of 79% would be anticipated.

Traffic Management / Community Safety

The Traffic Management Plan has been prepared for the Project to ensure efficient and safe road access for public and site vehicular traffic and non-vehicular traffic through and around the site during the construction period of the ARNLR Project. The key approach to traffic management includes:

- Minimise road network congestion surrounding the Project site and minimise journey time delays, particularly during peak periods
- Minimise interference to traffic flow on and in the vicinity of the site in accordance with Main Roads Policy for Traffic Management at Roadworks on State Roads, and make adequate provision for the safe movement of all legal road users including permit vehicles
- Implement an effective TMP with minimal complaints from local businesses and residents
- Ensure the road safety of the public and the Project workforce for the Project duration
- Provide safe access and ensure continuity of the travel network for all modes of transport including vehicles, heavy vehicles, pedestrians and cyclists, for the duration of the Project.

The location of some of the Project interfaces with a variety of road categories, network requirements and road users are described below. The local road network, including the Kwinana Freeway and Armadale Road, service high volumes of traffic which in various locations at differing times tips over the capacity of some of the roads and intersections.

Table 7: Network Interfaces, Issues and Strategies

Area of Network	Interface Required	Key Issues	Strategies
• Kwinana Freeway	• Implement temporary road side barriers adjacent to traffic to separate construction activity from the passing traffic	• Road Safety Barriers require 80km/h traffic conditions yet more than 30+% of road users are exceeding the 100km/h speed limit thus implementing a false speed limit and increasing the risk of collision through excessive speed differential	<ul style="list-style-type: none"> • Reduce the lane widths on the freeway to create tighter driving environment that encourages drivers to be more cautious which inherently reduces the speed of the road users. • Where traffic demand permits, and through effective traffic modelling, reduce the number of lanes on the freeway to increase the density of vehicles on the road. This encourages drivers to be more cautious which inherently reduces the speed of the road users.

• Kwinana Freeway	• Kwinana Freeway closure	• Traffic congestion on Freeway lanes during lane closures • RAV network • PTA interface and timing	• Minimise closure of Freeway lanes required by efficient construction methods and where possible conduct lane closures at night.
• Kwinana Freeway	• Sufficient working room is required to construct the bridge piers on Kwinana Freeway north bound and south bound may require long term lane closures on the Kwinana Freeway	• Potential long term lane closures on the Kwinana Freeway may create congestion.	• Realign traffic lanes around the bridge piers as per the traffic staging diagrams to create enough space for traffic lanes to remain in use and maintain acceptable traffic flows.
• Armada Road	• Excavation of trench structure	• Interface between excavation footprint and material haulage movements •	• Interface between construction operations and traffic minimised by switching traffic to temporary alignments away from construction areas thereby removing large areas where this interface exists.
• Armada Road	• Cut to fill operations for roadworks	• Excavation footprints and construction areas interface with traffic. • Material haulage and movement of soil material by earthworks trucks.	• Interface between materials haulage vehicles and traffic will be minimised by switching Armada traffic to temporary alignments to create construction works areas where interfaces between construction and local traffic are minimised.
• Armada Road	• Closure of Solomon Road	• Temporary Solomon Road closure to enable construction, will affect road users looking to access Solomon Road	• During closure of Solomon Road, a temporary roundabout at the intersection of Armada Road and Tapper Road will be constructed, traffic needing access to Solomon Road will use this roundabout and access Solomon Road via Verde Drive.
• Armada Road	• Construction of Piers for Bridges	• Pier construction and formwork for concrete pours interfacing with traffic	• Pier formwork will require working room around the pier footprint, traffic will be managed and switched to temporary alignments around the bridge footprints where possible to reduce this interface.
• PTA Cockburn Central Carpark	• Construction work and rail commuters	• Potential change in access route for PTA rail commuters to Cockburn Station car park	• Rail commuters will follow the Verde Drive West extension to access the Cockburn Station PTA carpark.

All communication that relates to changes in road layout, disruptions and closures is being released to the public at least 21 days prior to scheduled work being undertaken or as soon as possible in the case of urgent non-scheduled work. The Project Team is working closely with Main Roads to provide information to the community in advance of traffic changes via:

- Formal updates to Main Roads and other key stakeholders;

- Roadworks notifications issued by EDM to Project email distribution list;
- Social media posts via Main Roads Facebook page;
- Newspaper advertisements (if required);
- Signage in key community areas;
- Main Roads media channels, website, etc.;
- Signage displayed at the site (VMB signs);
- Face-to-face consultations as required (including with the Technical Working Group);
- Email notification to select groups (e.g. businesses) as required; and
- Specific or ad-hoc initiatives as necessary.

Workforce Safety

The workforce safety is managed on the Project via the Safety and Health Management Plan (SHMP) in conjunction with the Rail Safety Management plan.

The Project Safety strategy is based on Next Gear which is a Laing O'Rourke approach to Safety based on three principles and five tools:

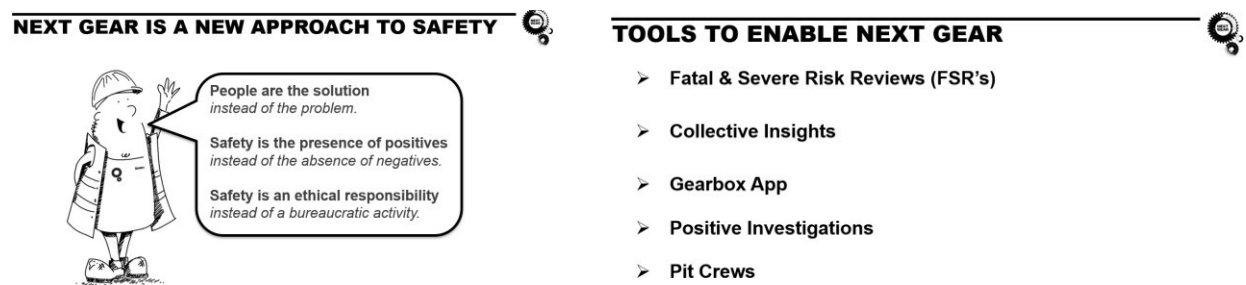


Figure 13: Next Gear Principles and Tools

The Next Gear is publicly available and further details can be found on <https://nextgearsms.com>

Project objectives and targets to improve workforce safety are:

Table 8: Project Safety Objectives and Targets

Item	Objective	Targets / Frequency	Progress to date
1.	Eliminate the occurrence of a Class 1 (fatality) and disabling injury	Zero fatalities and non-fatal permanent disabilities.	On track
2.	Project Senior Management to engage with the workforce	In accordance with Leadership Engagement System requirement, types of engagement activities available include: Facilitate a Collective Insight Conduct a Fatal and Severe Risk Assessment Facilitate formal HS engagement forum with the supply chain Facilitate a Positive Investigation Conduct a Leadership Engagement Visit.	Major focus on Fatal and Severe Risks (FSR) with booklets developed and given to everyone who comes to Site KPIs developed and maintained for in-field inspections including HSE Inspections, FSR Audits, Field Leadership Engagement for Alliance Project Personnel

3.	Site Induction	100% completion	On track
4.	Alcohol and Drug Testing	100% daily alcohol breath test for all persons prior to construction works. Random monthly drug screen for personnel working at the site. To comply with primary Standard Fitness for work as well as Building Code 2016 requirements.	On track
5.	Personnel attend Next Gear engagement workshop	100% completion by all permanent personnel.	On track

Community Amenity

Refer Sustainable Transport Section.

Diversity

The Project team committed to building a more diverse workforce and ensuring we have a fully inclusive culture.

The key focus and target groups for the Diversity and Inclusion are as follows:

- Female Participation – target of 10%
- Aboriginal employment - minimum 10% - man hours worked by Aboriginal persons
- Aboriginal business engagement - \$5 million spend with Aboriginal owned businesses
- Cultural awareness – Training and awareness activities implemented
- Unemployed people - Traineeships developed for local people

The Project Specific Action Strategies include:

- Events to promote Cultural Awareness, diversity, health and wellbeing
- Embed flexible work practices for the Project
- Detailed strategy for Aboriginal employment and business engagement
- Training partnership with NUDGE to effectively manage traineeships
- Career development for all personnel, including career discussions and development plans
- Mentoring program implemented on site for Aboriginal personnel
- Graduate and undergraduate opportunities
- Inclusive leadership training for senior management

Some Laing O'Rourke company wide initiatives supported by the Project include:

- Gender Diversity Action Plan – This plan specifically calls out Laing O'Rourke efforts around creating gender diversity, but does not take away from the importance of continuing to develop teams that are diverse in many ways.
- Supporting pay equity – Laing O'Rourke Managing Director, Cathal O'Rourke, has joined over 100 CEOs and directors across the country as a Workplace Gender Equality Agency (WGEA) Pay Equity Ambassador.

- Inspiring STEM – School engagement programme is designed to encourage more girls to enter STEM courses at university and ultimately follow careers in construction and engineering.
- Connecting Women Network – A programme of networking events provides a forum for connecting our women, role modelling careers, and building new networks for support and advice.
- Executive Diversity and Inclusion Council – The council includes a range of Laing O’Rourke Senior Leaders, who establish the direction for our diversity and inclusion agenda and monitor progress.
- Laing O’Rourke Code of Conduct, Parental Leave Policy and Flexible Working Policy also contain information relevant to Project commitment to the principles of diversity and inclusion.

Workforce Development

A detailed register of the skills and competencies for all personnel for the activities that the personnel will undertake during the Project is maintained and Training Needs Analysis matrix has been developed based on the legal on-boarding, training, Induction and VOC requirements.

Additionally, Alliance Team and Employee Development Plan has been prepared and includes the following employee development initiatives:

- “Knowing Our People” strategy which is a Laing O’Rourke approach to talent and succession, engagement, remuneration and benefits, learning and development, leadership and capability development
- Developing a Personal Development Plan (PDP), setting out development goals to be achieved over a 12-month period by each employee
- Career Conversations and Career Toolkits
- Next Gear workshops and tools
- Cultural awareness workshops
- Leadership programmes such as Engaging Leaders and Frontline Leaders
- Formal or informal mentorships
- Aboriginal traineeship

Case Study – Aboriginal Traineeship



Figure 14 Five new aboriginal trainees completing Project Inductions

With support of Nudge, the Project provided employment to five aboriginal trainees who will be completing a Certificate III in Civil Construction (delivered by Carey Training, a local Aboriginal Business). The trainees started on the Project in May 2020 and will spend time working directly with Project team and our subcontractors. The Nudge Good News Series shared this story on their website: <https://nudge.ngo/nudgegoodnews-7/>.

At the date of this Report, Certificate III Civil Construction Traineeships is underway with trainees having completed their second month on site.

Out of five selected trainees, one had to resign in early June for personal reasons. Alliance will be keeping in contact with him.

One applicant was offered a role in Traffic management with our subcontractor Highways and is settling into the role very well.

Carey Training (an Aboriginal Business) has now signed their contract and will deliver the first unit to the trainees in July for the traineeships; and the administration of the traineeship is being carried out by the Apprenticeship Community.

In June 2020, Project undertook discussion with Nudge and a nearby project to see if they had any trainees finishing up. The Project has interviewed two people who completed a Certificate II in December and will be starting at the Project and completing their certificate III with us. This is a good example of industry collaboration to provide long term employment and training outcomes for local Aboriginal young people.

Our Earthworks and plant hire companies continue to supply experienced Aboriginal operators of plant and equipment. Local Aboriginal small business Brindabella now have 100% Aboriginal Operators (4) on wet hire.

Appendix 1 - List of Protected Areas Project interfaces with:

The Project does not interface with any protected areas.

Appendix 2 - Protected fauna and flora species and habitat

Flora

No species listed as Declared Rare Flora or Threatened (T or X) under the Wildlife Conservation Act 1950 or as Threatened under the EPBC Act have been recorded within the Project area. Initial flora and vegetation surveys of the Project area didn't identify any Priority Flora species. Targeted orchid surveys were also conducted and did not identify any conservation significant orchid species within or immediately outside the Project area.

One Banksia Woodlands Threatened Ecological Community (TEC) occurs within the Project area with an area of 5.87 ha. The TEC was mapped as Degraded to Very Good, with variations representing weed infestations. In accordance with the Conservation Advice, for the TEC assessment the entire patch was classified as 'Good' condition, informed by weed foliage cover and species diversity.

Six remnant native vegetation types were identified and mapped, including:

- Banksia Woodland type BaHhMp (0.93 ha): inferred FCT23a, did not meet minimum condition and size threshold for TEC
- Banksia Woodland type BmEpEc (5.87 ha), inferred FCT23a, confirmed to represent the Banksia Woodlands TEC and Priority 3 PEC
- Banksia Woodland type BaXpEc (0.64 ha), considerably degraded, did not meet minimum size and condition thresholds for TEC, unlikely to represent PEC
- Wetland type MpAsHr (10.3 ha), locally and regionally significant for its hydrological and habitat refuge functions
- Wetland type EmAcOp (0.47 ha), mapped as degraded
- Marri Woodland CcAhEc (0.46 ha) isolated occurrence between noise wall and Freeway, inaccessible.

Fauna

Six species of conservation significance have been recorded within the project site and surrounding area, including:

- Carnaby's Cockatoo (*Calyptorhynchus latirostris*)
- Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*)
- Horsfield's Bronze Cuckoo (*Chrysococcyx basalis*)
- Magpie Lark (*Grallina cyanoleuca*)
- Australian White Ibis (*Threskiornis moluccus*)
- Quenda (*Isodon obesulus fusciventer*)

Eight fauna habitats have been defined within the Project area. The most common fauna habitat within the Project area, apart from Cleared Predominantly Bare Ground, is the Isolated Trees habitat at approximately 12%. This habitat generally comprises cleared, or partially cleared areas, with scattered isolated mature trees (including Tuart and Flooded Gum). This habitat would

support many of the common species of the area and may also be utilised by many of the conservation significant species such as the Forest Red-tailed Black Cockatoo (*Calyptorhynchus banksii naso*), Carnaby's Cockatoo (*Calyptorhynchus latirostris*), Perth Lined Skink (*Lerista lineata*), Quenda (*Isoodon obesulus fusciventer*) and Rainbow Bee-eater (*Merops ornatus*).

The eight fauna habitats identified within the Project area include:

- Woodland – 6.18ha (7.11%)
- Woodland with minimal understorey – 0.55ha (0.63%)
- Shrubland with minimal groundcover – 5.15ha (5.93%)
- Shrubland – 0.94 (1.08%)
- Isolated trees – 10.72ha (12.34%)
- Parkland and maintained gardens – 4.18ha (4.81%)
- Wetlands, riparian vegetation and drainage – 4.36 (5.01%)
- Cleared – predominately bare ground - 19.57 (22.51%)

Appendix 3 – List of Stakeholders to the project

Local Government

City of Cockburn (principal LGA)

City of Cockburn Councillors

City of Armadale (adjacent LGA)

Federal MPs

Federal Minister for Infrastructure

Member for Fremantle, Josh Wilson

Member for Burt, Matt Keogh

Other Government Agencies

Department of Prime Minister and Cabinet

Metropolitan Redevelopment Authority

Department of Planning

Department of Water and Environmental Regulation

Department of Biodiversity, conservation and Attractions

Department of Transport

Department of Aboriginal Affairs

Department of Fire and Emergency Services

St John Ambulance

Landcorp

WA Police

Road Users

Local media

The West Australian

The Sunday Times

Community newspapers

Metropolitan radio stations

Perth Now

WA Today

State

Minister for Transport, Hon. Rita Saffioti

State MPs

Member for Cockburn Hon. Fran Logan

Member for Kwinana Hon. Roger Cook

Member for Jandakot Mr Yaz Mubarakai

PTA and Metronet

Local Businesses

Local residents, special interest groups

Construction Reference Group

Other Local business operators and nearby owners

Whadjuk People

South West Aboriginal Land and Sea Council (SWALSC)

Local Residents

Atwell Community Association

Banjup Residents Group

Cockburn Resident Groups

Treeby Community Association

Schools

Project Team

Armadale Access Alliance

Social media

Facebook

Twitter

Appendix 4 – Glossary of Terms

N/A