



# **Byford Rail Extension – Thomas Road over Rail: Project Annual Sustainability Report 2021/2022**

Prepared by the Armadale Access Alliance Contract 237/16

This annual report covers the period from 1/07/2021 to 30/06/2022. This is the first annual report to be prepared for the project.

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## Approval for Publication

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## Disclaimer

All information was true and accurate at date of publication. Data is subject to change pending audits, verifications, and reviews.

## Abbreviations and Acronyms Table

Abbreviation	Full Form
AAA	Armadale Access Alliance, also referred to as “the Project”
ASS	Acid Sulfate Soils
CAR	Clearing Assessment Report
CBD	Central Business District
CEMP	Construction Environmental Management Plan
CRC	Crushed Recycled Concrete
CSE	Community and Stakeholder Engagement
DAWE	Department of Agriculture, Water and Environment
DBCA	Department of Biodiversity, Conservation and Attractions
DWER	Department of Water and Environmental Regulation
DWQMP	Dewatering Water Quality Management Plan
EPA	Environmental Protection Authority of Western Australia
FSR	Fatal and Severe Risk
GHG	Green House Gas
GJ	Megajoule; Gigajoule: unit of energy which is equivalent to 1 billion Joules
GRI	Global Reporting Initiative
GRI	Global Reporting Initiatives
ha	Hectare(s)
HSELT	Health, Safety, Environment Leadership Team
IPP	Industry Participation Plan
IS	Infrastructure Sustainability
ISC	Infrastructure Sustainability Council
KL	Kilolitre
km	Kilometre(s)
KPI	Key Performance Indicator
KRA	Key Result Area
KSI	Killed and/or Seriously Injured
LTIFR	Lost Time Injury Frequency Rate
m	Metre(s)
Main Roads	Main Roads Western Australia
MNES	Matters of National Environmental Significance
NGA	National Greenhouse Accounts
PASS	Potential Acid Sulfate Soils

Abbreviation	Full Form
PEIA	Preliminary Environmental Impact Assessment
PSP	Principle Shared Path
RAP	Reclaimed Asphalt Pavement
ROSMA	Main Roads WA Road Safety Management System
SCM	Supplementary Cementitious Materials
SER	Severe Environmental Risk
SHMP	Safety and Health Management Plan
STEM	Science, Technology, Engineering, Mathematics
SWALSC	South West Aboriginal Land and Sea Council
tCO <sub>2</sub> e	Tonnes of carbon dioxide equivalent
TEC	Threatened Ecological Community
TMP	Traffic Management Plan
TPZ	Tree Protection Zone
TRIFR	Total Recordable Injury Frequency Rate

# Table of Contents

1	About this Report.....	8
1.1	Purpose.....	8
1.2	Sustainability Statement.....	8
1.3	Highlights.....	9
2	Project Overview.....	11
2.1	Locality and Scope.....	11
2.2	Value and Funding .....	11
2.3	Delivery Agents/Partners/Contractors .....	11
2.4	Project Timeline .....	12
3	Governance.....	13
3.1	Approach to Sustainability .....	13
3.2	Material Sustainability Issues.....	13
3.3	Sustainability Targets.....	13
3.4	Climate Change Assessments.....	16
3.5	Technology and Innovation .....	17
4	Economic.....	18
4.1	Key Economic Context .....	18
4.2	Key Economic Outcomes .....	20
4.3	Sustainable Procurement and Buy Local.....	21
4.4	Sustainable Transport.....	22
4.5	Economic Case Study .....	23
5	Environmental.....	24
5.1	Environmental Context .....	25
5.2	Environmental Management .....	26
5.3	Water Management.....	27
5.4	Vegetation .....	29
5.5	Carbon Emissions and Energy.....	30
5.6	Materials and Recycling.....	32
5.7	Noise and Vibration .....	35
5.8	Air Quality .....	36
5.9	Light Spill.....	36
5.10	Contamination .....	36
5.11	Acid Sulfate Soils.....	36
5.12	Environmental Case Study.....	37
6	Social.....	39

6.1	Social Context.....	40
6.2	Community and Stakeholder Engagement.....	41
6.3	Community Satisfaction and Amenity.....	42
6.4	Heritage.....	43
6.5	Road Safety.....	43
6.6	Diversity.....	44
6.7	Traffic Management & Community Safety.....	45
6.8	Workforce Safety.....	46
6.9	Legacy Commitments.....	47
6.10	Social Case Study.....	48
7	Reference List.....	49
8	Glossary.....	52
9	Appendices.....	53
	Appendix 1 – List of Project Stakeholders.....	54

## Tables

Table 1	Key Initiatives and Outcomes.....	9
Table 2	Project Sustainability Targets.....	14
Table 3	Summary of key climate projections for the Thomas Road over Rail Project.....	16
Table 4	Summary of climate and natural hazard risks to the Thomas Road over Rail Project.....	16
Table 5	Summary of Economic Aspects.....	20
Table 6	Summary of Environmental Aspects.....	24
Table 7	Resource and Waste Summary.....	24
Table 8	Environmental Allowances, Approvals and Permits.....	27
Table 9	Water Parameters.....	28
Table 10	Energy Parameters.....	31
Table 11	Imported Raw/Traditional Materials for the Project.....	33
Table 12	Imported Recycled Materials for the Project.....	34
Table 13	Materials Reused on the Project.....	35
Table 14	Summary of Social Aspects.....	39
Table 15	Project Diversity Statistics.....	44
Table 16	Workplace Safety KPI Performance.....	46
Table 17	Glossary of Terms.....	52

# Figures

Figure 1 SiteHive Hexanodes.....	9
Figure 2 The Project Garden .....	10
Figure 3 Equine Underpass.....	10
Figure 4 Project Location and Scope.....	11
Figure 5 Project Timeline.....	12
Figure 6 SJ 2050 Vision Outcomes (Hames Sharley 2016) .....	19
Figure 7 Rail Corridor facing north, showing completely degraded vegetation.....	26
Figure 8 Existing Vegetation Types and Black Cockatoo Trees .....	29
Figure 9 Energy Impacts.....	30
Figure 10 Toyota Rav 4 Hybrid cars utilised on the Project.....	31
Figure 11 Base Case Materials GHG breakdown .....	32
Figure 12 Tree Protection Zones .....	37
Figure 13 Additional TPZ protection measures (concept sketch left, site photograph of applied protection right) .....	38
Figure 14 Aerial Context Map of Figure .....	39
Figure 15 Existing Bridle Trail adjacent to Project works alongside property line .....	40
Figure 16 Perth Homeless Support Group Volunteer Day .....	43
Figure 17 Legacy Initiative - Underpass 9527 under construction to facilitate future bridle path and PSP .....	47
Figure 18 School Nature Play (top left: before photo, top right: opening, bottom: final product) .....	48

# 1 About this Report

## 1.1 Purpose

This report has been prepared for the Thomas Road over Rail Project (herein 'the Project'). This report was compiled by the Armadale Access Alliance (AAA) on behalf of Main Roads Western Australia (herein after 'Main Roads'). This report will accompany the Main Roads Annual Sustainability Report and will ultimately be integrated into the Main Roads Annual Report. The report content is prepared in accordance with Global Reporting Initiatives (GRI) principals. This report summarises the sustainability initiatives and potential environmental, social, and economic impacts of the Project. Material topics reported in this report have been determined through a materiality process that adheres to Infrastructure Sustainability Council (ISC) and GRI principles

## 1.2 Sustainability Statement

The design and construction of the Thomas Road over Rail Project will be undertaken in a manner that builds upon the intent of both the [Main Roads WA](#) and [Laing O'Rourke Sustainability Policies](#). The Project sustainability objectives and initiatives are aligned with the [Main Roads Sustainability Policy](#), which is underpinned by six key aspects: Sustainable Transport, Climate Change, Environmental Footprint, Behaviour, Governance and Performance, and Funding and Financing.

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*"The Armadale Access Alliance (AAA) is committed to the delivery of the Thomas Road over Rail Project in a way which seeks to provide a grade separated crossing of the rail line whilst ensuring the social, environmental, and economic aspects of the Project are delivered in the most sustainable and practicable manner possible."*

*– Michael Crocetta, Project Director*

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### 1.3 Highlights


The Thomas Road over Rail Project is located on Thomas Road between South Western Highway and Wungong South Road within the suburbs of Darling Downs and Byford. It is comprised of the design and construction of a new dual lane single span bridge over the rail line with provision to accommodate four rail lines, a Principal Shared Path (PSP), equine path and a maintenance track. A secondary bridge over Butcher Road as well as construction of a new adjacent Shared Path and Noise/Screen Walls also form the project works.

The top sustainability material topics were identified via a materiality assessment at the beginning of the Project and, in order of rated importance, were:

1. Noise, Vibration, Air Quality & Light Pollution
2. Urban and Landscape Design
3. Stakeholder Engagement
4. Sustainable Procurement

Key Initiatives and their outcomes are summarised in below Table 1.

Table 1 Key Initiatives and Outcomes

Key Initiatives and Outcomes	
<p><b>Energy Efficiency</b></p> <p>Modelling completed during the design stage of the Project indicates an energy saving across the asset’s lifecycle of 17% in comparison to the base case model. Key initiatives leading to the most significant energy savings include:</p> <ul style="list-style-type: none"> <li>• Use of LED lighting, saving ~157.5 tCO2e during asset operation</li> <li>• The revegetation of an area larger than the cleared area, saving ~44 tCO2e</li> <li>• Grid connected site office and facilities rather than diesel generators, saving ~20.3 tCO2e</li> </ul> <p>The use of three hybrid cars in place of three diesel utes, saving 20.1 tCO2e</p>	
<p><b>Use of SiteHive Hexanodes</b></p> <p>The Armadale Access Alliance (AAA) have been trialling SiteHive monitoring equipment on the Thomas Road Over Rail Project. This is the first time SiteHive devices have been used in Western Australia. The SiteHive Hexanode is a digital, multi-sensor monitor which measures both noise and dust. There is also the capability for third party integration, which allows integration of analogue monitoring devices (e.g., vibration monitors). The Hexanodes are a small lightweight device, making them a lot easier to move compared to traditional analogue monitoring systems. They also provide real time data that can be accessed 24/7. While the remote data access capabilities are similar to other online platforms used previously, SiteHive’s intelligent cloud software has a number of new and unique features. This includes directional sound maps, image capture, audio recordings, as well as the ability to explain events, create rules and set trigger levels based on Project criteria. These features all help to efficiently investigate and explain criteria exceedance as they occur.</p>	 <p>Figure 1 SiteHive Hexanodes</p>
<p><b>Tree Protection Zones</b></p> <p>Where trees along the edge of the Project footprint were to be retained, each tree was assessed individually, and a tree protection zone was established. In accordance with the original DA conditions for the subdivision the use of the tree protection zones was to prevent adverse impacts on the future tree’s health via construction activities within proximity.</p>	

### Aboriginal Engagement

The Project team committed to provide employment opportunities to Aboriginal persons and subcontract and supply opportunities for Aboriginal businesses throughout the Project. As of June 2022, the Alliance has a planned spend of \$1.49 million direct with Aboriginal businesses and has engaged six different enterprises. The Project has also achieved a total of 9071 hours worked by Aboriginal people, which equates to 11.69% of total hours on the Project. Furthermore, the Project has facilitated 3 apprenticeships for Aboriginal people to date.

### Diversity

Laing O'Rourke has a global target of 50/50 gender balance among staff by 2023 which has been a key driver in facilitating a more diverse workforce on the Project. The number of direct FTE staff on the Project is made up of 32% female, inclusive of women in roles such as engineering and management. When considering the wider workforce including subcontractors, traffic controllers, truck drivers etc., the makeup of people on site averages 12% females.

### Project Garden

The Project has implemented a small vegetable garden at the Project office as a wellbeing and connectivity initiative. The garden utilising a living worm farm which is fed via the office food scraps, fertilised with office coffee grindings, and watered with captured rainwater. Harvested crops are shared amongst team members and meals have been prepared from the harvested vegetables and shared with the team, showcasing its opportunity to provide a sense of community and connectivity. The effects of gardening have been known to provide mental health benefits and the garden provides a place for people to connect and take a break which contributes to the Alliance's [5 Ways of Wellbeing](#) campaign.



Figure 2 The Project Garden

### Interactive Events

The Project has committed to undertaking community interaction events with local community groups. As of June 2022, the Project has undertaken three interaction events including:

- Perth Homeless Support Group where team members volunteered their time to assist in food preparation, provided needed items and monetary donations
- Serpentine-Jarrahdale Shire Presentation and Site Tour where the Project provided a technical presentation and a site walk tour to some of the Project's key stakeholders.

Donation of logs to a local school, creating a new nature play area

### Equine Underpass

A key legacy initiative implemented in the Project was the provision made within the design to incorporate a bridle path crossing underneath Thomas Road in the form of an underpass. The underpass (Underpass 9527) has been designed with sufficient clearance to allow for a future Principle Shared Path (PSP) as well as a future bridle path which will allow a safe passage for equine traffic from the north to south side of Thomas Road. The initiative resulted from engagement with a key stakeholder, the Shire of Serpentine-Jarrahdale Equine Advisory Group, and will form part of the Shire of Serpentine-Jarrahdale Equine Trails Masterplan



Figure 3 Equine Underpass

## 2 Project Overview

During August 2020, the Armadale Access Alliance (AAA) was awarded an additional Scope of Works to replace the existing Thomas Road level crossing with a road-over-rail bridge, the commencement of works forming part of the METRONET Byford Rail Extension. The Project forms part of the State Government's COVID-19 Economic Response Stimulus Package and will be designed and constructed under a collaborative alliance contract.

Once complete, the Project will make it easier for Byford residents to catch public transport into Armadale, and other centres on the route to the Perth CBD, opening new opportunities for employment, education and entertainment. The Byford Rail Extension will also act as a catalyst for further development in the future town centre, maximising the growth potential of the town.

Further details on how this package of works ties into the Byford Rail extension can be found on the Project website: <https://metronet.wa.gov.au/projects/byford-extension>.

### 2.1 Locality and Scope

The Project is located on Thomas Road between South Western Highway and Wungong South Road within the suburbs of Darling Downs and Byford (Figure 4). The Project falls within the Shire of Serpentine-Jarrahdale and comprises of the design and construction of a new dual lane single span bridge over the rail line with provision to accommodate four rail lines, a Principal Shared Path (PSP) and a maintenance track. A secondary bridge over Butcher Road as well as construction of a new Shared Path and Noise and Screen Walls also form part of the Project Works. Following the input from the stakeholder engagement, the scope of the Project was extended to include a new underpass to allow safe passage of pedestrians and equine users from the northern side of Thomas Rd to the southern side which is to be completed by the Byford Rail Extension Project.



Figure 4 Project Location and Scope

### 2.2 Value and Funding

The Thomas Road over Rail Project has a total value of \$75 million, with all funding provided by the State Government.

### 2.3 Delivery Agents/Partners/Contractors

The Project is delivered by the Armadale Access Alliance (AAA) which comprises Laing O'Rourke and BG&E in partnership with Main Roads Western Australia.

## 2.4 Project Timeline

The Armadale Access Alliance (AAA) was awarded the Thomas Road over Rail Project as a scope variation to the Armadale Road North Lake Road Project in August 2020 (Figure 5). The Project’s materiality assessment was completed in June 2021 as detailed in Section 3.2. A base case was developed in November 2021 as a benchmark to measure project sustainability initiatives and improvements.

Early construction works including the diversion of traffic and services on the Project commenced from December 2020 in parallel to design development. All design packages except the Urban Design and Landscaping are now complete, with the last two packages due to be complete early September 2022. Construction is currently underway with an anticipated completion date of mid-2023.

The Project is currently undertaking a self-assessment against the Infrastructure Sustainability (IS) Design and As Built Rating Tool (version 2.0). The design component of the self-assessment is expected to be completed in September 2022. The As Built component will be ongoing throughout construction, with a final assessment to be completed once the overall construction works are complete.

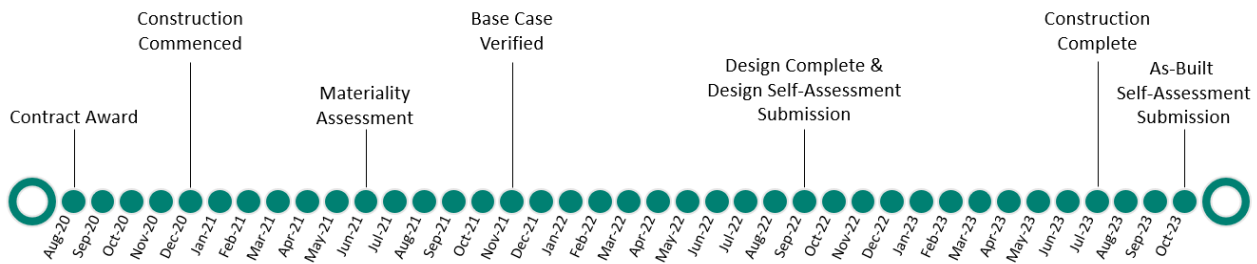


Figure 5 Project Timeline

## 3 Governance

### 3.1 Approach to Sustainability

AAA have utilised the learnings and management systems from the Armadale Road to North Lake Road Bridge Project to guide the approach to sustainability. The design and construction of the Thomas Road over Rail Project will be undertaken in a manner that builds upon the intent of both the [Main Roads WA](#) and [Laing O'Rourke](#) Sustainability Policies, whilst maintaining a large focus on wellbeing and giving back to the community.

The Project's sustainability objectives and initiatives are aligned with the [Main Roads Sustainability Policy](#), which is underpinned by six key aspects: Sustainable Transport, Climate Change, Environmental Footprint, Behaviour, Governance and Performance, and Funding and Financing. Key initiatives and their outcomes have been detailed in Section 1.3.

Sustainability on the Project is undertaken as per the Project's Sustainability Management Plan. To integrate sustainability into the general Project functions of management, procurement, stakeholder and community engagement, environment, safety, design and delivery, each function has a sustainability champion to represent it. The Project's Sustainability Advisor coordinates regular meetings with the sustainability champions to discuss general progress, risks and opportunities, initiatives, and performance against Project targets.

The Project is not required to undertake a formal assessment via the Infrastructure Sustainability Council (ISC), however are still utilising version 2.0 of the Design and As Built rating tool to encourage innovation and positive project outcomes. AAA are currently targeting a score of 40 points, with the interim self-assessed design rating to be reviewed by Main Roads in quarter three of 2022.

### 3.2 Material Sustainability Issues

During the early stages of the Project, AAA undertook an assessment with internal stakeholders to identify the priority sustainability topics that should be included in the sustainability plan, strategy and targets. This materiality assessment was conducted in accordance with Infrastructure Sustainability Council (ISC) and Global Reporting Initiatives (GRI) principals. The materiality assessment identified seven categories to be of high materiality. There were, in order of ranking;

- Noise
- Vibration
- Air Quality
- Light Pollution
- Urban Landscape Design
- Stakeholder Engagement, and
- Sustainable Procurement

### 3.3 Sustainability Targets

The sustainability targets were developed by AAA with consideration of the results of the materiality assessment, the Main Roads WA and Laing O'Rourke Sustainability Policies and the IS version 2.0 rating tool. Targets have been developed to align with the IS categories and the Project's Key Result Areas (KRAs) and have been detailed in Table 2. These have been further utilised by the Project to inform and encourage the Project's sustainability initiatives.

Table 2 Project Sustainability Targets

Aspect	Impact	Target	Currently Tracking as of June 2022
Urban Design	Active Transport	90% of users are satisfied that the Urban and Landscape Plan has been successfully implemented	To be determined. Design not yet complete
Sustainable Procurement	Human Right Compliance	100% Supplier & Subcontractor acknowledgement of Code of Conduct	On Track
	Human Right Compliance	100% of suppliers for at risk countries are evidence checked for human right compliance	On Track
	Compliance with environment and fair operating practices impact areas	100% Procurement Packages are evaluated based on commercial and non-commercial multiple criteria	On Track
	Local Procurement	100% of workforce live locally in WA 90% material supply items from within Western Australia	On Track
	Sustainable Labels	2% of the total value of all products must have sustainable labels	To be determined Evaluation not yet complete
Resilience	High or Above Climate Risks mitigated	100% of High or Above Climate Risks mitigated	Achieved
Energy and Carbon	Energy reduction targets	5% carbon reduction compared to a base case footprint	Tracking Above Target
Environmental Impacts	Major Environmental Incidents	Zero Major Environmental Incidents	On Track
	Environmental Lead Indicators	>90% completion of scheduled activities to raise awareness towards positive environmental outcomes (Environmental & Sustainability inspections, toolbox talks and knowledge sharing)	On Track
	Noise Impacts	No recurring or major exceedances of the noise goals during construction and operations	On Track
	Light Pollution	No light spill above allowable criteria during construction and operations	On Track
Resource Efficiency	Material Reduction	5% reduction in materials lifecycle impacts compared to a Base Case footprint	To be determined Evaluation not yet complete
	Recycled Materials	>30% SCM (replacement of Portland Cement with Fly Ash or Slag in structural concrete)	Exceeding target for in-situ concrete. Precast concrete to be evaluated.

Aspect	Impact	Target	Currently Tracking as of June 2022
	Landfill diversion targets	Clean/Inert excavation spoil >95% re-use diverted from landfill Office resource outputs >70% diverted from landfill Other inert resource outputs >80% diverted from landfill	On Track  On Track  Behind
	Resource management (Acid Sulfate Soils, Contamination)	Contamination >65% onsite retention/re-use Treated Acid Sulfate Soil >85% re-use diverted from landfill (incl. >50% onsite re-use)	Not Applicable – contamination not yet realised on the Project.
Water	Water reduction targets	5% reduction in water use in construction and operational phases compared to a base case footprint	On Track
Ecology	Ecological Outcomes	Design will achieve a no net loss ecological outcome (offsets may be used)	To be determined - evaluation not yet complete.
Stakeholder Engagement	Positive community sentiment	>70% community survey respondents are satisfied with communication about the Project	To be determined - surveys not yet undertaken.
	Community Complaints resolution	<8 business day resolution of community queries and complaints	On Track
Aboriginal Participation	Indigenous Employment	10% construction man hours are Aboriginal employment*	Tracking Above Target (Currently at 11.7%)
	Aboriginal Training	>5 Formal Apprenticeships completed	On Track
	Aboriginal business engagement	\$1.5 million spent on engagement of Aboriginal Owned Businesses	On Track
Legacy	Positive Legacy Implementation	One priority legacy issue implemented	On Track
Heritage	Heritage assets and values	Zero damage to known and unknown cultural heritage sites	On Track
	Cultural Awareness	>8 Cultural Awareness activities (Cultural Awareness Training, mentoring, cultural events)	On Track
Workforce Sustainability	Mental Health Resilience	Score 4 (out of 5) or above on Mental Health Resilience surveys	To be determined - surveys not yet undertaken
	Improving Mental Health	>30 Mental Health wellbeing activities on the Project	On Track

### 3.4 Climate Change Assessments

A Climate Change Adaptation Plan was developed for the Project to understand the direct and indirect impacts of natural hazards and climate change on the Thomas Road over Rail Project. 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 for the Perth region is provided in Table 3.

Table 3 Summary of key climate projections for the Thomas Road over Rail Project

Climate variable	Projected change
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

#### 3.4.1 Risk Findings

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).

Table 4 Summary of climate and natural hazard risks to the Thomas Road over Rail Project

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



### **3.4.2 Key Impact Areas**

Structural elements were identified as the elements of the asset associated with the highest number of climate risks. The key climate impacts for structures included increased intensity of hot days, increased average temperatures, and flooding impacts.

Treatment options were identified and assessed for all risks, with feasible options implemented in the final design. Following treatment there were no residual extreme or high direct risks.

## **3.5 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. The 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.

## 4 Economic

### 4.1 Key Economic Context

#### 4.1.1 The Region

The City of Armadale is located 40 kms south-east of Perth, with Byford located a further 8 kms south. Both are identified as activity centres under the *State Planning Policy 4.2: Activity Centres for Perth and Peel*. Armadale is classified as a strategic metropolitan centre and Byford as a district centre (Western Australian Government 2010). As hubs for local services and social infrastructure, the intention of the activity centres is to:

- Reduce overall need to travel by bringing services closer to residential communities,
- Support the use of public and active transport modes, and
- Promote energy-efficient urban form (Infrastructure Australia 2020).

However, Infrastructure Australia (2020) reports that Armadale currently lags behind other strategic metropolitan centres across a range of economic indicators including the diversity of jobs and industries. It is suggested that this may be due to the lack of accessibility to public transport for residents located south-east of Armadale (Infrastructure Australia 2020).

The population is forecasted to grow rapidly in the area in line with the *Perth and Peel @3.5million* strategic document (Western Australian Planning Commission 2018). Significant medium and high-density residential development is a large contributor (Infrastructure Australia 2020) to the forecasted population of 100,000 people in the Shire of Serpentine Jarrahdale by 2050 (Hames Sharley 2016) (Government of Western Australia 2019). Data collected in 2016 indicates that of the shire's residents that are employed, 67.4% drive to work, 5.2% catch public transport, 1.6% walk, and 0.1% cycle (Shire of Serpentine Jarrahdale n.d.). It is anticipated that with the growth anticipated, lack of public transport network, lack of jobs in the local area (Lucid Economics 2018) and current car dependency trends demonstrated in these statistics, that the growing transport issues within Perth's south-east corridor are likely to become nationally significant over the next 15 years (Infrastructure Australia 2020).

In response to the *Perth and Peel @3.5million* strategic document (Western Australian Planning Commission 2018), the Shire of Serpentine Jarrahdale has developed a strategic growth framework named *SJ 2050* (Hames Sharley 2016). The vision aspirations centre around three pillars of people, place and prosperity. The vision outcomes are shown in the following Figure 6 and centre around healthy living, connectivity and amenity, greater transportation choice, economic development, enhancing culture, and protecting the environment.



Figure 6 SJ 2050 Vision Outcomes (Hames Sharley 2016)

The Shire’s strategic plans build on delivering *SJ 2050* and generally present community feedback that supports the need to improve connectivity with the wider region, improve transport networks, and improve public transport services (GHD 2020, Shire of Serpentine Jarrahdale 2019). Furthermore, the growth of the suburban area of Byford is expected to put increased pressures on local services and social infrastructure which need to be accommodated whilst being flexible and accessible.

#### 4.1.2 The Project

In April 2018, a joint media release between the Premier of Western Australia, Mark McGowan and the Prime Minister of Australia, Malcolm Turnbull, to announce funding for infrastructure projects to facilitate creation of jobs, stimulation of economic growth, and relieving congestion in Western

Australia, with the extension of the Armadale line to Byford on the list of METRONET projects included (Government of Western Australia 2018). The Thomas Road over Rail Project is an early facilitation package of works for the upcoming Byford Rail Extension Project, which was accelerated as part of the State Government's COVID-19 *WA Recovery Plan* (Government of Western Australia 2020) to save time and money in the construction of the Byford Rail Extension (Government of Western Australia 2020).

A summary of economic performance and aspects for the Project are detailed in Table 5.

Table 5 Summary of Economic Aspects

ECONOMIC ASPECT	UNIT	TOTAL THIS PERIOD	TOTAL FOR PROJECT
Funding Received	\$	40,779,756	70,779,756
Indigenous Enterprises	#	6	6
Disability Enterprises	#	0	0
People Employed by Supply Chain	#	359	359
Suppliers Engaged	#	113	113
Buy Local Spend	\$	30,348,437	30,348,437

## 4.2 Key Economic Outcomes

The Thomas Road over Rail Project is a core enabler for the Byford Rail Extension Project, with the separation of the scope of works due to speed up program and save money (Government of Western Australia 2020). Consequently, the key economic outcomes of the Project are demonstrated when viewing the Project holistically with the broader Byford Rail Extension.

The wider Byford Rail Extension Project is consistent with the approach to address the significant future growth in the region in the *SJ 2050* and *Perth and Peel @3.5million* strategic documents. The Project will provide the following benefits:

- Greater transport choice (Building for Tomorrow 2022) allowing for improved transport resilience by providing alternative options (Department of Infrastructure, Transport, Regional Development, Communications and the Arts 2022), provision of a more sustainable transport system (Infrastructure Australia 2020), an opportunity for behaviour change and reduction in car dependency (Department of Infrastructure, Transport, Regional Development, Communications and the Arts 2022).
- Improved connection to Perth CBD (METRONET 2022), the strategic metropolitan centre of Armadale and the wider Perth metropolitan area. This will improve access to critical functions such as employment and education (Infrastructure Australia 2020).
- Improve traffic and ease congestion via removal of level crossings (Building for Tomorrow 2022), elevation of Armadale station (METRONET 2022), and reduction in car dependency (Infrastructure Australia 2020). This further facilitates future growth identified in Section 4.1.1, addressing the associated increase in travel demand (Building for Tomorrow 2022) and need for efficient public transport (Department of Infrastructure, Transport, Regional Development, Communications and the Arts 2022).
- Improved safety, accessibility and connectivity for public transport users, road users, pedestrians and cyclists (METRONET 2022) (Building for Tomorrow 2022).
- New versatile public space incorporating improved urban form (METRONET 2022) (Infrastructure Australia 2020).

- Act as a catalyst for further community and economic development opportunities in the growing town centre of Byford and the strategic metropolitan centre of Armadale (Building for Tomorrow 2022) (Infrastructure Australia 2020). The impact on the Byford Town centre already shown with the release of the Shire of Serpentine Jarrahdale's *Byford Town Centre Master Plan* showing intention for the town centre to grow around the future train station, incorporating a nature play splash park and green space, a health hub, and an intergenerational hub including a community library, childcare centre, maternal and child health program, office space and a computer lab (Urbis 2022).
- Support the creation of jobs and growth of businesses during project delivery (Building for Tomorrow 2022).

To further elaborate on the benefits during project delivery associated with job creation and growth of businesses, the Thomas Road over Rail Project, in addition to the broader Byford Rail Extension Project can provide local jobs for people in the community and for Western Australians in alignment with the State Government's intentions of boosting jobs (Government of Western Australia 2018). The creation of local jobs directly provides a boost of jobs within the Shire of Serpentine Jarrahdale where the Shire's *Economic Development Strategy* has previously identified a job deficit (Lucid Economics 2018) where more residents worked in construction than in any other industry (Shire of Serpentine Jarrahdale n.d.).

Furthermore, the Project has already provided opportunities for Aboriginal businesses, Aboriginal people and women as summarised in Table 5, Table 14 and Table 15. Refer to Sections 4.3 and 6.6 for further detail.

## 4.3 Sustainable Procurement and Buy Local

### 4.3.1 Strategy

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 overarching Industry Participation Plan (IPP) to help achieve this objective and to ensure consistency with the State Government's Building Local Industry Policy. The IPP 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 & Aboriginal Participation Plan have been prepared by the Alliance Management Team incorporating the requirements of Main Roads IPP, 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 Alliance endeavoured to maximise opportunities to Western Australia, in the first instance, and then countrywide. All suppliers and subcontractors were 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 were required to make opportunities available for Aboriginal enterprises to tender for subcontract works to provide goods and/or services to the Project.

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

- Design Value Engineering and Innovation Processes
- 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 a 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

#### **4.3.2 Performance**

The Project has a total of five sustainability targets which specifically relate to sustainable procurement (refer to Table 2). In addition to these, the Thomas Road over Rail Project has achieved, to date, the economic aspects summarised in Table 5.

AAA is committed to provide employment opportunities to Aboriginal persons and subcontract and supply opportunities for Aboriginal businesses throughout the Project. As of June 2022, the Alliance has a planned spend of \$1.49 million direct with Aboriginal businesses and has engaged six different enterprises. The Project has also achieved a total of 9071 hours worked by Aboriginal people, which equates to 11.69% of total hours on the Project. Furthermore, the Project has facilitated three apprenticeships for Aboriginal people to date.

### **4.4 Sustainable Transport**

The Thomas Road over Rail Project forms part of the early works for the broader Byford Rail Extension Project. The Project's scope of works are detailed in Section 2.1. The Project design allows for the future Byford Rail Extension works which will create more accessible public transport for the local community and reduce traffic congestion with the removal of boom gates along with many other benefits detailed in Section 4.2.

Improvement of pedestrian facilities forms part of the Project scope including a new shared path along Thomas Road for the length of the Project removing the need for a pedestrian level crossing to cross the active rail line, a shared path on the south side of Thomas Road between Plaistowe Boulevard and Hay Road, and a footpath along Butcher Road connecting to Vlasich Road. Further safety, connectivity, and accessibility improvements will be realised with the construction of the remainder of the Byford Rail Extension scope.

Sustainable transport options for the workforce during construction has also been considered with three hybrid Toyota Rav 4's replacing traditional inefficient site utes.

## 4.5 Economic Case Study

A key focus area and Key Performance Indicator (KPI) for the Project is to provide opportunities for Aboriginal people and businesses. As discussed in Sections 4.3 and 6.6, the Project is currently on track to achieve and potentially exceed the targets set out in Table 2. Supported by the policies of all participants of the Alliance, the Project's strategy is detailed in the Alliance's Aboriginal Participation Plan and consists of the following main principles:

- Direct Hire – Targeting opportunities within our Project delivery team
- Indirect Hire – Targets and supports in place across subcontracts to support Aboriginal employment
- Training and Development – Training partnerships and coordination of a Project wide program
- Support – Support our contract partners through resourcing, mentoring and trainee placement
- Procurement – Identification of opportunities for local Aboriginal businesses
- Relationship Building – Working in partnership with Main Roads and the local community to achieve a common goal
- Team Culture – A whole team approach to creating a culturally aware and supportive environment.

Achievements to date for work hours completed by Aboriginal people and facilitated apprenticeships are detailed in Table 5 and Table 15. Through procurement, the Alliance has identified and engaged with Aboriginal enterprises for the following packages of works, providing a planned spend of \$1.49 million. These include the following packages:

- Traffic Management
- Site Cleaning
- Bins and Waste Disposal
- Stationery and Office Supplies
- Fencing
- Labour Hire
- Streetlighting
- W-Beam Barriers

A stretch target has been identified of \$1.74 million which relies on packages still to be let including soft and hard landscaping.

## 5 Environmental

The Thomas Road over Rail Project is a brownfields project whereby the footprint encompasses the existing Thomas Road and the surrounding road reserve areas. The surrounding areas have typically been used as semi-rural land. Key environmental impacts identified for the Project are summarised in Section 5.1. A summary of environmental performance and aspects for the Project are detailed in Table 6.

Table 6 Summary of Environmental Aspects

ENVIRONMENTAL ASPECTS	UNIT	TOTAL THIS PERIOD	TOTAL FOR PROJECT
Native Vegetation Cleared	ha	0	0.02
Native Vegetation Retained (due to design)	ha	1.01	1.01
Revegetation/rehabilitation Undertaken	ha	0	0
Number of Trees Cleared	#	33	33
Number of Trees Retained (due to design)	#	17	17
Total Water Consumption	kL	15,943	18,777
Total Non-Potable Water Consumption	kL	15,756	18,543
Total Potable Water Consumption	kL	187	234
Non-Potable Water Replacement	%	98.8	98.8
Total Energy Consumption	GJ	162.71	180.83
Renewable Energy Mix	%	0	0

A summary of resource inputs and wastes for the Project are detailed in Table 7.

Table 7 Resource and Waste Summary

RESOURCE INPUTS AND GENERATED WASTE	UNIT	TOTAL THIS PERIOD	TOTAL FOR THE PROJECT
<b>Resource Inputs (Materials)</b>			
Total Quantity of Virgin Materials Used	t	158,889.9	162,495.9
Total Quantity of Recycled Materials Used	t	0	0
Total Quantity of Reused Materials Used Onsite	t	5,709.8	5,709.8
Percentage of Recycled Material Used	%	3.5	3.4
<b>Resource Outputs (Wastes)</b>			
Waste Sent to Landfill	t	225	225
Waste Diverted from Landfill	t	7,989	8,507
Total Waste Generated by Project	t	8,214	8,732
Waste Diversion Rate	%	97.3	97.4



## 5.1 Environmental Context

The Project area is located on Thomas Road between Plaistowe Boulevard and the South Western Highway, bordering the suburbs of Darling Downs and Byford. The Project will construct a grade separation of the road and rail corridors, with Thomas Road going over the rail. The coordinates of the current road and rail crossing area: -32.204900, 116.007312

Impact assessments for the Project were undertaken within a 5 km radius for the Project.

A Preliminary Environmental Impact Assessment (PEIA) was undertaken in December 2020 for the Project on the existing environment and the activities associated with the Project to evaluate the potential impacts the Project may have on key environmental aspects. Key potential impacts for the Project identified included:

- Removal of up to 0.64 ha of black cockatoo foraging habitat
- Removal of eight black cockatoo potential breeding trees, none of which contain suitable hollows
- Clearing of 1.03 ha of native vegetation in degraded to completely degraded condition
- Abstraction of water during construction, within an area of moderate to low risk of ASS and an area marked as a contaminated site
- Noise impacts on nearby residents
- Visual amenity impacts on residents due to bridge obscuring existing views.

The PEIA concluded that the Project was not required to be referred to the Western Australian Environmental Protection Agency (EPA) due to its small scale and low significance of its impacts to the surrounding environment. There was also no impact on Matters of National Environmental Significance (MNES) nor impact to Commonwealth land and therefore did not require referral to the Commonwealth Department of Agriculture, Water and the Environment (DAWE).

A biological survey was completed for the Byford Rail Extension Project in November 2019 by a botanist and ecologist which incorporated the Thomas Road over Rail Project area. The outcomes in relation to the Thomas Road over Rail Project area can be summarised as:

- No threatened flora was identified or located in or adjacent to the Thomas Road Project area
- Vegetation in degraded to completely degraded condition, with large, cleared areas (Figure 7)
- The area has been historically cleared, with sections of planted trees and constructed drainage basins throughout
- No naturally occurring watercourses or permanent water bodies occur within the Project area
- One small area (0.05ha) of remnant native vegetation remains, characterised as Eucalypt woodland
- No conservation significant fauna were recorded within the Thomas Road over Rail Project area

A subsequent site visit was conducted by suitably qualified environmental scientists in August 2020 to confirm the previous survey results. This assessment confirmed no further investigations were required and the environmental impact of the project has been adequately assessed.



Figure 7 Rail Corridor facing north, showing completely degraded vegetation

## 5.2 Environmental Management

The Project operates an Environmental Management System compliant with AS/NZS ISO 14001. This system is integrated with the health and safety management system and is known as HSEMS. The system includes three core components:

- System Requirements
- Environmental Primary Standards and
- Severe Environmental Risk (SER) protocols.

All works carried out on the site will be in accordance with:

- The approved Construction Environmental Management Plan (CEMP)
- The Environmental Management System compliant with AS/NZS ISO 14001
- All relevant Government Act and Regulations.
- Contractor's compliance obligations including mandatory requirements of the Contract.

Summary of the key environmental legislation impacting the Project:

- *Environmental Protection Act 1986*
- *Environmental Protection (Noise) Regulations 1997*
- *National Environment Protection Council Act 1994*
- *National Environment Protection (Air Toxics) Measure*
- *National Environment Protection (Ambient Air Quality) Measure*
- *National Environment Protection (Diesel Vehicle Emissions) Measure*
- *National Greenhouse and Energy Reporting Act 2007 (Cwth)*
- *National Greenhouse and Energy Reporting (Measurement) Determination 2008*
- *National Greenhouse and Energy Reporting Regulations 2008*
- *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989 and Regulations 1995 (Cwth)*
- *Environmental Protection (Ozone Protection) Policy Approval Order 2000*
- *Fuel Quality Standards Act 2000 and Regulations 2001(Cwth)*
- *Environmental Protection (Metal Coating) Regulations 2004*
- *Contaminated Sites Act 2003*
- *Contaminated Sites Regulations 2006*

- *National Environment Protection (Assessment of Site Contamination) Measure (Cwth)*
- *Environment Protection and Biodiversity Conservation Act 1999 (Cwth)*
- *Environment Protection and Biodiversity Conservation Regulations 2000 (Cwth)*
- *Heritage of Western Australia Act 1990*
- *Local Government Act 1995*
- *Planning and Development Act 2005*
- *Planning and Development Regulations 2009*
- *Bush Fires Act and Regulations 1954*

As discussed in Section 5.1, a PEIA was undertaken in December 2020 for the Project on the existing environment and the activities associated with the Project to evaluate the potential impacts the Project may have on key environmental aspects. The PEIA concluded that the Project was not required to be referred to the Western Australian EPA due to its small scale and low significance of its impacts to the surrounding environment. There was also no impact on MNES nor impact to Commonwealth land and therefore did not require referral to DAWE. The Project has also completed an environmental risk assessment that is reviewed on a six-monthly basis.

The environmental allowances and approvals are summarised in Table 8.

*Table 8 Environmental Allowances, Approvals and Permits*

ENVIRONMENTAL ALLOWANCE TYPE	UNIT	PROJECT ALLOWANCE
Clearing Permit Allowance (CPS818/15)	ha	1.03
Water Abstraction Licence (5C) GWL205140(1)	kL	60,000

### 5.3 Water Management

Water is predominately sourced for the Project from a construction groundwater bore. Prior to installation and use, a water abstraction licence (Table 8) was obtained through the Department of Water and Environmental Regulation (DWER). Potential drawdown resulting from the proposed groundwater bore is reduced through the installation of a turkey's nest adjacent to the groundwater bore. The construction of this turkey's nest includes a high-density polyethylene plastic liner, sufficient fauna egress and cut-off switches and adequate freeboard to prevent overflow. The size of the turkey's nest was designed to allow AAA to have greater control over the volume of water that is extracted and effectively manage the abstraction rate.

The water is drawn from the Leederville Aquifer to achieve the desired yield. Scheme water is also used in conjunction with abstracted groundwater where construction activities require certain water quality, and for site office facilities. This reduces the potential for adverse environmental impacts including mobilization of contaminants and drawdown on nearby wetlands and groundwater users. The use of groundwater in addition to scheme water will also reduce the risk for oxidation of Potential Acid Sulfate Soils (PASS). This in turn will reduce the direct or indirect impacts to sensitive environmental receptors, as well as nearby bore users and structures.

The groundwater bore can cause temporary and localized drawdown however, no significant impacts are expected at any of the wetlands, nearby groundwater users, or vegetation communities near the Project site. The Project's Environmental Management Plan also considers requirements around water abstraction management in relation to the contaminated site restrictions at Site ID 6218, 42429, 42430, 42431, 42434 and 42435.

The use of water was modelled at the beginning of construction to inform licencing requirements,

water source selection, and initiatives that could be undertaken by the Project to reduce water use throughout the infrastructure lifecycle. The water use of the Project to date is presented in Table 9.

Table 9 Water Parameters

WATER PARAMETER	TOTAL THIS PERIOD		TOTAL FOR PROJECT	
	kL	%	kL	%
<b>Potable Water</b>				
Standpipe / Scheme Water Purchased	187	1.2	234	1.2
<b>Non-Potable Water</b>				
Bore Water	15,756	98.8	18,543	98.8
Surface Water	0	0.0	0	0.0
Recycled / Wastewater	0	0.0	0	0.0
<b>Total Water Used</b>	<b>15,943</b>	<b>100.0</b>	<b>18,777</b>	<b>100.0</b>

### 5.3.1 Dewatering Requirements

Dewatering is required on the Project for the construction of bridge abutment footings as well as various activities where excavations are required to be lower than the groundwater table. Dewatering is undertaken in accordance with the Project's Dewatering Water Quality Management Plan (DWQMP) and CEMP.

The most significant use of dewatering is related to the construction of bridge footings where footings depths were reduced during the design stage to limit the extent of dewatering required. The extent and duration of dewatering for the Project overall is expected to be minor.

### 5.3.2 Water Saving Initiatives

Several initiatives were targeted on the Project that reduce water use during both construction and operation phases, such as:

- Applying dust suppressants when areas are to be left for extended periods of time
- Progressive monitoring of water used over compacted areas to reduce over-wetting and overall consumption for soil conditioning
- Optimising the spread of mulch throughout the alignment at the earliest opportunity.
- Utilising automated timed tap fittings and half-flush toilets.
- Installation of rainwater runoff tanks to collect rainwater for the Project Garden and miscellaneous water uses.

With implementation of the above initiatives, the Project has modelled a reduction of 21.4% of forecasted total water use.

## 5.4 Vegetation

### 5.4.1 Clearing

A clearing impact assessment was completed for the Project in October 2020 including a detailed Clearing Assessment Report (CAR), site visit and review of the biological survey undertaken for the broader Byford Rail Extension Project (refer to Section 5.1). The area is predominately located on disturbed or modified areas, following the alignment of the existing infrastructure. The vegetation mapping indicates the existing vegetation is degraded to completely degraded, consisting primarily of historically cleared areas with sections of planted vegetation and isolated trees including *Corymbia calophylla* (Marri) trees with small patches of remnant native vegetation (0.05ha of CcXpTo ,Figure 8). Eight trees were identified as potential black cockatoo habitat, however all lacked suitable hollows, or were unlikely to form suitable hollows. These were re-inspected prior to clearing. There was no threatened or priority flora or fauna identified, no naturally occurring watercourses or permanent water bodies, the ecosystem diversity is low in most areas mapped and the area is not of high biological diversity.



Figure 8 Existing Vegetation Types and Black Cockatoo Trees

Apart from activities that are exempt under the clearing regulation (Section 5 – Prescribed Clearing), all native vegetation clearing completed will be undertaken in under and in accordance with Main Roads' State-wide permit CPS 818/15 where the Project specifically has a maximum clearing area of 1.03 ha of native and non-native vegetation. Efforts were made during the design to minimise the clearing footprint including:

- Steepening of batter slopes
  - Installation of safety barriers
  - Installation of kerbing
  - Preferential use of existing cleared areas for access tracks, construction storage and stockpiling.
- The Project has also implemented tree protection zones as an initiative which is further detailed in Section 5.12.

### 5.4.2 Revegetation/Rehabilitation

The Project will plant new vegetation alongside the new road in accordance with the Project urban and landscape design. Species have been selected for revegetation and landscape works that:

- Are of provenance to the adjacent remnant vegetation complex (Forrestfield Complex) and, or,

- Are species of provenance to the Swan Coastal Plain, which have been selected for their proven revegetation success within other Main Roads WA projects.

Proposed species selection for seeding and planting zones adhere with the Main Roads WA – Vegetation Placement Guidelines for Verges and Medians (with the exception of tree planting). The landscape design will be undertaken with species that will provide visual softening of the built structure adjacent to the residential areas.

### 5.4.3 Dieback

The Project’s PEIA undertaken in December 2020 evaluated the area for dieback and any potential impacts. It was concluded that the Project area should be treated as Unmappable (areas that are sufficiently disturbed, so the *Phytophthora cinnamomic* occurrence mapping is not possible at the time of inspection) or Uninterpretable (dieback unknown). Standard hygiene practices including clean earth moving equipment on entry and exit, dieback free imported materials and no movement of machinery beyond the clearing line are implemented as precautionary measures

## 5.5 Carbon Emissions and Energy

The greenhouse gas emissions and the energy consumption of the Project have been modelled for the infrastructure lifecycle. The major sources of greenhouse gas emissions on the Project are related to material impacts. Specifically, the largest contributor is the in-situ and precast concrete elements, followed by aggregates. Excluding material impacts which are further discussed in Section 5.6, the makeup of energy impacts modelled at the design stage for the lifecycle of the asset are represented in Figure 9.

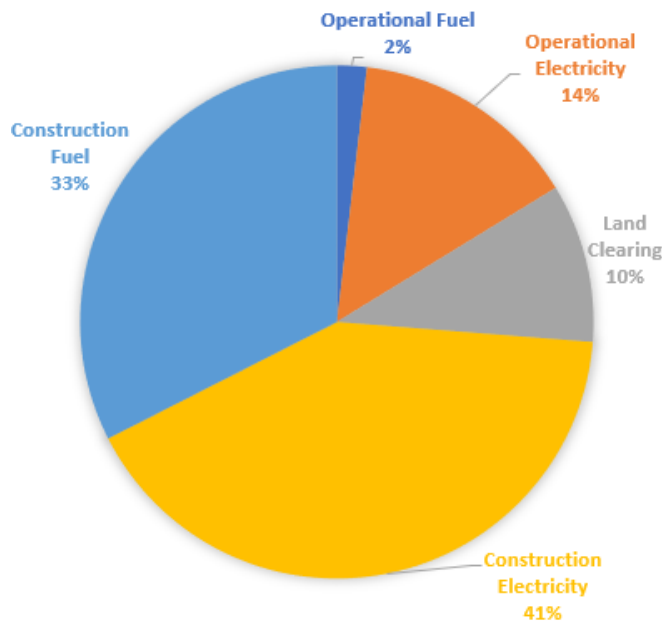


Figure 9 Energy Impacts

The Project has a target of 5% carbon reduction compared to a base case footprint. The current modelling suggests a reduction of 17% which is well above the target. Project opportunities are reassessed periodically throughout the Project and a list of initiatives are reported each month to Main Roads WA. Project initiatives which provide the most significant energy savings include:

- Use of LED lighting, saving ~157.5 tCO<sub>2</sub>e during asset operation
- The revegetation of an area larger than the cleared area, saving ~44 tCO<sub>2</sub>e
- Grid connected site office and facilities rather than diesel generators, saving ~20.3 tCO<sub>2</sub>e

- The use of three hybrid cars in place of three diesel utes for use by construction engineers (see Figure 10), saving ~20.1 tCO<sub>2</sub>e



Figure 10 Toyota Rav 4 Hybrid cars utilised on the Project

The energy use on the Project to date inclusive of the design and construction phase is detailed in Table 10.

Table 10 Energy Parameters

ENERGY PARAMETERS	TOTAL THIS PERIOD			TOTAL FOR PROJECT		
	LITRES	KWH	% OF TOTAL USE	LITRES	KWH	% OF TOTAL USE
Unleaded (on and off road)	1542.7	14,656	1.25	1542.7	14,656	1.1
Diesel Used (on and off road)	111,297.2	1,112,972	94.9	122,845.2	1,228,452	95.0
Liquefied Petroleum Gas (LPG)	0	0	0	0	0	0
Biodiesel	0	0	0	0	0	0
Hydrogen	0	0	0	0	0	0
Oil	0	0	0	0	0	0
Other	0	0	0	0	0	0
Purchased Electricity from Grid	-	45,198	3.85	-	50,231	3.9
Green Power Mix	-	-	0	-	-	0
Generated from Renewable Energy Onsite and Used Onsite	-	0	0	-	0	0
<b>Total Energy Used</b>	-	1,172,826	<b>100.0</b>	-	1,293,339	<b>100.0</b>

Note: Energy in gigajoules (GJ) is calculated using the conversion values detailed in the [National Greenhouse Account Factors](#).

## 5.6 Materials and Recycling

The Thomas Road over Rail Project objective is to create a grade separation with the existing rail line, allowing the additional space and clearances required for the upcoming Byford Rail Extension works. To facilitate this in the constrained road reserve, the design constitutes two bridges and retaining walls along each side of the embankment along with an underpass to allow safe passage from north to south for pedestrians, cyclists, and equine users once the Byford Rail Extension Project is complete. Consequently, the materials to be used on the Project are largely made up of both in-situ and precast concrete, along with sand and aggregates for the embankments. Material usage to date, presented in Table 11, Table 12 and Table 13 show the significance of these products. Modelling of the base case undertaken showcases this relationship (represented in Figure 11), with the largest contributors of Green House Gases (GHG) also being concrete followed by aggregates.

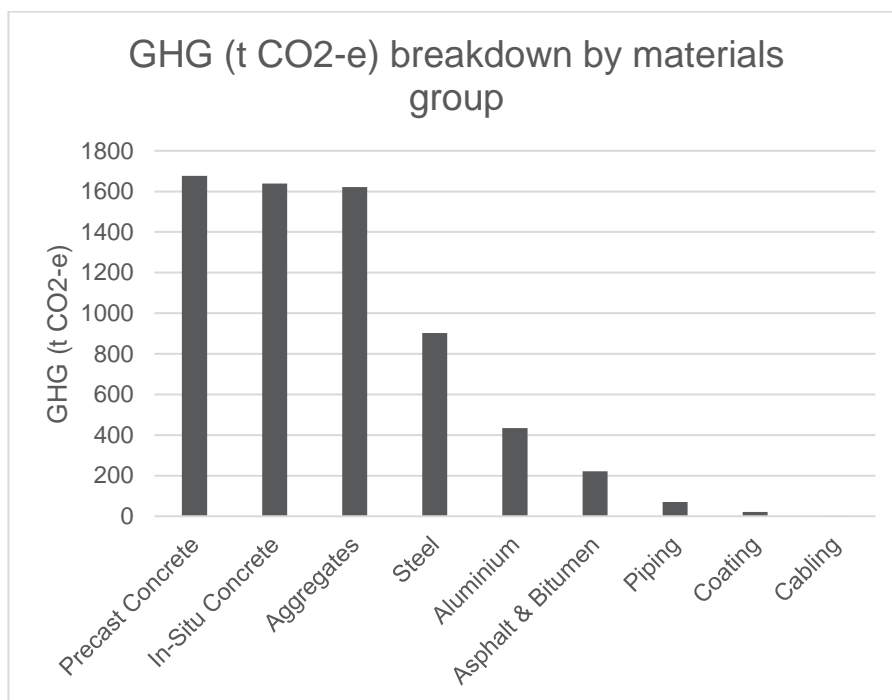


Figure 11 Base Case Materials GHG breakdown

With knowledge of the largest quantities of materials, and largest contributors to greenhouse gases, AAA was able to strategically identify opportunities to reduce the materials impacts of the Project. Examples of these initiatives include:

- Utilising Mechanically Stabilised Earth walls in place of other types of retaining walls and abutment walls where specifications permit, reducing the quantities of concrete
- Design change removing a concrete retaining wall, replacing with a steepened batter, reinforced with rock pitching. This reduces the quantities of concrete used, which have a larger impact on greenhouse gases than the additional sand and rocks used
- Improving efficiencies in design concrete mixes by increasing Supplementary Cementing Materials (SCMs) content where possible, and selection of appropriate concrete mix strength for elements
- Reduction of earthworks required by undertaking further geotechnical assessments on site to retain existing materials
- General design optimisation to reduce concrete, sand and other materials required for construction



Opportunities to include recycled materials on the Project including crushed recycled concrete (CRC) within pavements, CRC as aggregate replacements within concrete mixes and use of recycled glass within embankments were investigated, however were infeasible for this Project.

Table 11 Imported Raw/Traditional Materials for the Project

IMPORTED RAW/TRADITIONAL MATERIALS			
MATERIAL	UNIT	TOTAL THIS PERIOD	TOTAL FOR PROJECT
Aggregate	t	433.34	433.34
Aluminium	t	0.1	0.1
Asphalt	t	0	0
Ballast	t	0	0
Bedding Aggregate	t	0	0
Bitumen	t	14	14
Bitumen Cutter (MCC)	t	0	0
Bitumen Cutter (SCC)	t	0	0
Cement	t	0	0
Cement Additives	t	0	0
Cement Stabilised Backfill	t	272.88	272.88
Clay	t	0	0
Concrete	t	4,899.23	4,899.23
Crushed Dust (including Cracker Dust)	t	12.6	12.6
Crushed Limestone	t	3,656.14	6,278.14
Crushed Rock	t	1,361.61	1,361.61
Crushed Rock Base	t	0	0
Emulsion Based Prime (e.g. Ecoprime)	t	0	0
Ferricrete	t	11.8	11.8
Geofabric Polymers	t	1	1
Glass (including Glass Beads)	t	0	0
Gravel	t	0	0
Laterite	t	0	0
Lime	t	0	0
Lime Additives	t	0	0
Mechanically Stabilised Earth Backfill	t	42,998	42,998.00
Mulch	t	0	0
Paint (Waterborne, Thermoplastic, Cold Applied Plastics)	l	128	128
Perspex	t	0	0

Plastic	t	0	0
Precast Concrete	t	3,844.56	3,844.56
Sand	t	23,988.56	24,972.56
Steel	t	275.54	275.54
Synthetic Binders	t	0	0
Topsoil	t	0	0
Other	t	0	0

Table 12 Imported Recycled Materials for the Project

IMPORTED RECYCLED MATERIALS			
MATERIALS	UNIT	TOTAL THIS PERIOD	TOTAL FOR PROJECT
Crumb Rubber	t	0	0
Crushed Recycled Concrete (CRC)	t	0	0
Crushed Recycled Glass	t	0	0
Eco-blocks	t	0	0
Geopolymer Concrete	t	0	0
Low Carbon Concrete	t	0	0
Mulch and Soil Conditioner (not including Food Organic and Garden Organics (FOGO))	t	0	0
Mulch (FOGO)	t	0	0
Soil Conditioner (FOGO)	t	0	0
Reclaimed Asphalt Pavement	t	0	0
Recycled Aggregate	t	0	0
Recycled Aluminium	t	0	0
Recycled Clay	t	0	0
Recycled Granular Material	t	0	0
Recycled HDPE Plastic Pipes	t	0	0
Recycled Mineral Sand	t	0	0
Recycled Sand (as per the definition in the Contractor Monthly Reporting form)	t	0	0
Supplementary Cementitious Materials – slag	t	0	0
Supplementary Cementitious – fly ash	t	0	0
Supplementary Cementitious – silica fume	t	0	0
Supplementary Cementitious – other	t	0	0
Topsoil	t	0	0
Warm Mix Asphalt	t	0	0

Other	t	0	0
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Table 13 Materials Reused on the Project

<b>MATERIALS REUSED WITHIN THE PROJECT SITE</b>			
<b>MATERIAL</b>	<b>UNIT</b>	<b>TOTAL THIS PERIOD</b>	<b>TOTAL FOR PROJECT</b>
Aggregate	t	0	0
Asphalt (RAP)	t	0	0
Clay	t	0	0
General Fill	t	610	610
Granular Material	t	0	0
Limestone	t	5,100	5,100
Mulch	t	0	0
Overburden	t	0	0
Road Base	t	0	0
Sand	t	0	0
Spoil	t	0	0
Topsoil	t	0	0
Other	t	0	0

## 5.7 Noise and Vibration

Due to the proximity of the Project to residents, construction noise has the potential to adversely impact the amenity of nearby noise sensitive receivers. Construction work is managed in accordance with regulation 13 of the Environmental Protection (Noise) Regulations 1997. Where out of hours works are required, management plans are prepared in accordance with the noise regulations, residents and the Shire of Serpentine Jarrahdale are notified.

Similarly, vibration during construction is a material concern for the surrounding residents. Dilapidation surveys were carried out prior to construction commencing and will be completed again at the completion of construction.

Construction noise and vibration is managed in accordance with the Project's Construction Noise and Vibration Management Plan and the CEMP. Noise and Vibration monitors have been positioned between the construction working areas and local residences to ensure that the allowable levels of noise and vibration are not exceeded at any time. The monitored data is sent directly to a server and recorded 24/7 in real time from all monitoring stations and is assessed, collated, and reported on each month to Main Roads WA and the Shire of Serpentine Jarrahdale. Should the level reach the pre-set caution (level, length, time, etc.) an alarm is sent immediately to the mobile phones held by project management. To date there have been no exceedances of the allowable noise or vibration levels.

## 5.8 Air Quality

As the Project is a widening and re-alignment project for a small section of the existing network, it was determined that a local air quality assessment was not required in the Project's PEIA. However, dust during construction presents a minor issue for nearby residents.

Dust monitors have been positioned between the construction working areas and local residences to ensure that the allowable levels of dust are not exceeded at any time. The monitored data is sent directly to a server and recorded 24/7 in real time from all monitoring stations and is assessed, collated, and reported on each month to Main Roads WA and the Shire of Serpentine Jarrahdale. Should the level reach the pre-set caution (level, length, time, etc.) an alarm is sent immediately to the mobile phones held by project management. To date there have been no exceedances of the allowable dust levels.

## 5.9 Light Spill

The Project predominately operates during daylight hours, however at times night works are required or unavoidable. Notification to affected residents are undertaken prior to any out of hours works. Lighting towers are positioned as to prevent glare to nearby traffic and adjacent residences.

## 5.10 Contamination

There are three identified contaminated sites within the Project area as well as three additional contaminated sites directly adjacent to the north of the Project area. All six sites are classified as "Remediated for Restricted Use" and relate to the historical use of one site (Site ID 6218) as a service station for approximately 45 years from 1955 to 2000. The nature of the contamination is a hydrocarbon plume, such as from petrol, which is present in groundwater beneath the former service station and extends to beneath each of the other sites.

Restrictions on use are consistent across all six sites, except for one further restriction for the primary site. The land use restrictions are unlikely to impact the Project, as ground disturbance at a depth of greater than two meters below ground level is unlikely to occur at this location. The Project will not develop Site 6218 for a sensitive use and is therefore aligned with the restriction relating to commercial/industrial use only for this site.

## 5.11 Acid Sulfate Soils

The SLIP/ASRIS database indicates that the western end of the Project area is classified as "moderate to low risk", and the area east of Portwine Avenue has no known Acid Sulfate Soil (ASS) risk. Acid Sulfate Testing was done on the Project in November 2021 within the moderate to low-risk area and no Acid Sulfate Soils were identified. The Project induction includes information on ASS to allow work crews to identify it, and what to do if it should be encountered. To date, no Acid Sulfate Soils have been encountered on the Project.

## 5.12 Environmental Case Study

To minimise the impact on the existing environment, and the visual amenity of nearby resident's individual tree assessments were undertaken on the trees alongside the work area. Initially, each tree was plotted against the design and construction footprints. The assessment undertaken reported the classification, condition, impact and recommended tree protection zone (TPZ) radius for each individual tree (Figure 12). Protection of the root systems by adjacent construction works was the key objective of the assessment, to ensure the longevity and health of the trees.



Figure 12 Tree Protection Zones

As an outcome of the assessment, protection measure was employed on a tree-by-tree basis. Where the trees fell within the adjacent resident's property, the trees were identified to require one of two protection measures depending on the required TPZ and the proximity to the works. Most trees TPZ were able to be protected simply by fencing. However, 15 trees were identified as requiring additional measures. These additional measures included installation of a rumble board or similar layered over a geotextile and mulch layer (Figure 13) to protect the soil and root zone underneath.

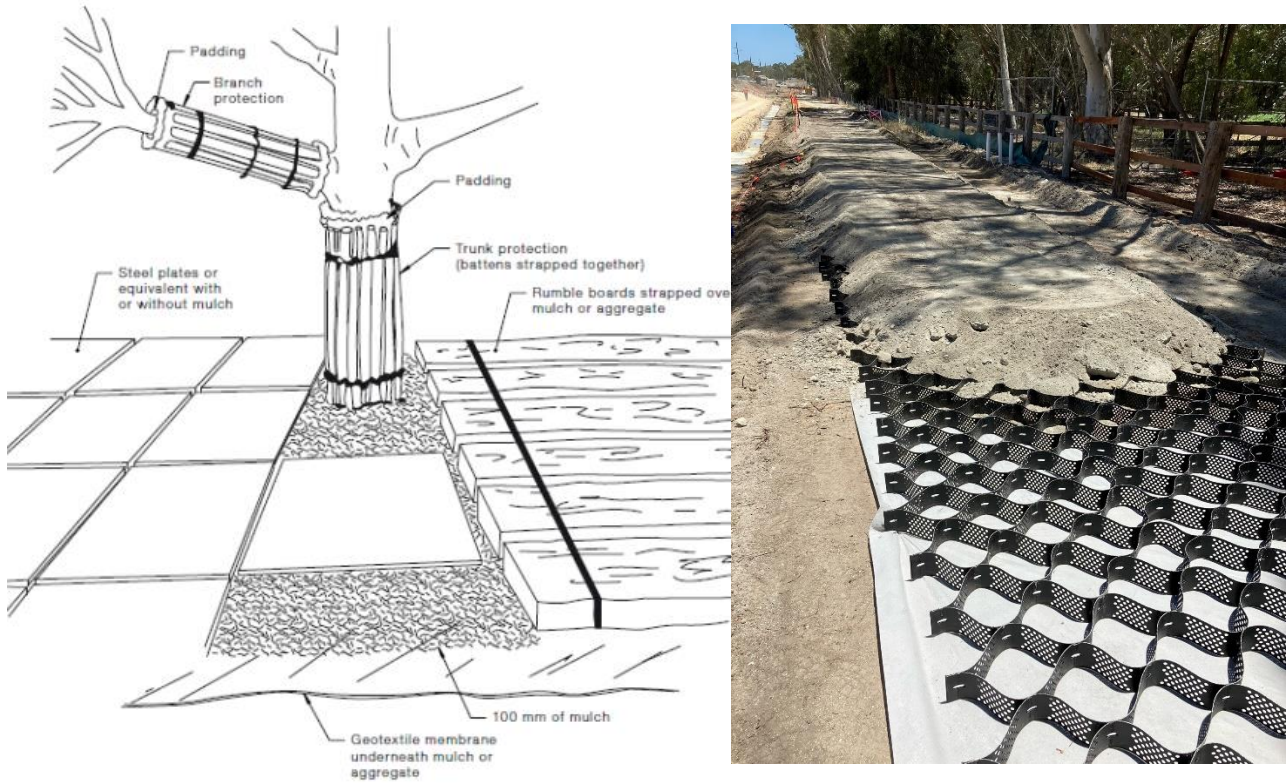


Figure 13 Additional TPZ protection measures (concept sketch left, site photograph of applied protection right)

Where trees were retained but either resided in the work zone, or the TPZ extended into the work zone, the specific construction activities and impacts were assessed further and additional controls were put in place. Activities which each had specifically tailored controls, included service relocations, installation of a new boundary fence, and the impacts associated with the temporary propping required for the adjacent retaining wall. All workforce commencing on the Project are educated on the tree protection zones through the Project induction.

## 6 Social

The Thomas Road over Rail Project is situated along Thomas Road directly on the border of Darling Downs and Byford, which are both situated in the Shire of Serpentine-Jarrahdale. The Shire of Serpentine-Jarrahdale is a diverse local government area with a vision of “city living offering a rural lifestyle” (Shire of Serpentine Jarrahdale 2019). As seen in the below Figure 14, to the northern side of Thomas Road is the suburb of Darling Downs, which is predominately rural style residential properties with large blocks and a country feel. To the southern side of Thomas Road is the suburb of Byford which is predominately suburban, residential properties.



Figure 14 Aerial Context Map of Figure

Thomas Road currently has an at grade level crossing at the centre of the Project where the Australind regional train services currently run (Figure 14). The Project will facilitate the replacement of this level crossing with a bridge over the rail line prior to the installation of the full scope of the METRONET Byford Rail Extension which will utilise this same rail corridor.

A summary of key social aspects and performance for the Project is detailed in Table 14.

Table 14 Summary of Social Aspects

SOCIAL ASPECT	UNIT	TOTAL FOR THIS PERIOD	TOTAL FOR THE PROJECT
Stakeholder enquiries received	#	53	53
Heritage sites in Project vicinity*	#	0	0
Length of Principal Shared Path (Addition/Refurbished)	km	0.74	0.74
Women in Workforce	%	12	12
Indigenous People in Workforce	%	16	16
Lost Time Injury Frequency Rate (LTIFR)	#	0	0
Development Employees and Apprentices on the Project	#	3	3

\*Project vicinity is defined the Project footprint and does not extend from this Project area boundary.

## 6.1 Social Context

### 6.1.1 Area Demographics

The Project lies within the residential areas of Darling Downs and Byford within the Shire of Serpentine Jarrahdale. The 2021 census recorded a total of 20,471 people with a median age of 31 in the statistical area of Byford which includes Darling Downs (Australian Bureau of Statistics 2021). The area is predominately home to families with children (54.7% couples with children, 15% one parent families) (Australian Bureau of Statistics 2021). Significant population growth is expected in the area with further detail on how this relates to the Project and the broader Byford Rail Extension Project is discussed in Section 4.1.

The Shire of Serpentine Jarrahdale has a large equine community and an associated [Equine strategy](#). The strategy highlights the largest involvement in the equine discipline is Trail Riding, followed by recreational riding (Shire of Serpentine Jarrahdale n.d.) The Project runs alongside an existing bridle track (see far left of Figure 15) which links with the Darling Downs Bridle Trails (Shire of Serpentine Jarrahdale n.d.). The Darling Downs Bridle Trails comprise of 26 km of trail networks that allow residents to ride to and from the area and are voted the most frequently used trail network in the shire (Shire of Serpentine Jarrahdale n.d.). The new road constructed as part of the Thomas Road over Rail Project is elevated and prevented safe passage of equine users from the south side of Thomas Road to the north side, limiting the access to the trails. As a result of engagement with the Shire, an underpass was incorporated into the Thomas Road over Rail Project design to address this issue. For further details on the initiative, see Section 6.9.



*Figure 15 Existing Bridle Trail adjacent to Project works alongside property line*



### 6.1.2 Stakeholders

The most highly affected community stakeholders are residents within proximity to the works, the Shire of Serpentine Jarrahdale, Public Transport Authority, METRONET and general road users. The most significant topics include future proofing for the Byford Rail Extension, negotiation of impacts to the Australind train services, integration with the Shire of Serpentine Jarrahdale's strategic plans, traffic management during construction, and impacts to residents such as noise and vibration during construction. For a full list of Project stakeholders refer to Appendix 1.

### 6.1.3 Expected Project Social Outcomes

The Project can facilitate positive social outcomes both during construction, and in the operational life of the asset. These include opportunities job creation, utilisation of local businesses and Aboriginal businesses, employment diversity with women and Aboriginal people in the workforce, improvements to road safety, removal of a level crossing, and improvements to community amenity. The Byford Rail Extension will further broaden the opportunities.

The Shire of Serpentine Jarrahdale has identified a job deficit within the shire within their *Economic Development Strategy* where 79% of local resident workers seek employment outside of the shire (Lucid Economics 2018). The Shire's *Health and Wellbeing Strategy 2020-2024* indicates more residents worked in construction than in any other industry (Shire of Serpentine Jarrahdale n.d.). Consequently, the Thomas Road over Rail Project, in addition to the broader Byford Rail Extension Project can provide local jobs for people in the community. Furthermore, the Project has already provided opportunities for Aboriginal businesses, Aboriginal people and women as summarised in Table 5, Table 14 and Table 15. Refer to Sections 4.3 and 6.6 for further detail.

For outcomes related to safety improvements refer to Sections 6.5 and 6.7. For outcomes related to community amenity refer to Section 6.3.3.

## 6.2 Community and Stakeholder Engagement

The Community and Stakeholder Engagement team (CSE) is integrated within the Project delivery team are responsible for the delivery of a comprehensive engagement program with the community and stakeholders throughout the Project. The Project is aligned with the Main Roads Communication and Stakeholder Engagement Strategy and is being 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. Project community and stakeholder engagement objectives are listed below:

- Support Main Road's centralised approach to communication by the provision of consistent, timely and accurate information about the Project
- Build trust and foster support within the community for the Project through a proactive and responsive culture conducting ourselves in a respectful, approachable and proactive manner
- Identify and manage potential issues early by proactively managing stakeholder enquiries and concerns

A list of the Project stakeholders has been provided in Appendix 1.

## 6.3 Community Satisfaction and Amenity

### 6.3.1 Strategy

The Project acknowledges that effective engagement with stakeholders and the community will deliver better project outcomes. With the use of open, inclusive, and respectful communication and appropriate levels of participation, the Project seeks to foster stakeholder relationships throughout the design and delivery.

With all communications and notices provided to the community, contact information is provided for the community to communicate their concerns, and where applicable, an out of hours phone number is provided. These details are also available on the [Project website](#). A half-yearly survey will be undertaken to measure the community sentiment about the Project communication and results will be used to measure success against the Project's community and stakeholder engagement KPIs.

### 6.3.2 Targets

Two of the three stakeholder engagement targets noted in Table 2 relate directly to the Project key performance indicators (KPIs) and are monitored throughout the Project. Table 2 also provides indication of how the Project is tracking in relation to these targets.

In addition to these targets, the Project has committed to undertaking community interaction events with local community groups which is again measured via KPI performance metrics. As of June 2022, three interaction events have been undertaken.

- The Perth Homeless Support Group is a not-for-profit charity that is 100% funded by their supporters with donations directly funding food and necessities for those experiencing homelessness. The Project to date has completed one commitment with the Perth Homeless Support Group. This included:
  - Donations of food and drinks
  - Volunteering in a 'busy bee' day to prepare for the Sunday morning outreach service. This included making approximately 400 sandwiches, making jelly and custard cups, and bagging baked goods (Figure 16).
- Serpentine-Jarrahdale Shire were provided a technical presentation and a site tour by the Project. The intent of the presentation and site tour was to bring the Serpentine-Jarrahdale Shire along the Project's journey and provide familiarisation of the current and planned major infrastructure works to be undertaken within the Shire such as the Thomas Road over Rail Project, the broader Byford Rail Extension Project, the Thomas Road Duplication Project and the Tonkin Hwy Extension Project.
- Donation of logs from Project clearing to a local school, creating a new nature play area. See case study in section 6.10 for further details.



Figure 16 Perth Homeless Support Group Volunteer Day

### 6.3.3 Amenity

The Project's design provides improvements to community amenity via the inclusion of pedestrian and cyclist facilities, allowance for a future bridle path for equine users, and through the urban and landscape design which aims to enhance a sense of place and create places for the residents to enjoy.

As Thomas Road will be elevated to pass over the rail corridor with two lanes in each direction, the visual impacts of the road development for the properties surrounding the project will be increased. These visual impacts are proposed to be mitigated by:

- Aesthetic finishes to retaining walls and abutments that complement the surrounding environment and landscape
- Utilising natural colours for structures
- Provision of visual screening and softening via soft landscaping and associated species selection

## 6.4 Heritage

A heritage assessment was completed by the Byford Rail Extension team in accordance with Burra Charter guidelines. Traditional owners Whadjuk and Gnaala Karla Booja (GKB) representatives nominated by the SWALSC (South West Aboriginal Land and Sea Council) were consulted as part of the heritage assessment. The engagement did not identify any sites within the Thomas Road Over Rail Project boundary.

## 6.5 Road Safety

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

There is a limited crash history for the section of Thomas Road subject to the Project's scope of work. In the past 5 years there has only been one medical crash recorded resulting from a rear end crash involving a vehicle turning left into Wungong South Road being hit by an east bound vehicle on Thomas Road. No crash history of significance was found for the other intersections forming part of this Project scope.

The Project will address the existing Thomas Road level rail crossing in Byford where it will be reconfigured to accommodate METRONET's Byford Rail Extension which will duplicate and electrify the existing track. This is in line with METRONET's Project to remove other existing level crossings

along the existing Armadale Line to improve safety for road and rail users.

The Project will widen the section of Thomas Road between Wungong South Road and Butcher Road and formalise existing shared paths with the bridge to expand to four lanes (two westbound and two eastbound) with 2 m sealed shoulders and median with a 2 m shared path. The Project scope also includes the Hay Road intersection with Thomas Road. The following changes were made to improve safety at this intersection:

- Reduced number of lanes for pedestrians to cross Thomas Road. It is noted that a pedestrian was injured at this specific crossing previously
- Allows Transperth bus stops to be included.

The road trauma assessment was evaluated for year 2041 and identified a trauma reduction target of 0%. The implied KSI reduction achieved of 26.9% indicates that these works will have a positive influence in reducing the potential for future crashes occurring.

## 6.6 Diversity

The Project team are committed to building a more diverse workforce and ensuring we have a fully inclusive culture. Diversity and inclusion targets have been set for the Project and can be found in Table 2. In addition to these, Laing O’Rourke has a global target of 50/50 gender balance among staff by 2023. The Project’s statistics on diversity is summarised in the below Table 15, whereby the average total workforce present on site is considered, inclusive of subcontractors. Further to this, the number of direct FTE staff on the Project is made up of 32% females, inclusive of women in roles such as engineering and management.

Table 15 Project Diversity Statistics

DIVERSITY ASPECT	UNIT	TOTAL FOR THIS PERIOD	TOTAL FOR THE PROJECT
Women in Workforce	%	12	12
Women in Workforce	#	14	14
Indigenous People in Workforce	%	16	16
Indigenous People in Workforce	#	19	19

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
- Career development for all personnel, including career discussions and development plans
- Mentoring program implemented on site for Aboriginal personnel completing traineeship
- Graduate and undergraduate opportunities
- Inclusive leadership training for senior management

Some Laing O’Rourke companywide 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.

- 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.
- Partnership with the National Association of Women in Construction (NAWIC) to encourage and celebrate women in the construction industry.

## 6.7 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 Thomas Road over Rail 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.

All Project communication relating 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 works 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
- Letterbox distribution
- 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.

## 6.8 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 (. The Next Gear is publicly available and further details can be found via link: <https://lorhsems.com/>. The Laing O'Rourke safety system further extends to incorporate Mental Health and Wellbeing. The Project has a network of Mental Health Champions and provides general awareness training to all personnel via Mates in Construction.

The Project regularly reviews upcoming works to identify risks. These include weekly four-week lookaheads, monthly 30/60/90-day reviews, and Health, Safety, Environment Leadership Team (HSELT) Leadership Meetings. The Project additionally has KPIs set for project management and supervisory personnel. These include undertaking:

- Safety Inspections.
- Environmental & Sustainability inspections.
- Fatal and Severe Risk Field Check, Severe Environmental Risk Field checks.
- Safe Work Method Statement Observations
- Gearbox Observations
- Field leadership engagements
- Toolbox meetings

The performance of the Project staff against the KPI is presented in below Table 16.

Table 16 Workplace Safety KPI Performance

MONTH	PLAN MONTHLY	ACTUAL MONTHLY	ACTUAL CUMULATIVE	MONTHLY % COMPLIANCE
Jul-21	76	78	78	<b>103%</b>
Aug-21	78	78	156	<b>100%</b>
Sep-21	80	82	277	<b>102%</b>
Oct-21	80	83	360	<b>104%</b>
Nov-21	86	93	453	<b>108%</b>
Dec-21	82	94	547	<b>115%</b>
Jan-22	82	82	629	<b>100%</b>
Feb-22	90	94	723	<b>104%</b>
Mar-22	102	121	844	<b>119%</b>
Apr-22	92	153	997	<b>141%</b>
May-22	92	127	1,124	<b>140%</b>
Jun-22	92	155	1,279	<b>147%</b>

The Project's safety performance is demonstrated via a Total Recordable Injury Frequency Rate (TRIFR) score of zero. Furthermore, the Project has zero recordable and serious incidents and has achieved minimal COVID-19 impacts on site due to workplace control and education measures. A total of 13 incidents were reported over the 12 months, all of which are minor and where the majority are related to theft or damage.

## 6.9 Legacy Commitments

The Alliance strives to create positive community sentiment and contribute to positive impacts surrounding the scope of the Project wherever possible. A key legacy initiative implemented in the Project was the provision made within the design to incorporate a bridle path crossing underneath Thomas Road in the form of an underpass. The underpass has been designed with sufficient clearance to allow for a future Principle Shared Path (PSP) as well as a future bridle path which will allow a safe passage for equine traffic from the north to south side of Thomas Road. The initiative resulted from engagement with a key stakeholder, the Shire of Serpentine-Jarrahdale Equine Advisory Group, will form part of the Shire of Serpentine-Jarrahdale Equine Trails Masterplan, and is currently under construction (Figure 17).



Figure 17 Legacy Initiative - Underpass 9527 under construction to facilitate future bridle path and PSP

## 6.10 Social Case Study

As a project initiative, the Thomas Road over Rail team delivered logs from project clearing to a local primary school to create a loose parts nature play area (Figure 18). With consultation with the school, a suitable time window was established, and the work crew assembled the play space for students to utilise immediately. The initiative provided an opportunity for the Project to make a positive impact on the community rather than simply mulching the logs.



Figure 18 School Nature Play (top left: before photo, top right: opening, bottom: final product)



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## 8 Glossary

A glossary of terms used throughout this document is detailed in Table 17.

Table 17 Glossary of Terms

Term	Description	Link to Further Information
<b>Material; Materiality</b>	Relevant topics are those that may reasonably be considered important for reflecting the organisation’s economic, environmental, and social impacts, or influencing the decisions of stakeholders.	<a href="#">Global Reporting</a>
<b>National Greenhouse Accounts Factors</b>	The National Greenhouse Accounts (NGA) Factors has been prepared by the Department of Industry, Science, Energy and Resources and is designed for use by companies and individuals to estimate greenhouse gas emissions. The NGA Factors is not published for the purposes of reporting under the <i>National Greenhouse and Energy Reporting Act 2007</i> (the NGER Act). While drawing on the National Greenhouse and Energy Reporting (Measurement) Determination 2008, the methods described in the NGA Factors have a general application to the estimation of a broader range of greenhouse emissions inventories.	<a href="#">Australian National Greenhouse Account Factors</a>  <i>Ensure the most recent year copy is referred to.</i>
<b>Scope 1 Emissions</b>	Scope 1 greenhouse gas emissions are the emissions released to the atmosphere as a direct result of an activity, or series of activities at a facility level. Scope 1 emissions are sometimes referred to as direct emissions.	<a href="#">Clean Energy Regulator</a>
<b>Scope 2 Emissions</b>	Scope 2 greenhouse gas emissions are the emissions released to the atmosphere from the indirect consumption of an energy commodity. Scope 2 emissions from one facility are part of the scope 1 emissions from another facility.	
<b>Scope 3 Emissions</b>	Scope 3 emissions are indirect greenhouse gas emissions other than scope 2 emissions that are generated in the wider economy. They occur as a consequence of the activities of a facility, but from sources not owned or controlled by that facility's business. Some examples are extraction and production of purchased materials, transportation of purchased fuels, use of sold products and services, and flying on a commercial airline by a person from another business.	

## 9 Appendices

Appendix	Title
<b>Appendix 1</b>	List of Project Stakeholders

## Appendix 1 – List of Project Stakeholders

Stakeholders include all three levels of government, regulators, landowners, business owners, environmental groups, special interest groups, communities, and road users

STAKEHOLDER GROUP	SPECIFIC STAKEHOLDERS	ENGAGEMENT TYPE
Federal Government	Hon Michael McCormack MP – Minister for Transport, Infrastructure and Regional Development Andrew Hastie, MP, Member for Canning	Approval of communication material Individual briefings as required, or on request
State Government	Minister for Transport, Hon Rita Saffioti	Approval of communication material Individual briefings as required, or on request
Local Members	Alyssa Hayden, MLA, Member for Darling Range Matthew Swinbourn MLC, Member for Eastern Region	Individual briefings as required, or on request
Local Government	Shire of Serpentine-Jarrahdale Councillors and staff	Regular meetings with technical officers Council briefings at key milestones, and on request
State Government	METRONET Public Transport Authority (PTA) Department of Transport (DoT) Environmental Protection Agency (EPA) Department of Planning, Lands and Heritage (DPLH) Department of Fire and Emergency Services (FESA) Water Corporation Western Power ATCO Gas Department of Biodiversity, Conservation and Attractions (DBCA)	Regular meetings with technical officers
Federal Government	Department of Agriculture, Water, and the Environment (DAWE)	Keep informed
Other Emergency Services	St John Ambulance FESA	Keep informed

Community Groups	Byford Progress Association Byford Scarp Residents Association Hopeland Community Association Keysbrook Community Committee Mundijong Community Association Serpentine Jarrahdale Ratepayers and Residents Association Byford Glades Residents Association Darling Downs Residents Association Jarrahdale Community Collective Korribinjal Brook Residents Group Serpentine Community Association	General community awareness
Local Byford businesses	Byford Dome Café Electric Foothills Tattoo Total Eden Saddles Plus Perth Veranda Home and Garden Genesis Health and Fitness Byford Four Seasons patisserie café and bakery Byford Pharmacy Subway Byford Newsagency Australia Post Office Cape and Scissors hair salon ALDI	General community awareness Seek feedback
Environmental groups	Urban Bushland Council WA Inc Landcare Serpentine-Jarrahdale – Byford Enviro-Link Community	Add to subscriber lists General community awareness
Local shopping Centres	Armadale Central Shopping Centre – Silverleaf Investments Byford Village Shopping Centre Byford Market Place	Displays Project Updates General community awareness
Local schools	Marri Grove Primary School Salvado Catholic College, Byford Byford Secondary College	Add to subscriber lists Project updates Project webpage
Residents directly impacted by project	List of Residents	High level of engagement Direct mailouts Encourage to subscribe for Project updates Door knocking One on one meetings
General Residents	Shire of Serpentine Jarrahdale residents	Encourage to subscribe to Project updates General community awareness Project Website