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2 MAY 2023

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Development Application 2 Eleventh Road Bridge

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Byford Rail Extension

Development Application 2 – Eleventh Road Bridge

Document details	
Title	Development Application 2 – Eleventh Road Bridge
Project	Byford Rail Extension (BRE) Design and Construction Project
Laing O'Rourke Project No.	R30
Client	Public Transport Authority of Western Australia
Client contract No.	PTA200142
MetCONNx Document No.	BRE-META-PN-RPT-00404

Rev	Date	Revision Description	Prepared by	Reviewed by	Approved by
A	28-Feb-2023	Issued for IPLS	Timothy Hodge	Georgia Young	Richard Christie
B	03-Apr-2023	Issued for DA	Timothy Hodge	Nicholas Temov	Richard Christie

Table 1: Revision History

Executive Summary and Introduction



Acknowledgment of Country

MetCONN acknowledges the Whadjuk People and the Gnala Karla Booja People as the Traditional Custodians of the land and waters on which Byford Rail Extension Project is located. We pay our respects to Elders, past, present and emerging, and thank them for their continuing connection to country, culture and community.



This Development Application report has been prepared by the MetCONN Alliance (the Alliance) as part of the Byford Rail Extension (BRE). The Alliance was established to form a partnership with the Public Transport Authority (PTA) to design and build a new elevated station at Armadale, an at-grade station at Byford, and related works (Eleventh Road road-over-rail bridge).

This Development Application (DA) is named DA 2 – Eleventh Road Bridge.

The contents of this DA Report include:

- An overview of the proposed approach to future development applications which form part of the BRE that are not included in this DA
- An overview and explanation of the works that form part of this DA which require approval from DevelopmentWA
- An overview and explanation of works that are exempt from the requirement to obtain development approval
- An assessment of the proposal against the relevant planning framework
- An examination of the planning merits of the proposal.

This DA relates to one of several major infrastructure components to be completed as part of the BRE. Refer to **Section 3** – Development Overview for specific work associated with this DA.

This DA is accompanied by specialist reporting and supporting information, which includes:

- **Appendix C:** Planning Approval Requirements
- **Appendix D:** Staging and Construction Management Plan
- **Appendix E:** Structural Engineering Plans
- **Appendix F:** Civil Development Plans
- **Appendix G:** Geotechnical Reporting
- **Appendix H:** Operation Noise and Vibration
- **Appendix I:** Eleventh Road Drainage Strategy
- **Appendix J:** Bushfire Vehicular Access Strategy
- **Appendix K:** Engagement Summary
- **Appendix L:** Urban Design Treatment Strategy
- **Appendix M:** Landscaping Strategy

The Alliance understands an application fee of \$34,196 is applicable to this DA as the development exceeds \$20 million. To facilitate payment of the DA, the Alliance respectfully request that DevelopmentWA arrange an invoice be made out to:

Name Kellogg Brown & Root Pty Ltd & Laing O'Rourke Australia Construction Pty Ltd
& Pritchard Francis Consulting Pty Ltd

GPO Building Level 6, 3 Forrest Place, Perth 6000

ABN 46 854 627 068



1. BRE Project Overview

1.1 Structure of Development Applications for the BRE

A total of five DAs are proposed as part of BRE, three of which are located within the City of Armadale town centre, one within the Shire of Serpentine-Jarrahdale Town Centre, and one over Eleventh Road which is split across a DevelopmentWA redevelopment area, City of Armadale, and Shire of Serpentine- Jarrahdale.

The purpose of splitting DAs is to ensure agreed timeframes are met. DA naming was originally given based on the time/date order in which they were to be lodged with the local authority, though this had changed with DA 1.5 preceding this DA.

Separating the DA works is common for complex projects such as BRE. This approach has been supported by the WAPC and does not obviate the responsibility of the Alliance to deliver development compliant with the local and state planning framework.

Table 2 – Development Applications identifies each DA package associated as part of the BRE.

DA	Name	Lodgement To	Approval Authority	Additional information / Notes
DA 1	Early works for viaducts, columns	City of Armadale	WAPC	Simple DA material outlined by WAPC Some related items are not included in this DA (to be included in DA 3) <ul style="list-style-type: none"> Lighting Public art Façade treatment Emergency egress within the station area
DA 1.5	Temporary Bus Interchange and Associated Early Works	City of Armadale	WPAC	Approved March 2023
DA 2 (Subject DA)	Eleventh Road Bridge	DevelopmentWA	DevelopmentWA	The City of Armadale / Shire of Serpentine-Jarrahdale and State Government Agencies will be responsible for reviewing and provide specialised feedback into the technical reports
DA 3	Armadale Station structures, bus interchange facilities, public realm upgrades, viaduct treatments (where applicable), related car parking, and pedestrian and vehicle access)	City of Armadale	WAPC	Includes Neerigen Street open Space upgrades
DA 4	Byford Station structures, bus interchange facilities, public realm upgrades, viaduct treatments (where applicable), related car parking, and pedestrian and vehicle access)	Shire of Serpentine-Jarrahdale	WAPC	N/A

Table 2: Development Applications

DA 1

DA 1 relates solely to the works for viaducts, columns, and site establishment works at Armadale station and surrounds, and does not include design elements such as lighting, landscaping, public art, façade treatments, and emergency egress. These will be included in DA 3 – Armadale Station, with a key focus on the Armadale town centre.

Construction of the viaduct will be in such a way that will not restrict future development within the 'station zone' relating, connectivity, public realm activation, viaduct treatments, lighting, drainage, and other works associated with DA 3.

DA 1.5

DA 1.5 sought approval to develop a temporary bus interchange and undertake associated early works at Armadale Station which is required to facilitate project delivery and to ensure there is a viable public transport option for people traveling between Perth (via Victoria Park) and Armadale for the duration of works associated with BRE Project and the Victoria Park – Canning Level Crossing Removal Project.

DA 1.5 was approved by the Western Australian Planning Commission in March of 2023.

DA 2 (This DA 'Subject DA')

DA2 is subject to development approval given its location within a Metropolitan Redevelopment Authority Redevelopment Area as detailed in the *Metropolitan Redevelopment Act 2011*.

As the western portion of the development footprint is located within a redevelopment area, impacted by the *Metropolitan Redevelopment Authority Act 2011*, it suspends the *Planning and Development Act 2005*. Consequently, any infrastructure within affected redevelopment areas is subject to DA and approval through DevelopmentWA.

Although approximately half of the structure is located outside of the redevelopment area, the Alliance understands the importance to deliver high quality infrastructure and therefore has led a design-first approach, ensuring the construction of Eleventh Road bridge is held to the standards expected within a DevelopmentWA Redevelopment Area.

Planning approval requirements for DA 2 are detailed in **Appendix C** and **Figure 4** – Planning Approval Requirements.

DA 3

DA 3 includes the Armadale station structures, public transport interchange facilities, related car parking, and associated means of pedestrian and vehicle access. DA 3 is considered the 'primary' DA for Armadale and will include all elements typically associated with a large scale DA inclusive of landscaping, public art, façade treatments (where applicable), crime prevention through environmental design, and urban design integration within the public realm.

DA 4

DA 4 includes the Byford station structures, public transport interchange facilities, related car parking, and associated means of pedestrian and vehicle access. DA 4 will include all elements typically associated with a large scale DA inclusive of landscaping, public art, façade treatments (where applicable), crime prevention through environmental design, and urban design integration within the public realm.

1.2 Eleventh Road Bridge Site and Context Plan

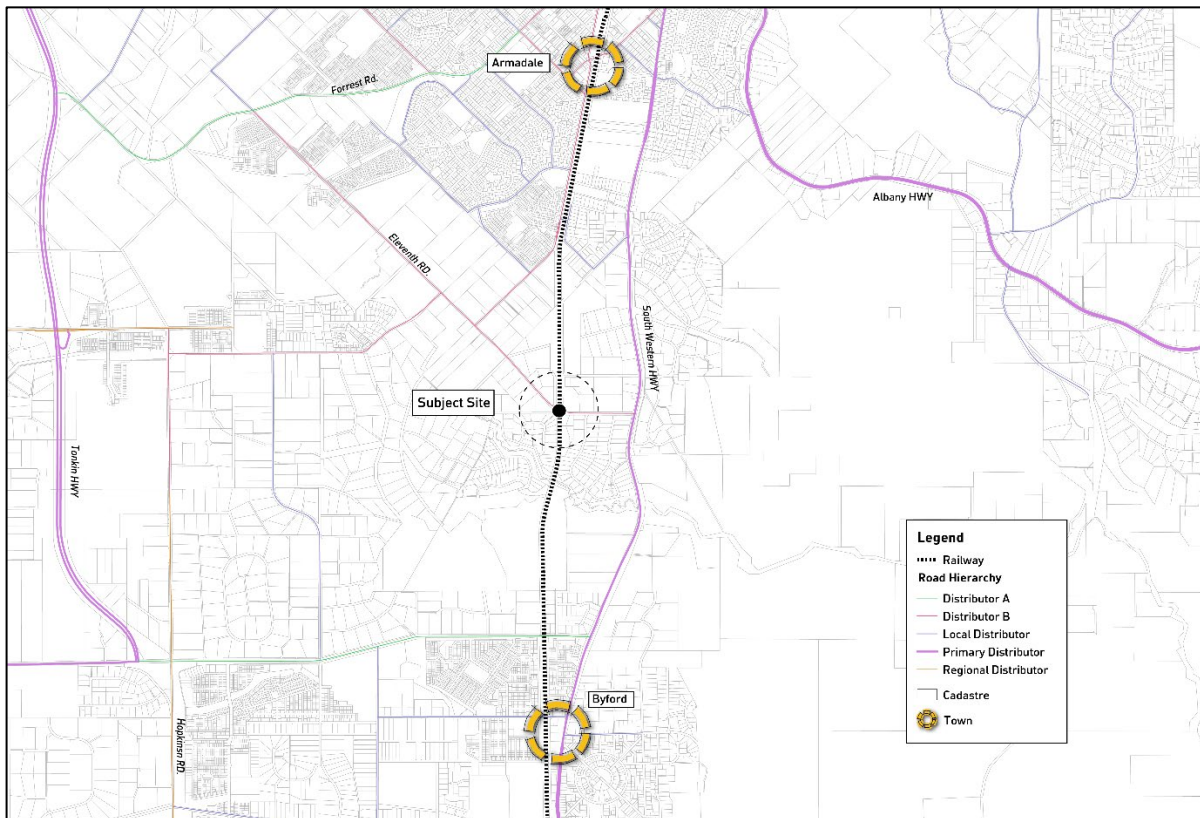


Figure 1: Context Plan

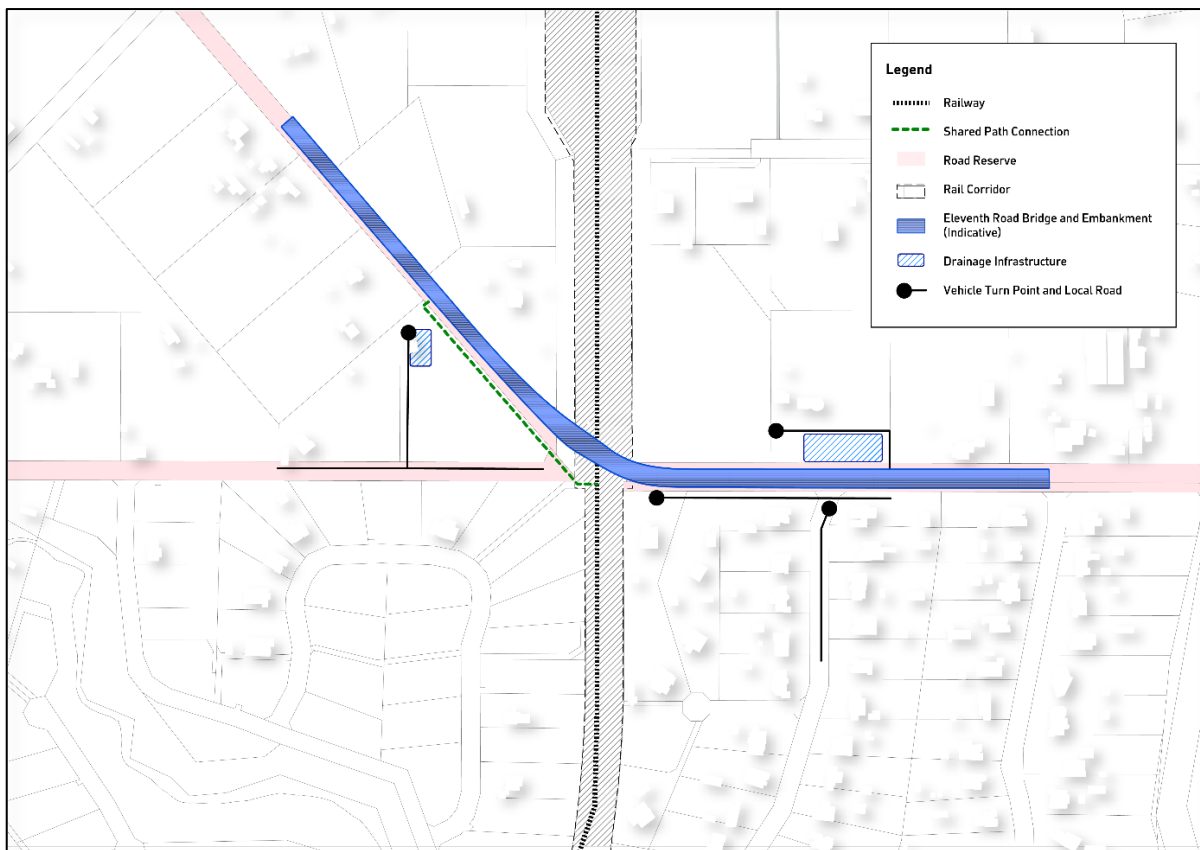


Figure 2: Location Plan (not to scale)

2. Project Team and Land Description

2.1 Project Team

Specialisation	Responsible
Statutory Planning	MetCONNx
Staging and Construction Management Plan	MetCONNx
Structural Engineering Drawings	MetCONNx
Civil Engineering Plans	MetCONNx
Geotechnical	MetCONNx
Operational Noise and Vibration	MetCONNx (SLR Consulting)
Eleventh Road Drainage Strategy	MetCONNx
Bushfire Vehicular Access Review	MetCONNx (Linfire Consultancy)
Engagement Summary	MetCONNx
Urban Design Treatment Strategy	MetCONNx

Table 3: Project Team

2.2 Land Description

Lot	Owner / Land Status	Deposited Plan	Volume	Folio	Lot area (m ²)
14	Public Transport Authority of Western Australia	223230	379	72A	16,364
110	Public Transport Authority Under Contract	71534	1768	776	14,003
106	State of Western Australia	27606	LR3018	128	188,569
1	Western Australian Planning Commission Portion Under Contract	33408	1450	774	20,234
12	Public Transport Authority Under Contract	223230	1447	12	12,134
16	Public Transport Authority Under Contract	223320	1905	251	20,234
17	Public Transport Authority Under Contract	223230	1388	400	20,230
22	Public Transport Authority Under Contract	223230	1438	72	20,234

Table 4: Land Ownership

Due to the expansive nature of the development, the PTA has acquired sections of privately-owned land that were not under the ownership of the State government. The purpose of this land being acquired was to include permanent infrastructure within these affected areas.

These parcels identified above have either been settled or are under contract awaiting settlement and transfer. As the identified parcels of land have been a recent acquisition, the transfer of land ownership details have not yet been updated on the Certificate of Titles shown in **Appendix B**.

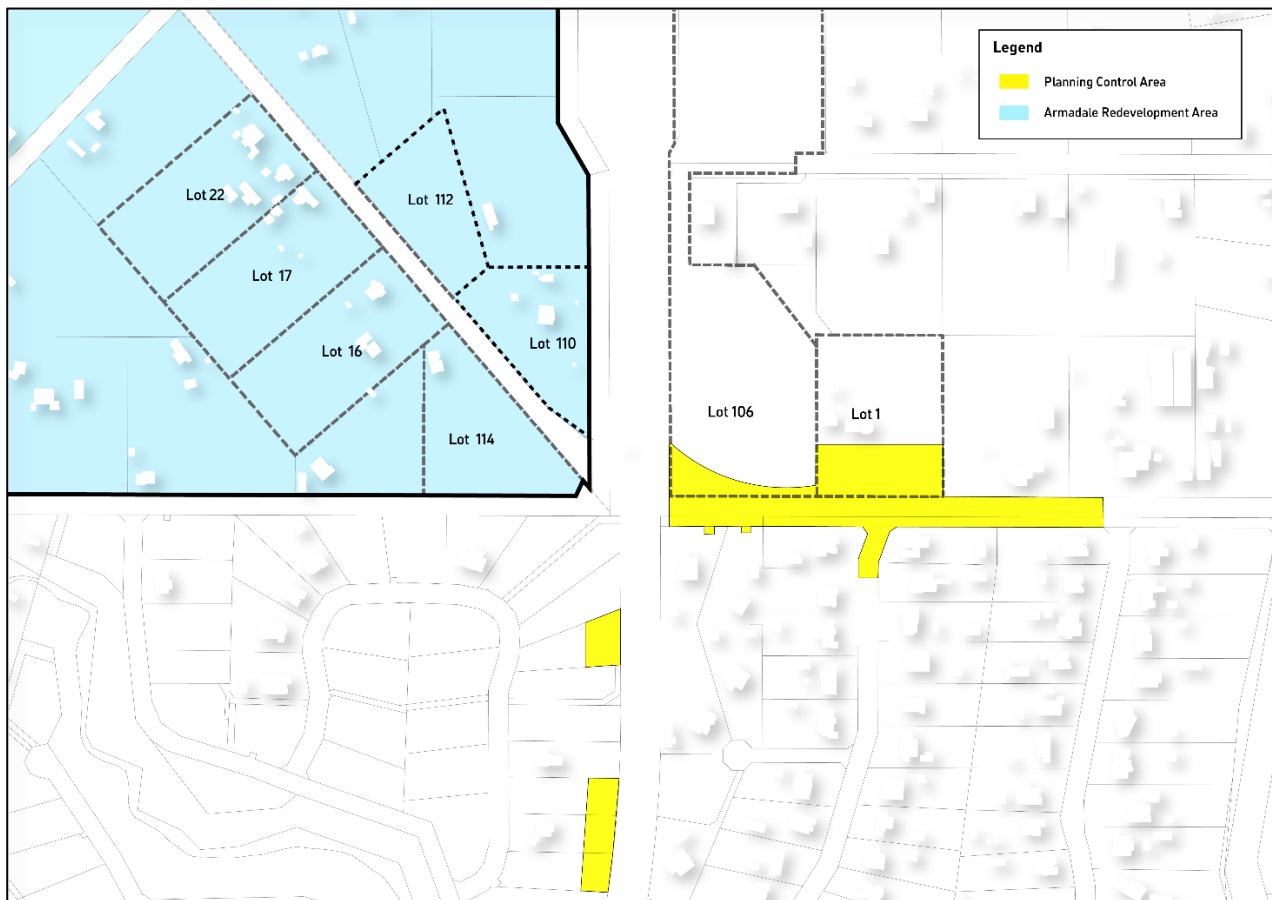


Figure 3: Land Ownership and Planning Jurisdiction Overview

3. Development Overview

The development includes the construction of a new road-over-rail bridge over Eleventh Road and includes the following works:

1. Construction of a road-over-rail bridge over an existing railway line.
2. Relocation of Bruns Drive connection to Eleventh Road further east and reconfiguration as a one-way access and construction of new cul-de-sac road to the south-east of the bridge, on the southern side of Eleventh Road.
3. Construction of a new drainage basin and private driveway to the north-east of Eleventh Road bridge.
4. Construction of a new drainage basin and private driveway to south-west of Eleventh Road Bridge, and extension of Keenan Street further to the east and north, forming an emergency egress way (EAW).
5. Construction of EAW from the current termination of Keenan Street, further, east to connect to the existing EAW from Rivose Crescent.
6. Construction of a new Fire Service Access Way (FSAR) / Emergency Access Way along the railway and underneath Eleventh Road bridge, from Rivose Crescent to the existing Wilson Street cul-de-sac 250m to the north, which ultimately utilises the PSP.
7. Construction of a new PSP south of, and underneath, Eleventh Road.
8. Realignment of existing driveways from various lots, to accommodate the new road layout.
9. Realignment of services to accommodate the proposed modifications.

4. Engagement

The BRE engagement team has prioritised a proactive approach engagement approach to improve understanding of the works in this DA and mitigate project risks. BRE engagement aims to:

- Inform the public with balanced and objective information
- Inform and consult on changes to current amenity
- Involve and work directly with the public to resolve issues that arise through construction
- Collaborate with key stakeholders to identify and realise opportunities or mitigate impacts.

Table 5 details at a high level the activities which have been undertaken aimed to improve place outcomes, provide accessible, clear, and timely information; create meaningful, two-way discussion, and mitigate risks.

Table 6 details at high level the engagement outcomes undertaken by the Alliance.

Appendix K includes additional information on engagement activities through a comprehensive Engagement Outcomes report. It details the BRE engagement strategy, social needs analysis, activities to date, and engagement outcomes.

What	Who	When
Stakeholder engagement in the form of briefings, presentations, meetings, community information sessions and workshops.	METRONET, PTA WA and Transperth State Design Review Panel, Office of the Government Architect WA City of Armadale Shire of Serpentine Jarrahdale Main Roads WA Development WA Utility providers including Western Power, Telstra, Optus, Water Corporation, ATCO Gas Community, residents, businesses, and special interest groups	Project update offered specifically to Eleventh Road residents in early October 2021 prior to Alliance contract award. Ongoing engagement with residents to discuss the impact and opportunities for consultation.
Stakeholder engagement in the form of briefings, presentations, meetings, and workshops.	PTA Main Roads WA City of Armadale	November 2022
Letters to adjoining neighbours with detailed information on works, their nature, and potential impacts, expected timelines, complaint, and communication channels.	Properties sharing boundaries with Eleventh Road and properties within 100 metres of construction sites.	Initial doorknocking in the Eleventh Road area in October 2021 prior to the Alliance contract award. Letters on an ongoing basis from May 2022 in line with key project milestones and developments.
Notifications providing information on project works, potential impacts, timing, and progress.	Notifications have been distributed to residents and properties within a 100 metres radius of construction sites.	Ongoing from June 2022 in line with key project milestones and developments.
Personalised briefings using presentations and opportunity for questions and answers.	Elected representatives and key stakeholders.	Initial briefing held in October 2021 prior to Alliance contract award. Briefings on an ongoing basis from June 2022 and as required/requested throughout the project lifespan.

Table 5: Engagement Summary

Sentiment	Issues Raised	Stakeholders	Response / Solutions
Drainage	City of Armadale has raised need for drainage consideration and compliance.	Residents City of Armadale MRWA	Drainage has been surveyed to ensure compliance. The water table in the area is very high and a significant consideration in the design. The hydrology/drainage concept for the project is that existing outflow rates/volumes will not be increased beyond current values to prevent impacts. Any additional stormwater caused by increased impermeable areas will be captured and stored within the project footprint in drainage swales or storage basins.
Bushfire risk	With the addition of grade separation and potential for cul-de-sacs to be used to ensure property access, some existing fire evacuation routes may be impacted.	Residents City of Armadale	A bushfire consultant is advising the team on entry and exit points for the project and the subdivisions will remain compliant.
Access and amenity during Construction	Residents and stakeholders have expressed a desire to maintain access and amenity during construction. This is particularly important to local businesses.	Residents	The project will work closely with those residents and stakeholders most affected to minimise impacts to access and amenity during construction. Traffic management plans will also be implemented to ensure all vehicle movements are facilitated safely while maintaining access where possible.
Noise during construction	Residents have expressed concerns about noise impacts during construction.	Residents	During construction the project will provide regular updates on upcoming construction works to mitigate impact on the amenity of residents. All vehicles will be fitted with croakers rather than beepers, to maintain safety requirements whilst being more amenable to residents requirements. The project will provide contact details to residents seeking information at any time. Efforts have been made to avoid after hours works where possible to reduce the impact on residents.
Noise during operation (Increased train frequency upon commissioning)	Residents have expressed concerns about the noise levels of metropolitan electric trains and the increased frequency of trains.	Residents	With consideration for the increased frequency of trains once the BRE project is completed, there will be significant positive impact from the removal of Eleventh Road level crossing. Currently residents have four diesel trains (two in each direction) travel past their properties per day, this will increase to 8-10 electric trains per hour. While the frequency will increase, electric trains are generally quieter.



Tree retention and landscaping	Throughout a number of streams of engagement various stakeholders have expressed their desire for tree retention and appropriate landscaping.	Residents City of Armadale	The project has a sustainability target for "no net loss of biodiversity". This will be achieved through offset management and tree retention planning, developed in collaboration with key stakeholders. Where impacts are unavoidable, the project will minimise and offset impacts. Our design and construction methods are being carefully considered to achieve optimum environmental and social outcomes. Where clearing is necessary, tree replacement will occur in accordance with a Landscaping Plan approved by PTA (and the local government where planning approval is required). Timber, seeds and other parts of the plants can be repurposed or donated to organisations such as Landcare.
Visual treatments on bridge	Stakeholders have expressed a desire for input on the visual treatments of the bridge.	Residents City of Armadale	The landscaping and aesthetics of the bridge and noise walls are currently being finalised. Where there are opportunities for public consultation and input in this area stakeholders will be engaged.
Lighting	Stakeholders have shared mixed views on lighting the bridge in terms of both safety and the amenity for surrounding properties.	Residents City of Armadale	The road approaching the bridge from either direction is lit. This road lighting provides that further lighting is not required to be directly attached to the bridge structure due to the short length of the bridge.

Table 6: Engagement Outcomes

4.1 DevelopmentWA

A pre-lodgement meeting held with DevelopmentWA on 1 February 2023 was an important step in the planning and development process and provides opportunities for the Alliance and DevelopmentWA to discuss the proposed development and identify any potential issues that may need to be addressed, prior to formal lodgement. DevelopmentWA outlined the following key considerations for the project:

- Justification of aesthetic treatments to adjacent and future residents
- Artificial water basins
- Landscaping plans
- Wall and screen treatments
- Consideration of the design in the presence of the Design Review Panel.

These outcomes of the meeting are addressed in **Section 5 – Design Criteria and Development Details** of this DA and attached appendices.

This DA demonstrates the Alliance has a strong understanding of the importance in delivering a high-quality infrastructure project. The Alliance has expressed a clear desire to ensure the Eleventh Road bridge meets the needs of the local community and is delivered to the highest possible standards. The commitment to quality is evident with on-going and effective with stakeholders and local community members. Additionally, the Alliance has demonstrated a willingness to collaborate with the decision maker and relevant referral authorities to ensure the project is delivered in a way that is sensitive to the needs of the surrounding area. This strong focus on quality and collaboration is key for the successful delivery of the Eleventh Road Bridge.



5. Design Criteria and Development Details

DevelopmentWA has the following redevelopment objectives for the Wungong Area which relate to the proposed development at Eleventh Road.

Objective	Response
To build a sense of place by supporting high-quality urban design	<p>High-quality urban design plays a crucial role in the development of a sense of place within a community. By creating spaces that are visually appealing, functional, and reflective of the unique character and history of a place, urban design can help to build a sense of identity and pride among residents and visitors.</p> <p>Eleventh Road bridge can promote a sense of place by supporting walkability and other forms of active transportation, which can help to foster social interaction and community engagement. By incorporating streets, footpaths and edges that are safe, accessible, and welcoming to pedestrians and cyclists, designers can encourage more people to get out and explore their community.</p> <p>Landscape elements have been carefully considered in prominent locations and important edges to reduce their impact and embed bridge structure in the local place. Treatments on the bridge structures will be designed to reflect the local landscape, referencing earth coloured tones influenced by the neighbouring Darling Scarp.</p>
To promote economic wellbeing by supporting, where appropriate, development that facilitates investment and provides opportunities for local businesses and emerging industries	<p>Eleventh Road bridge serves as a catalyst for new development, particularly in areas that were previously isolated by transportation infrastructure. By providing improved access and connectivity, Eleventh Road bridge can make it more attractive for developers and investors to consider new projects and initiatives in the surrounding area. This can lead to new development as well as residential and mixed-use projects that create jobs, housing, and other amenities for local residents.</p>
To promote urban efficiency through infrastructure and buildings	<p>Eleventh Road bridge improves transportation efficiency by reducing traffic congestion and travel times, improving access to employment, education, and other services, and enhancing mobility for people and goods. By providing safe, reliable, and convenient transportation options, the Eleventh Road bridge can help to support economic growth and reduce the negative impacts of traffic congestion.</p>
To enhance connectivity and reduce the need to travel by supporting development aimed at well-designed places that support walking, cycling and public transit	<p>The Eleventh Road bridge enhances connectivity between different neighbourhoods and regions, improving access to jobs, services, and amenities for residents and businesses. By creating new connections and strengthening existing ones, the Eleventh Road bridge can help to promote social and economic inclusion, reduce spatial disparities, and support more equitable and sustainable urban development.</p> <p>The bridge will allow for grade separated operation of the suburban rail network, which promotes sustainable transport for residents of Byford and beyond.</p>

Table 7: Wungong Objectives

5.1 Wungong Vision

The vision for the Wungong Project area is to establish a vibrant and sustainable urban community within a landscape that respects and promotes the ecological and cultural features of the site.

Development of the Eleventh Road bridge results in the construction of modern infrastructure that supports the ongoing needs to the Wungong community and the expanding south-east urban corridor of the Perth Metropolitan area. Development within the subject site will exemplify the Armadale Redevelopment Scheme's 2 (Redevelopment Scheme) objectives, incorporating best practice water sensitive urban design measures, which integrate with the site's natural drainage systems and

facilitates efficient use of resources and infrastructure. It is important to note, however, that the specific infrastructure requirements of the development (e.g. as a grade separated bridge with associated upgrades) will mean that some specific design requirements within the Redevelopment Scheme will not be applicable.

As such, we respectfully request DevelopmentWA apply discretion to the local planning framework to balance good design with essential infrastructure requirements of the Eleventh Road bridge. Should further justification be required under the planning framework based on feedback from DevelopmentWA's referral agencies, the Alliance can prepare additional reporting and justification either through the assessment process and/or as a condition of development approval.

5.2 Public Realm and Land Use

Section 5.3 of the Redevelopment Scheme expresses the importance of creating sustainable places and spaces with strong emphasis places on the quality of the built form.

Table 6.2 of the Redevelopment Scheme identifies that within Precinct 17 – Eleventh Road 'residential' and 'community' uses are preferred with 'dining & entertainment' and 'commercial' uses contemplated. Where a development application is lodged with DevelopmentWA which does not reasonably fit within the definition of any identified land use, DevelopmentWA will consider the proposed use against category descriptions prescribed in Table 6.1 of the Armadale Redevelopment Scheme. Eleventh Road bridge is considered an infrastructure project which is defined within the Redevelopment Scheme as:

“a strategically important development required to provide basic services to the project area and greater Armadale region”.

The proposal does therefore not reasonably relate to any of the land use categories detailed in Table 6.1.

For consideration about how the development relates to the public realm and urban context, please refer to **Table 7** -Wungong Objectives and **Table 8** – State Planning Policy 7.0 Design of the Built Environment.

5.3 Urban Design Treatment Strategy

One of the design features of the Eleventh Road bridge will be the use of surface treatments (such as artwork and relief designs) on the north and south elevations. These designs will reduce the visual impact of the infrastructure and improve its links back to the Wungong area. The design will consider the unique sense of place that reflects the local cultural heritage and identity of the community.

The artwork aims to soften the visual impact of the bridge and reducing its perceived scale, breaking up the monotony of concrete edges, adding texture, colour, and depth to the structure.

Lightweight screening will also be incorporated into the bridge design to protect adjacent neighbouring properties' privacy as the bridge returns to the existing grade.

The artwork treatment and landscaping plan are still conceptual at this stage, and the final design will be completed in cooperation with the local government authorities and considering community needs.

Details of the Eleventh Road bridge urban treatment is detailed in **Appendix L** and **Renders 1-6**.



Render 1: Eleventh Road bridge facing north-east.



Render 2: Eleventh Road bridge facing north-east, showing modifications to Bruns Drive



Render 3: Eleventh Road bridge facing east, showing modifications to Bruns Drive



Render 4: Eleventh Road bridge facing south, showing maximum elevation and PSP



Render 5: Eleventh Road bridge facing west, showing south-west embankment and PSP



Render 6: Eleventh Road bridge facing north-east at human scale

5.4 Drainage and Urban Water Management

The drainage strategy for Eleventh Road has been developed in accordance with the PTA's Scope of Works and Technical Criteria.

The subject site is located within Precinct 17 of the Redevelopment Scheme and is split into two catchments which are located east and west of the existing at grade rail level crossing. The existing drainage network is made up of shallow open channel drains and culverts across Eleventh Road and west of the rail crossing. The road is uncurbed and stormwater runoff sheets off the shoulder into existing open drainage channels either side of the road.

The Eleventh Road drainage strategy has the following primary objectives:

1. Provide road drainage for Eleventh Road to satisfactorily manage runoff from post-development flows and associated drainage network, including pit and pipe network, and where possible utilising open channel drains to convey flow.
2. Provide attenuation of stormwater runoff to control discharge from the project works to predevelopment flow rates including the provision of a new drainage basin on the south-western corner of the Eleventh Road Bridge crossing.
3. Provide road drainage for ancillary local road extensions (Bruns Drive and Keenan Street).

The approach to drainage has been to maintain the existing drainage regime where possible. This is achieved through retention of existing infrastructure where practicable, maintaining existing flow paths and controlling runoff to a pre-development flow rate.

For effective stormwater treatment within the proposed drainage basins and swales, a selection of planting will be derived from the vegetation guidelines for stormwater biofilters in the south-west of Western Australia. This document provides a reference list to guide the selection of native plant species specific to the region and their function for effective nutrient removal in combination with the proposed filter media. Plants selected will also consider requirements to help support and stabilise basin and swale batters.

Additional consideration has also been given to the erosion and sediment control. Part of the environmental control measures for stockpile and material management will be to ensure that sediment and surface water from the development area are contained within the local area and project boundaries. The following controls will be considered:

- Incorporating water sensitive design principles
- Construction staging will ensure appropriate surface water management such as culverts and drainage diversions are installed prior to heavy downpour weather events
- Use of slit curtains and erosion matting to minimise impact from the project during construction
- Installation of temporary drainage structure to manage, maintain or improve existing surface water drainage from the proposal and incorporate erosion protection measures to minimise impacts to habitats and sensitive environmental receptors
- Maintain existing surface water flows
- Temporary capture of runoff to control discharge of sediment and minimise turbidity of water potentially leaving the development envelope.

Refer to **Appendix F** for the Civil Development Plans and **Appendix I** for the Eleventh Road Drainage Strategy for further details of the drainage network.



5.5 Artificial Water Pond (shallow basin)

Two construction water ponds are proposed as part of this DA, located either side of the rail corridor within the Redevelopment Area and PCA. The water pond located within the PCA is not subject to development approval (**Appendix C** – Planning Approval Requirements). The construction water pond located within the Redevelopment Area, otherwise, known as a ‘turkey’s nest’, does require development approval and will be designed to hold only enough construction water, so as to ensure that there is sufficient supply for dust suppression, but small enough to ensure the water does not stagnate and become a breeding ground for mosquitoes. Details of treatment options including screening/landscaping can be explored through a condition of development approval and/or detailed design for integration into the development.

5.6 Mosquito Management

As detailed in the Redevelopment Scheme, a Mosquito Management Plan is required due to the construction of artificial water basins. Based on the advice received from referral departments during assessment of the DA, the Alliance respectfully requests that any management plans related to mosquito management are conditioned as part of the DA.

5.7 Landscaping

Landscaping is proposed along the embankments and south of Eleventh Road bridge and consists primarily of pea gravel, prime bark timber mulch, and tube stock plant mix.

In addition, extensive landscaping will be carried out around the bridge. Native plants and trees will be used to create a natural transition between the bridge and the adjacent land, which will not only enhance the visual appearance of the structure but also contribute to the local biodiversity and ecological sustainability.

The landscaping will be designed to create a visual buffer between the bridge and the surrounding residential area. It will help to mitigate the noise and visual impacts of the bridge while creating an attractive environment for people to use and enjoy.

Refer to **Appendix F** for the Civil Development Plans for further details regarding landscaping on Eleventh Road bridge, and **Appendix M** for the Landscaping Strategy which demonstrates how the Alliance proposes to landscape the area in a realistic and sustainable manner.

5.8 Crime Prevention Through Environmental Design

Crime prevention through environmental design (CPTED) suggests that the design and layout of the physical environment can influence criminal behaviour. It aims to reduce crime and increase safety by creating a physical environment that is both welcoming and discouraging to criminal activity. CPTED is based on four principles which have been applied to the development, where appropriate:

1. Natural surveillance: The physical design allows for maximum visibility, making it easier for people to see what is happening and reducing the opportunities for criminals to hide.
2. Natural access control: The use of physical features such as fences, gates, and landscaping to guide people and control access to a space, making it more difficult for criminals to enter or exit unnoticed.
3. Territoriality: Involves creating a sense of ownership and belonging in a space, which can discourage criminal activity by making it clear that the area is being monitored and cared for.
4. Maintenance: Ensuring that a space is well-maintained, clean, and free of obstructions, which can make it less attractive to criminals and increase the sense of ownership and pride among the community.



The design ensures that the footpath area (that runs adjacent to the rail line, under the bridge), and footpath area over the bridge have broad sightlines that reduce areas of entrapment. In addition, lighting along all public footpaths on approach and at the bridge assists with user safety into the evening and night.

5.9 Tree Retention and Clearing

The Eleventh Road bridge works area includes areas of significant native fauna habitat, flora species, ecological communities, and vegetation complexities. The design process has been mindful of this to minimise disturbance where possible and promote revegetation.

In total, approximately 2 hectares of native vegetation is planned for removal within the Eleventh Road works area. Within this area, the following trees are scheduled for removal:

- 22 Black Cockatoo (habitat trees)
- 6 Introduced
- 1 Corymbia Citriodora
- 13 Corymbia Calophylla
- 1 Eucalyptus Globulus
- 1 Eucalyptus.

The Alliance has identified tree retention opportunities with review and input at multiple stages by the Project Arborist and Landscape Architect. Whilst the loss of some trees is recognised as being unavoidable to accommodate such a bridge structure, the project team has actively reconsidered ways to reduce the footprint of the temporary works area, and the bridge's permanent footprint to maximise tree retention. Examples include:

1. Relocating the temporary works area from Lot 14 which contains 4 x Black Cockatoo Trees and Guildford Vegetation Complex to an area that does not hold these constraints.
2. Minimising construction clearing requirements for the area closest to the known population of Diuris Purdiei.

The Alliance commenced early engagement with the City regarding tree retention and clearing, including the commencement of the Landscaping Strategy. In addition to the Landscape Strategy, a Tree Retention and Replacement Plan is under development by the Landscape Architect and Project Arborist. It will include the following drawings and specifications:

- Drawings will include trees to be retained, nominated Tree Protection Zones (TPZ's), and trees to be removed.
- Proposed endemic trees and plants including size at planting, species, and installation locations.
- Trees Retention Specification will include site specific measures to retain and protect nominated trees as directed by the Project Arborist.

Review, coordination, and recalculation of the clearing area is conducted on a weekly basis to ensure compliance with Environmental Clearing conditions and will be an ongoing action until all clearing activities are complete.



Trees not anticipated for removal are being protected through temporary fencing to ensure that retained vegetation is not removed and/or damaged. The project design and construction planning incorporate the environmental attributes with native vegetation retention being a key priority for the project. Specifically, the Alliance is maximising the use of cleared land for use as a temporary roads and construction laydown areas. Additionally, the Alliance has designed the construction water ponds to be as deep as possible, and placed in an area of sparse vegetation, minimising clearing requirements.

For trees that cannot be relocated and are destined to be removed, the Alliance will be donating tree trunks and branches to organisations such as Kaarakin Black Cockatoo Centre, Landcare, Men's Shed and Nature Play. Grass trees will be relocated and used for landscaping at the Byford and Armadale Stations.

Other tree retention actions include, but not limited to:

- Design and construction within TPZ's shall be conducted as per AS 4970 (2009) 'Tree Protection on Development Sites'.
- Any pruning or management of trees shall be conducted as per AS 4373 (2007) 'Pruning of Amenity Trees' - Arborist will advise of the ability to prune trees instead of complete removal in the case of trees being very close to a clearing boundary.
- Project Arborist will provide continued desktop review all proposed designs and shall undertake further site based visual inspections to review and advise on minimising impacts to existing trees.
- Trees and other vegetation subject to retention will be surveyed, marked, and fenced off to prevent accidental removal. All trees (trunk diameter DBH 150mm and greater) located within the Development Envelope in areas to be impacted shall be inspected and physically tagged by the project Arborist.
- TPZ's will be included on all consultants drawings (Landscape, Civil, Electrical, Hydraulic etc) to ensure TPZ's are coordinated with design and construction works.
- A feature survey of all trees (tagged and untagged with a trunk diameter DBH 150mm and greater) and all Xanthorrhoea sp. and Kingia sp. (Balgas / Grass trees) (greater than 300mm trunk height) within the Development Envelope shall be undertaken.
- Training and special instructions are provided to contractors each morning during pre-start and the importance of tree retention will be a key message. Internal clearing permits which contain environmental checks and hold points are approved by the Environmental Manager prior to any clearing activity.
- Arborist shall monitor all construction works within TPZ's as per AS 4970 (2009).
- The size of the water drainage and construction water basin is noted as requiring further inputs to minimise impacts to trees.
- Investigating the use of additional retaining wall, reducing batter size.
- Transplanting at least 600 Grass Trees taken from the clearing area and moved to the Armadale and Byford Stations and precincts.
- Rehabilitation and replanting of vegetation.
- Project target to obtain the Infrastructure Sustainability Council (ISC) ecology credit.



5.10 Operational Noise and Vibration

No specific road traffic noise mitigation measures are proposed at this stage. This is based on detailed modelling of the future road alignments. Detailed noise contour maps for Eleventh Road will be included in a future revision of the Operational Noise and Vibration Report, once further design of the development is progressed.

Refer to **Appendix H** for a copy of the Operational Noise and Vibration Report.

5.11 Geotechnical

A Geotechnical Report has been prepared to provide a documented record of the geotechnical design for the Eleventh Road bridge.

The design report provides the following information:

- Approach, methodology and assumptions made for the geotechnical design
- Geotechnical pile information for the Eleventh Road bridge
- Geotechnical design information for the proposed retaining walls and other structures associated with the bridge such as mechanically stabilised earth walls, shallow foundations, transitions slabs and deflection walls.

Refer to **Appendix F** for the Civil Development Plans and **Appendix G** for the Geotechnical Report for further details.

5.12 Bushfire Vehicular Access Review

Where an application for development approval is proposed within a bushfire prone area, it triggers a need to assess the proposal against State Planning Policy 3.7 Planning in Bushfire Prone Areas and the associated Guidelines for Planning in Bushfire Prone Areas. The requirement for planning in bushfire prone areas is triggered by Part 10A of the *Planning and Development (Local Planning Schemes) Regulations 2015*.

No new habitable buildings are proposed as part of these works. Additionally, there is no intensification of land use, as no additional occupants are being brought into as a result of this road modifications. Additionally, the modifications do not create an increased risk of bushfire to the area.

Although the works included in this DA could be considered exempt under the requirements of State Planning Policy 3.7 and the associated Guidelines, the Alliance has considered the modifications to the existing road network significant enough to warrant an assessment against the current Guidelines to determine the level of compliance of the existing road network. The assessment aims to demonstrate the proposal limits risk to acceptable levels and as achieved through the following:

- Review the level of compliance of the existing public road network at the time of approval and as it currently stands (immediately prior to the proposed modifications)
- Review the level of compliance of the post-development road network against the current Guidelines as well as the compliance of the existing road network
- Demonstrate that the proposed road modifications will produce an acceptable outcome which aligns with the current bushfire Guidelines, and not result in an unsafe / undesirable outcome.

For a full assessment of the road modifications proposed as part of this DA, refer to **Appendix J - Bushfire Vehicular Access Review**. Additionally, also refer to **Appendix F - Civil Development Plans**.

6. Project Delivery, Staging and Construction Management Plan

Staging and construction for the Eleventh Road bridge has been a key consideration to minimise impacts on the local community and the natural environment. The Staging and Construction Management Plan (SCMP) has given special consideration to minimise the clearing of vegetation through relocation of drainage infrastructure, the control of dust and other airborne materials as a result of construction, and consideration of mitigation measures for environmental protection.

Refer to **Appendix D** for The SCMP for further details.

7. State Planning Framework

7.1 State Planning Policy 5.4 – Road and Rail Noise

The criteria relevant to managing the impacts of road and rail noise are outlined within the WAPC's State Planning Policy 5.4 Road and Rail Noise (SPP 5.4). The objectives of SPP 5.4 are to:

- Protect the community from unreasonable levels of transport noise
- Protect strategic and other significant freight transport corridors from incompatible urban encroachment
- Ensure transport infrastructure and land-use can mutually exist within urban corridors
- Ensure the noise impacts are addressed as early as possible in the planning process
- Encourage best practice noise mitigation design and construction standards.

The proposed development is essentially an upgrade of the existing development in terms of use, being primarily for vehicle access, and as such, generally complies with the objectives of SPP 5.4. For further considerations regarding impacts of additional noise, please refer to **Appendix H – Operational Noise and Vibration Report**.

7.2 State Planning Policy 7.0 – Design of the Built Environment

State Planning Policy 7.0 (SPP 7.0) Design of the Built Environment became operational in 2019 and is the lead policy that elevates the importance of design quality across the built environment in Western Australia. SPP 7.0 includes 10 principles for good design and establishes the framework for integrating design review as part of the evaluation process.

SPP 7.0 requires new development proposals to address the criteria within the policy which has been created to promote good design outcomes. A design principles response addressing how the Eleventh Road bridge responds to SPP 7.0 design principles is provided in **Table 8** below.

Principle	Response
Context and Character	
Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.	<p>Eleventh Road bridge includes dedicated paths for pedestrians and cyclists, providing safe and convenient access for these modes of transportation. This can help to encourage more sustainable and active forms of mobility in the area and contribute to a sense of community and social interaction among local residents.</p> <p>Treatments on the bridge structures will be designed to reflect the local landscape, referencing earth-coloured tones influenced by the neighbouring Darling Scarp.</p> <p>Overall, Eleventh Road bridge responds to the characteristics of the Wungong area by improving local connectivity and access, and creating a distinctive landmark that contributes to a sense of place and identity in the community.</p>
Landscape Quality	
Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.	<p>Landscaping of infrastructure projects is a crucial part of the ecological context.</p> <p>Eleventh Road bridge considers sustainability principles, contextual design, water-sensitive design, biodiversity considerations, and pedestrian and cycling access, contributing to the developments impact on the Wungong community.</p> <p>Landscape elements have been carefully considered in prominent locations and important edges to reduce their impact and embed the bridge structure in the local place.</p>

Built Form and Scale	
<p>Good design ensures that the massing and height of development is appropriate to its setting and successfully negotiates between existing built form and the intended future character of the local area.</p>	<p>Eleventh Road bridge's height and massing are appropriate to the scale and character of the surrounding built environment. The design team took into consideration the intended future character of the area, to ensure that the bridge's height and massing would not detract from the surrounding buildings and natural environment.</p> <p>The design team has carefully considered the architectural style, materials, and colours of nearby buildings to ensure that the bridge would harmonise with its setting.</p> <p>The developments visual impact was carefully evaluated during the design process. The design team used computer modelling and visual simulations to assess the bridge's visibility from different viewpoints and to ensure that it would not create any visual obstructions or detract from important views (refer to Renders 1 - 6)</p> <p>The design process for the development involved community consultation allowing local residents and stakeholders to provide input and feedback on the design. This helped to ensure that the bridge's height, massing, and overall design were appropriate for the local context and aligned with the community's vision for the future of the Wungong area.</p>
Functionality and Build Quality	
<p>Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full lifecycle.</p>	<p>Eleventh Road bridge is designed to be accessible for all users, including pedestrians, cyclists, and drivers. It includes dedicated paths for pedestrians and cyclists, as well as separate lanes for vehicles, ensuring that all users can navigate the bridge safely and efficiently.</p> <p>The materials and coatings are selected to withstand environmental conditions, reducing the need for frequent maintenance and repairs.</p> <p>The structural design of the development is optimised to perform well and deliver optimum benefit over its full lifecycle. The bridge uses many precast elements which reduce the amount of steel and concrete required for construction, making the bridge more cost-effective and sustainable. The use of durable and low-maintenance materials also helps to minimise maintenance and repair costs over the bridge's lifecycle.</p> <p>Eleventh Road bridge meets the needs of users efficiently by balancing functional requirements to perform and deliver optimum benefit over the full lifecycle.</p>
Sustainability	
<p>Good design optimises the sustainability of the built environment, delivering positive environmental, social, and economic outcomes.</p>	<p>The Eleventh Road bridge optimises the sustainability of the built environment by delivering positive environmental social, and economic outcomes. It incorporates sustainable materials, energy-efficient lighting, water-efficient design, biodiversity considerations, community engagement, and economic benefits to create a bridge that is functional, sustainable, and contributes to the overall well-being of the local community.</p> <p>The development is constructed using sustainable materials, including steel, concrete, and composite materials. These materials are durable, low-maintenance, and have a long lifespan, reducing the need for frequent repairs and replacements.</p> <p>The developments drainage system is designed to reduce stormwater runoff and protect the local waterways. Refer to Appendix I for the Eleventh Road Drainage Strategy.</p> <p>The bridge's design incorporates ecological considerations. The design includes planting native vegetation, which provides habitat for local wildlife and contributes to the overall biodiversity of the area.</p> <p>The developments design includes features that support economic benefits, including improved transport links and connections within the Wungong community which can promote economic growth and development. The bridge's design also accommodates future growth and development, providing opportunities for businesses and industries to thrive.</p>
Amenity	
<p>Good design provides successful places that offer a variety of uses and activities while optimising internal and external amenity for occupants, visitors, and neighbours, providing</p>	<p>The Eleventh Road bridge provides connectivity between local communities and promotes active transportation by including dedicated paths for pedestrians and cyclists, as well as separate lanes for vehicles. This promotes a safe place for active transport, reduces car dependency, and improves access to local amenities.</p> <p>The development incorporates landscaping that provides shade, reduces heat island effects, and creates a pleasant environment for users.</p>



environments that are comfortable, productive, and healthy.	The use of native vegetation also helps to promote biodiversity and supports the local ecosystem.
Legibility	
Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.	<p>The Eleventh Road bridge incorporates clear navigation, visual continuity, landmarks, and pedestrian-friendly design elements to create buildings and places that are legible and easily navigable. Examples include clear sight lines through footpath areas over the bridge and beside the rail line.</p> <p>These design features help users to find their way around the space and create a sense of place that is recognisable, memorable, and engaging.</p>
Safety	
Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.	<p>The design of the Eleventh Road bridge design prioritises safety, minimising the risk of personal harm and promoting safe behaviour and use.</p> <p>It includes pathways with clear sightlines, allowing users to see their surroundings and identify potential hazards. The use of landscaping is carefully placed to avoid creating blind spots.</p> <p>The development includes dedicated paths for pedestrian and cyclist traffic, separated from vehicle traffic. This separation helps to minimise the risk of accidents and promote safe behaviour among all users.</p> <p>Pedestrian and cycling accessible spaces include barrier protection along its edges, to prevent users from falls. The design includes tactile strips, handrails, and other features that ensure the safety and comfort of all users.</p> <p>Lighting is provided to ensure that users feel safe and secure, with lighting levels sufficient to support safe behaviour and use during both day and night.</p> <p>The design accommodates emergency services access, allowing vehicles to respond quickly and efficiently in the event of an emergency.</p>
Community	
Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.	<p>The development responds to community needs by providing safe and convenient access for pedestrians and cyclists, improving connectivity, reflecting the local character of the area, and involving the local community in the design process.</p> <p>These features help to create a bridge, and footpath network that is not just a functional structure but also an integral part of the local community.</p>
Aesthetics	
Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.	Eleventh Road bridge prioritises aesthetics with careful consideration given to materials, colours, and textures. These treatments will incorporate element that reflect the natural landscape and local character, inspired by the local landscape through references to earth-coloured tones influenced by the neighbouring Darling Scarp.

Table 8: Response to State Planning Policy 7.0 – Design of the Built Environment

8. Conclusion

After consideration of various factors and potential benefits discussed in this DA, the Eleventh Road bridge design meets the objectives and provisions of the planning framework and should be approved as a critical infrastructure element of the BRE.

Construction of the Eleventh Road bridge would improve the safety of the road network by reducing the risk of accidents by removing a dangerous 'at-grade' level crossing. It provides a boost to the local economy, creating jobs and opportunities for businesses in the construction and transport sectors.

The project team has carefully designed the bridge, landscaping, and aesthetic treatments to mitigate potential concerns or visual impacts where possible.

Based on the information provided in this DA, the Alliance respectfully requests that DevelopmentWA utilise its discretion to approve this DA and condition any additional reporting and/or management plans.

10. Appendices

Application to Undertake Development + MRS Form 1

Refer to **Appendix A** for the Application to Undertake Development and MRS form 1 signed by the State of Western Australia / PTA.

Certificate of Titles

Refer to **Appendix B** for the Certificate of Title for Lots described in **Table 4**.

Planning Approval Requirements

Planning considerations associated with this DA are complex, given the subject site spans over a DevelopmentWA Redevelopment Area, a Planning Control Area, with permanent infrastructure affecting residents of both the City of Armadale and Shire of Serpentine-Jarrahdale.

Refer to **Appendix C** for a detailed overview of the Planning Approval Requirements and exemptions.

Staging and Construction Management Plan

The proposed demolition and construction management plan prepared by the Alliance demonstrates, at a high-level, construction work associated with Eleventh Road Bridge and how this will impact the locality.

A full demolition and construction management plan can be prepared by the Alliance prior to works commencing on-site, which is anticipated to be reflected through a condition of development approval.

Refer to **Appendix D** for the Demolition and Construction Management Plan.

Structural Engineering

Elevation plans produced as part of this DA aim to provide further detail around key structural elements of the bridge.

Refer to **Appendix E** for the Site and Elevation Plans.

Civil Development Plans

Civil engineering drawings related to the construction of the drainage, services, and ground infrastructure for the Eleventh Road bridge.

Refer to **Appendix F** for the Civil Development Plans.

Geotechnical

Geotechnical design information for the proposed retaining walls and other structures associated with the bridge such as mechanically stabilised earth walls, shallow foundations, transitions slabs and deflection walls.

Refer to **Appendix G** for the Geotechnical Report.



Operational Noise and Vibration

The criteria relevant to managing the impacts of road and rail noise are outlined within the WAPC's State Planning Policy 5.4 Road and Rail Noise.

Refer to **Appendix H** for the Operational Noise and Vibration Report.

Eleventh Road Drainage Strategy

The Eleventh Road Drainage Strategy covers the management of stormwater runoff from the Eleventh Road grade separation and how the grade separation interface with the line wide drainage strategy and hydrology.

Refer to **Appendix I** for the Water Management Strategy.

Bushfire Vehicular Access Review

The Bushfire Vehicular Access Review assesses the proposed development and road modifications against State Planning Policy 3.7 Planning in Bushfire Prone Areas and the associated *Guidelines for Planning in Bushfire Prone Areas*.

Refer to **Appendix J** for the Bushfire Vehicular Access Review.

Engagement Summary

The Engagement Summary details the engagement undertaken by the Alliance and how the outcomes of the engagement activities have influenced the design of the Eleventh Road bridge.

Refer to **Appendix K** for the Engagement Summary.

Urban Design Treatment Strategy

The Urban Design Treatment Strategy seeks to outline the considerations of the aesthetic impact of the Eleventh Road Bridge and associated infrastructure, and the efforts made to reduce the impact to both the immediate environment and key stakeholders.

Refer to **Appendix L** for a copy of the Urban Design Treatment Strategy.

Landscape Strategy

The Landscape Strategy considers the existing tree canopy coverage of the development area, proposed canopy removal, and post construction tree canopy to be achieved up to a 10 year period.

Refer to **Appendix M** for a copy of the Landscape Strategy.