



# METRONET YANCHEP RAIL EXTENSION

Alkimos Train Station

Prepared for  
**NEWEST ALLIANCE / PUBLIC TRANSPORT  
AUTHORITY**  
September 2020

**URBIS**

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Project Code              P0022083  
Report Number            Final

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# INTRODUCTION

Urbis acts as the planning consultant on behalf of the *NEWest Alliance*, the appointed contractor to deliver the METRONET Yanchep Rail Extension on behalf of the Public Transport Authority (the delivery agency for the METRONET program). The following development application seeks approval for the Alkimos train station and associated infrastructure, being one of three new train stations proposed as part of the METRONET Yanchep Rail Extension project, being the extension of the Joondalup line from Butler to Yanchep.

The Alkimos Train Station will be constructed within the core of the Alkimos Secondary Centre, located within the City of Wanneroo municipality. The Alkimos Train Station will be located within the Alkimos Activity Centre which is generally bounded by Romeo Road to the north, Marmion Avenue to the east and Wanneroo Road to the west. The Alkimos station is a multi-modal station, and will comprise the following:

- Main station building (including the station entrance and platform concourse) and typical station amenities. The station building is designed ‘in cut’, meaning the railway tracks and station platform are partially sunk below ground level, creating an at-grade entry experience to the station concourse. This station design serves the dual purpose of improving the pedestrian experience and ease of access through the station and to the platform, as well as meet the PTA’s safety requirement of delivering pedestrian access which does not directly interface with the rail infrastructure.
- Bus interchange immediately north of the Alkimos station building entrance. A direct, weather protected connection is provided between the station building and bus interchange.
- Principal shared path (**PSP**) to the western side of the railway line, traversing through the Station Precinct this PSP will ultimately form part of a wider connection generally running parallel to the Yanchep Rail Extension railway reservation from Butler to Yanchep.
- Private vehicle parking, including a dedicated kiss-and-ride pick-up/drop-off area and separate long-term parking area designed for Transperth ‘park-and-ride’ patrons.

A key objective in the station design is to apply principles which support transit oriented development (**TOD**), and encourage non-private vehicle use for connecting trips, as well as to support a diverse range of uses within the activity centre. However, the pragmatic requirement for long-term car parking for a new train station within an emerging activity centre must still be acknowledged and provided for in a way that is safe and does not overly impact the long-term placemaking opportunity. To strike an appropriate balance between these competing objectives, the following infrastructure hierarchy has been specifically applied to the station design:

- Pedestrian desire lines and accessibility have been key drivers in the station design. This is demonstrated through the direct pathway from the station entrance to future development immediately east and west of the station. The grade separated station design also supports pedestrian connectivity by allowing at-grade accessibility across the sunken railway line which assist in unifying the activity centre.
- Bus service convenience, with the bus interchange being located immediately adjacent to the station entrance. Passenger comfort is considered in the design, with weather protection provided between the station and bus interchange.
- Drop-off and pick-up (‘kiss-and-ride’) area within a short walk of the station entrance, which also provides for on-demand transport options; and
- Segregated long-term (all day commuter) parking is provided to the west and north-west of the station, at the greatest distance from the station entrance. Provision has also been made for ultimate future station car parking area north east of the station. This ultimate arrangement has been signed-off by Parliament and will be the final footprint.

This hierarchy encourages patrons to consider private car alternatives by delivering these as a more convenient mode of transport with a highly positive user experience, as well as removing the impact of large areas of at grade parking from the highest pedestrian area immediately adjoining the station. In addition, the segregated design of the long-term parking areas encourages passengers to engage with the future town centre as they move between the car parking areas and the station entrance.

The Alkimos Station is recognised as an essential catalyst to the successful progression of the Alkimos Secondary Centre, and unlocks the potential to implement a contemporary town centre including the possibility of higher density development within the heart of Alkimos than would have been possible without the transit option. The ‘infrastructure first’ model enables the town centre to be defined by the railway station from day one and ensure that movement and built form is defined holistically to the magnetism of the railway station.

This report considers the planning context and merit of the proposed development, including an overall explanation of the station and key design drivers. This includes an assessment of the application against the relevant planning framework, including the requirements of State Planning Policy No. 7 – Design of the Built Environment and the METRONET Station Precinct Design Guide. As demonstrated through this report, the thorough technical reporting, stakeholder consultation and careful design consideration have all come together through the Alkimos Station design to produce a transformative asset for the Alkimos region.

# 1. PROJECT BACKGROUND

## 1.1. YANCHEP RAIL EXTENSION BACKGROUND

METRONET is a key project of the West Australian State Government and the single largest investment in public transport ever undertaken in Perth. METRONET will positively change how people live and travel in Perth and significantly improve the connectivity across the metropolitan area. With the Yanchep-Two Rocks area expected to accommodate 2 to 3 percent of Perth's total population growth over the next 40 years, well planned and early implementation of travel infrastructure is an essential consideration for this region.

The METRONET Yanchep Rail Extension (**YRE**) project will deliver a 14.5km rail extension of the Joondalup Line from Butler Station to Yanchep. The project includes the delivery of 3 new stations at Alkimos, Eglinton and Yanchep, a new bus stowage depot at Alkimos, 9 new road-over rail bridges, 13.8km of principle shared path (PSP) and conversion of Butler Station into a 'through' station.

A context summary of the YRE extension is illustrated at Figure 1.

Figure 1 - Context Summary of YRE Extension



Following delivery of the extension, the Joondalup line will operate at the following frequency on commencement of operation:

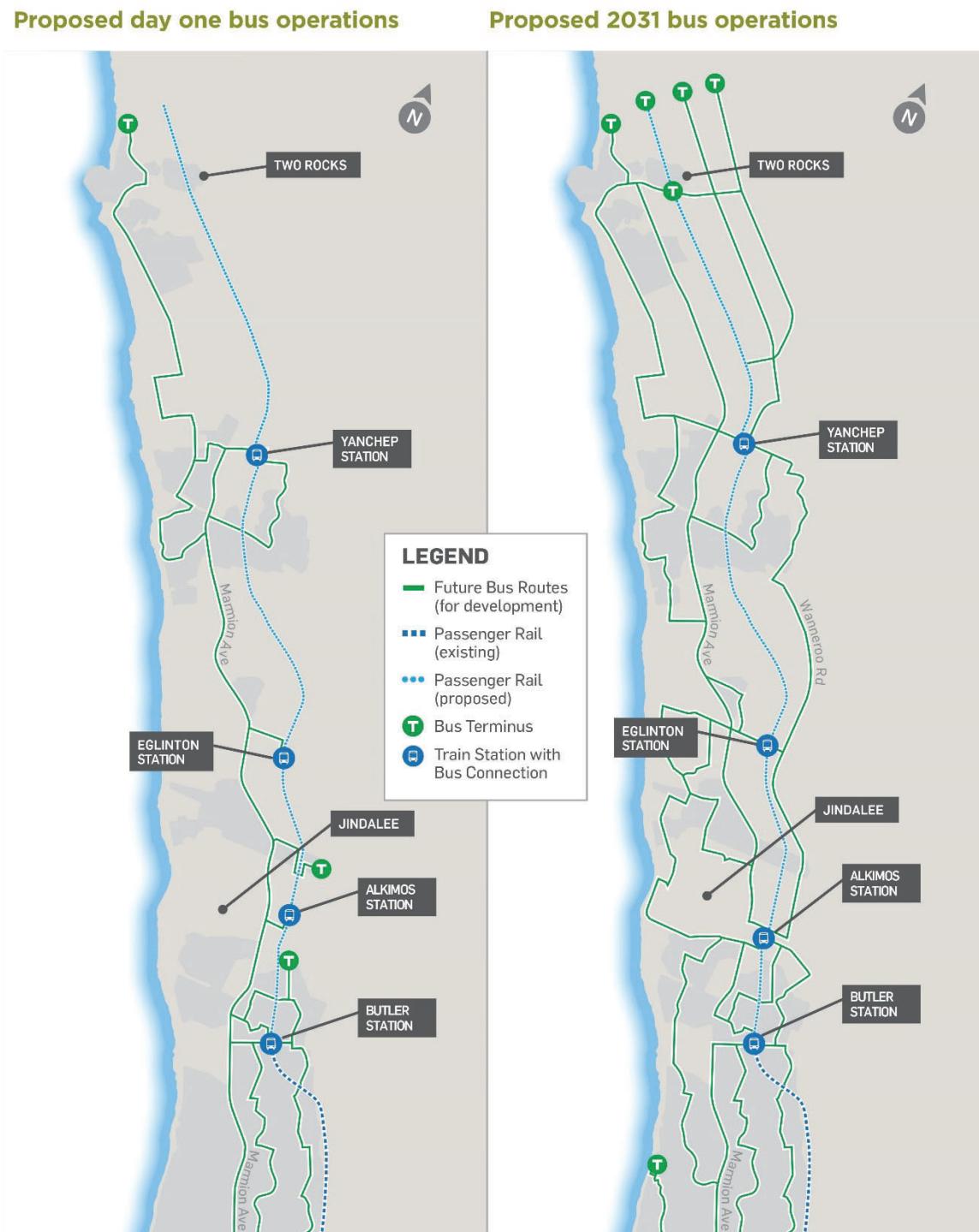
- Maintain the frequency of 12 trains per hour through Perth CBD
- Provide a frequency of 6 trains per hour from Yanchep in the peak morning hour
- Maintain the frequency of the Whitfords-Cockburn Shuttle being 6 trains per hour from Whitfords through to Perth, to Cockburn Central.

Early estimates of the YRE patronage estimates that around 5,200 daily boarding's will occur at day one operation, with this number drastically increasing to an estimate of approximately 19,400 daily boarding's by 2031.

Peak period operation of the YRE extension of the Joondalup line is expected to require six carriages operating at a frequency of 6 trains per hour (averaging one train per 10-minute intervals).

All new stations delivered as part of YRE are designed as multi-modal stations meaning the train station will be delivered in conjunction with supporting transport infrastructure including bus interchange, pedestrian and cyclists' pathways. Figure 2 below outlines the planned bus network to be implemented in conjunction with the YRE line, noting that the network is ultimately dependent on supporting local road constructions by parties other than the PTA, and may be subject to change subject to funding.

Figure 2 - Planned YRE Bus Network



Source: METRONET YRE Project Definition Plan

A summary of the METRONET YRE project is provided at **Appendix A** of this report.

## 1.2. ALKIMOS STATION BACKGROUND AND SUPPORTING OPERATIONS

Population growth for the Alkimos and Butler Region is forecast to reach over 40,000 by 2031. Patronage estimates used to inform the planning of the Alkimos Train Station suggests that approximately 2,100 daily boarding occur at the station commencement, and between 2,700 to 3,600 daily boarding's will be undertaken by 2031. The new station and rail extension provides an alternative to the 1 to 1.5hr private vehicle peak hour journey to the Perth CBD, reducing the journey to approximately 41 minutes, providing direct and tangible incentives for commutes to consider public transport over private vehicle use.

## 1.3. METRONET SCOPE AND REQUIREMENTS

The contractual arrangements under METRONET for the YRE project are structured as an alliance contract. In December 2019, the NEWest Alliance, with CPB Contractors, Downer Group and the PTA, was formed and selected as the contractor to deliver the YRE project, including the Alkimos Station and associated 'land-side' station infrastructure development.

As the YRE is a METRONET project, the funding for the project has been allocated by the State and Federal Governments, with the scope of the project being approved by Parliament of WA in the form of a Project Definition Plan. The scope of the project is captured within the contractual arrangements, including the METRONET specified Scope of Work and Technical Criteria (**SWTC**). This SWTC also sets the design criteria, standards and guidelines for the station design.

For the Alkimos Station specifically, the SWTC sets following direct design parameters relevant to the scope of this development application:

- Delivery of the station building, including two station platforms and all internal operational facilities, servicing and amenities.
- Station platform, which is 150 metres long and will cater for 6 car train sets below the station concourse. This includes a requirement for 50% of the platform to be weather protected.
- Bus interchange with at least 8 active bus stops and 4 bus layover bays, and associated infrastructure including bus roads, pedestrian access pathways, bus canopies and waiting areas.
- Two secure bicycle parking shelters and separate u-rails adjacent to the station entry points. Provision for two additional future secure bicycle parking shelters must also be considered.
- Landscaping to streets, forecourts and public open space on the PTA controlled land.
- A dedicated drop-off 'kiss-and-ride' area to be located west of the station, as well as two long term 'park-and-ride' car parks.

Importantly, the SWTC also sets key qualitative station design measures, such as:

- The requirement to deliver a multi-modal station with bus interchange and rail station. This included a specification that the bus interchange includes a continuous canopy shelter between the bus interchange and rail entrance.
- The need for the station to be located centrally to the main retail, commercial and residential areas of the future Alkimos Secondary Centre, and easily accessible to those users who rely on public transport.
- The requirement for pedestrian and cycle access to the station to be at concourse level, and forming a connection over the new rail line. The station building is required to provide an entry point to each façade, and include the ability to freely move through the station concourse (i.e. no fare gates) as a means of passing through the activity centre.
- Various measures to ensure high quality landscaping is delivered, including the requirement for landscaping to be designed by a landscape architect, maximise the retention of remnant endemic vegetation, as well as utilising remnant vegetation complexes and excavated limestone within the landscape design.

This SWTC therefore sets the basic building blocks for the delivery of a highly functional and contemporary multi-modal train station. The role of the NEWest Alliance is to interpret these requirements and apply them to the detailed station design, as proposed through this development application.

The station development envelope is also strictly defined by a number of factors, including landowner negotiations and environmental constraints, such as the clearing of significant vegetation and associated environmental offsets.

In terms of the development approvals process, this essentially means that there are some fixed aspects to the project, and as a result there are limitations on the ability to make fundamental changes to the design scope and requirements. However, the opportunity to make pragmatic changes which remain within the scope of the SWTC and environmental approvals may still be considered.

An extract of the SWTC Design Requirements for the Alkimos Station is provided at **Appendix B** of this report.

## **2. SITE LOCATION AND CONTEXT**

### **2.1. LOTS SUBJECT TO THIS APPLICATION**

The legal details of the lots directly affected by works the Alkimos Station and requiring development approval are detailed in Table 1.

Certificates of Title are enclosed within this application at **Appendix C**.

Table 1 Affected Lots (Alkimos Station)

Lot	Street Address	Plan	Vol/Folio	Proprietor
2000	N/A (rail corridor)	DP409771	2914 / 420	Western Australian Planning Commission
2	2570 Marmion Av	P419385	2985 / 162	Western Australian Land Authority (trading as Development WA)

### **2.2. SITE CONTEXT**

The Alkimos Station is proposed within the centre of the planned Alkimos Secondary Centre, which is an emerging activity centre currently undergoing detailed planning. The Alkimos Station and Secondary Centre are located around 40km north of the Perth CBD.

Development WA is the sole landowner and developer of the entire Alkimos Central landholding.

The railway alignment is reserved as 'Railways' under the MRS, with surrounding land zoned 'Centre' (refer to Section 7.2 of this report for more information). Butler and Eglinton are the closest activity centres to Alkimos, both of which are identified as 'District Centres' in accordance with the activity centre hierarchy specified in *State Planning Policy No. 4.2 – Activity Centres for Perth and Peel*. Accordingly, the Alkimos Secondary Centre will be the highest order centre within this immediate region.

As illustrated in Figure 3 below, the Alkimos Station and surrounding land is currently undeveloped.

Figure 3 – Current Aerial Photo

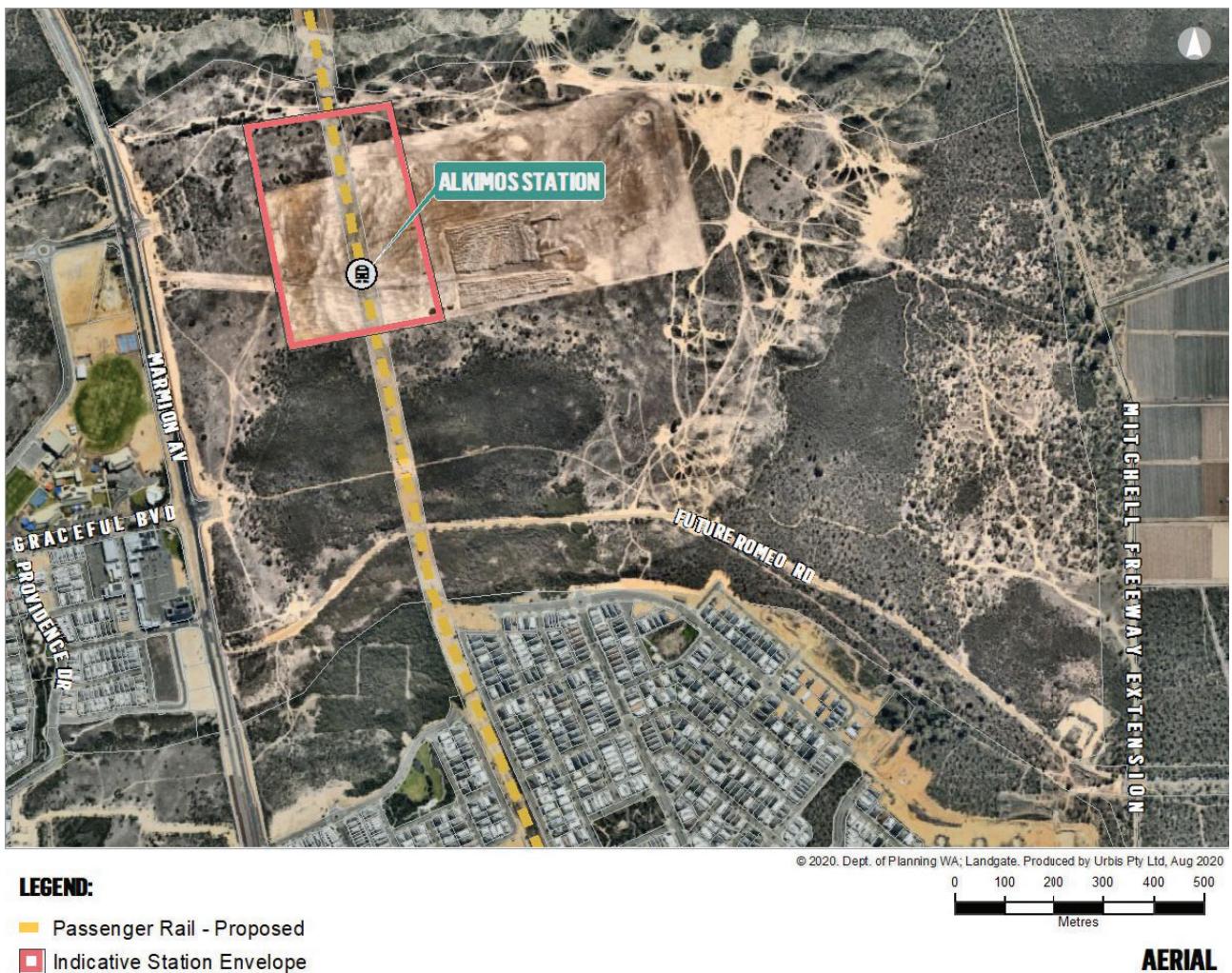


Figure 4 - Context Reference Plan

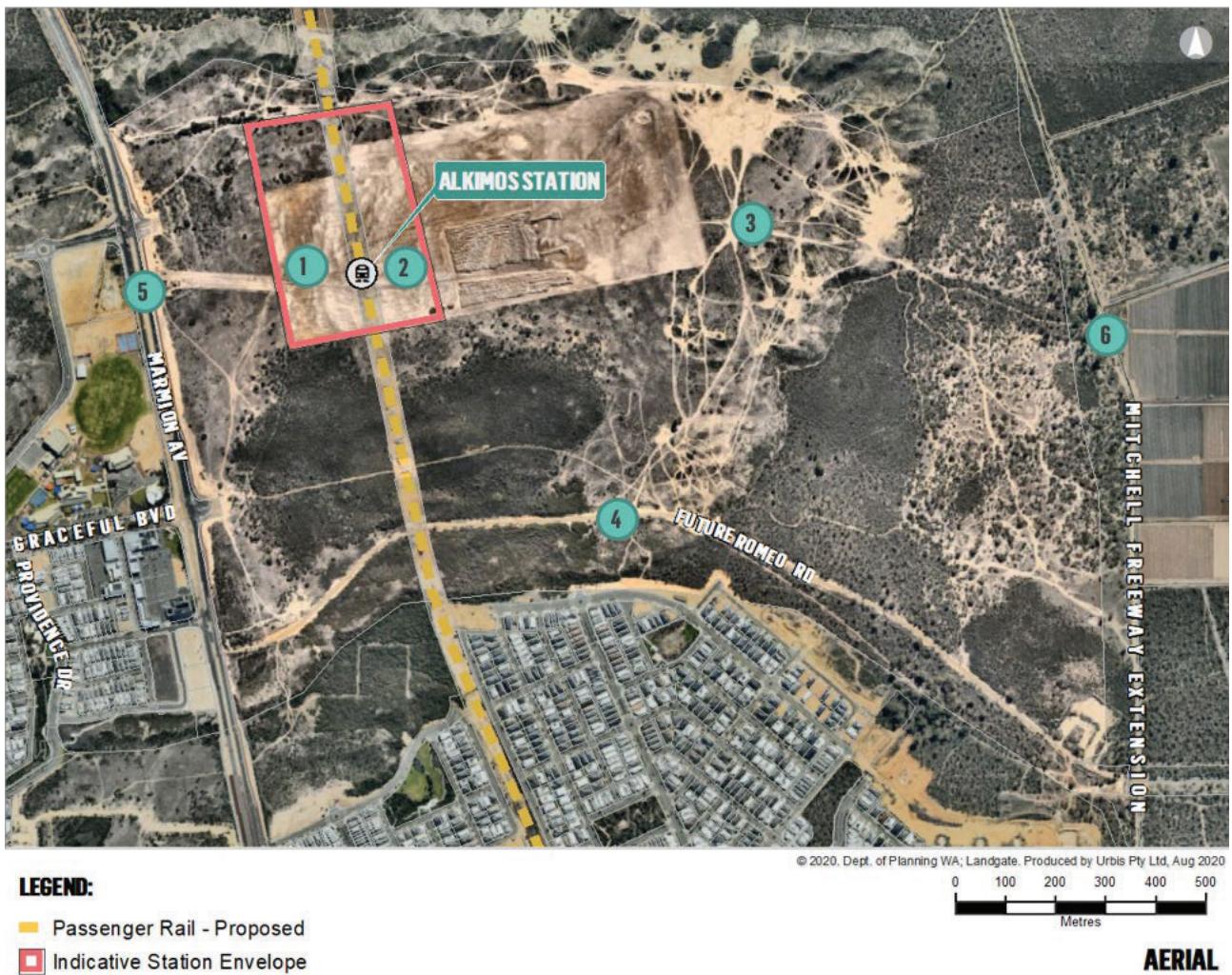


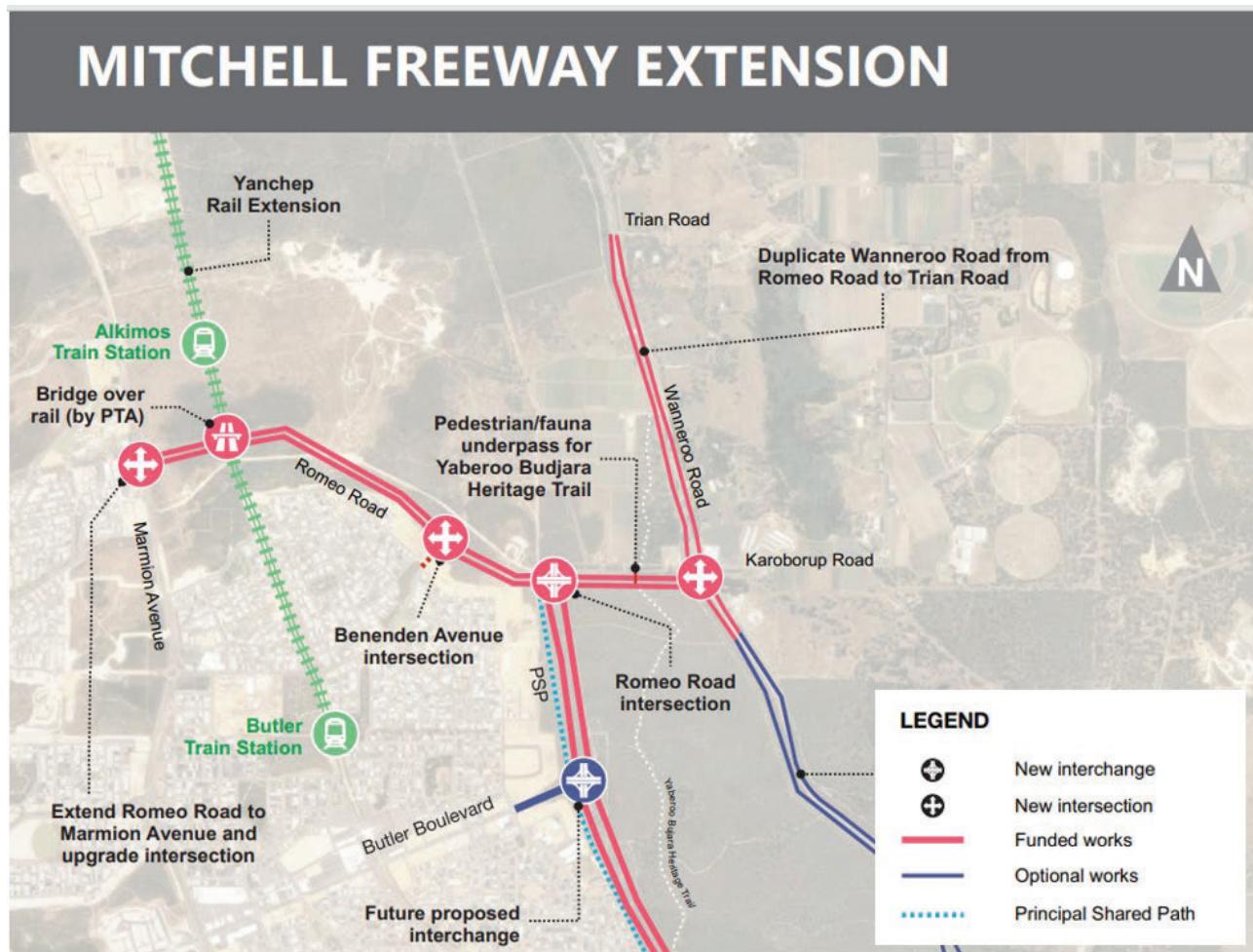
Table 2 Context Summary

CONTEXTUAL FEATURE	DETAILS
<b>1. Future Alkimos Activity Centre (West of Railway)</b>	<p>The Alkimos Activity Centre Plan identifies the land surrounding the Alkimos Station as commercial land, and located within the Station Precinct. At the time of writing this report, DevelopmentWA was in the progress of preparing an amendment to this ACP. It is understood that this amendment seeks the following key elements adjoining the Alkimos Station to the west:</p> <ul style="list-style-type: none"> <li>The area west of the railway line between Brindabella Parkway and Romeo Road will contain the retail and entertainment precinct, which could potentially contain the higher density of residential development above ground floor active commercial uses.</li> <li>The future north / south future road connecting future Brindabella Parkway and Romeo Road west of the station (generally denoted as LN1) will contain the activity centre main street; and</li> </ul>

CONTEXTUAL FEATURE	DETAILS
	<ul style="list-style-type: none"> <li>The extension of Tuart Drive west of the station will likely be a pedestrianised plaza, with no vehicle movements.</li> <li>The town square and community hub is to be located immediately west of the station building.</li> </ul> <p>These measures indicate that the land immediately west of the station will be the ‘civic heart’ of the future activity centre, containing the highest level of street activation and pedestrian activity.</p>
<b>2. Future Alkimos Activity Centre (East of Railway)</b>	<p>The area immediately east of the station remains within the activity centre core under the amended ACP, however this area is understood to have more of a commercial and business focus.</p> <p>The key opportunity for east of the station is Tuart Drive, which is identified as a potential ‘green link’ connection between the station and public open space network based on the surrounding dunal system (as noted in item 3 of this table).</p>
<b>3. Dunal System and Potential Future POS Circuit</b>	<p>The Alkimos dunal system generally runs along the perimeter of the future activity centre, within 1km of the Alkimos Station. This places the dunal system within a short walk of the Alkimos Station.</p> <p>DevelopmentWA have identifying this as a key public open space network opportunity, including the intent to create a dune ridge walk with bridges and crossings between the dunal systems. This creates two key opportunities for links with the Alkimos Station, being:</p> <ul style="list-style-type: none"> <li>The potential to create an east/west ‘green link’ along future Tuart Drive, connecting the Alkimos Station with the surrounding dunal POS network.</li> <li>The potential to link in with the PSP network and local cycling paths to create a 4km city centre loop.</li> </ul> <p>Where these opportunities are successfully implemented, these networks will create high amenity pedestrian connections with the Alkimos Station, and actively encourages passengers from the future residential areas to consider this as an alternative travel mode to the station.</p>
<b>4. Future Romeo Road</b>	<p>The future Romeo Road is reserved as an ‘Other Regional Road’ under the MRS, and is designated as a ‘Local Distributor’ road under the Main Roads road hierarchy. Once constructed, Romeo Road will from a major east-west connection between Marmion Avenue and the Mitchell Freeway.</p> <p>The construction of Romeo Road is included within the Main Roads scope of works for the Mitchell Freeway extension, as depicted in Figure 5 below. These works are scheduled to begin in late 2020 to align with the YRE extension.</p>

<b>5. Marmion Avenue</b>	<p>Marmion Avenue is reserved as an 'Other Regional Road' under the MRS, and is constructed as a four-lane carriageway (two lanes in each direction). Marmion Avenue is designated as a 'Distributor A' road under the Main Roads road hierarchy, and currently forms the primary connection to the northern corridor up to Yanchep.</p> <p>As demonstrated in Figure 5 below, the Main Roads Mitchell Freeway works will include an upgrade to the existing Marmion Avenue / Graceful Boulevard intersection to include the eastern Romeo Road extension.</p>
<b>6. Future Mitchell Freeway</b>	<p>The Mitchell Freeway extension is planned to align approximately 1.5km east of the Alkimos Train Station.</p> <p>Main Roads have announced the Mitchell Freeway extension to Romeo Road, Alkimos with works intentionally scheduled to begin in late 2020 to align with the YRE extension.</p> <p>The Main Roads scope of works include the construction of the Romeo Road connection between Marmion Avenue and Wanneroo Road. Refer Figure 5 below.</p>

Figure 5 - MRWA Mitchell Freeway Extension Map



Source: Main Roads WA

### **3. PROPOSED WORKS**

The delivery of the Alkimos Station provides existing and future residents nearby with a local rail and bus services, working towards the State Government's objectives to increase the reach and frequency of bus and rail services, alleviate road demand, and provide alternative and sustainable transport options to residents of Perth.

Consistent with the METRONET ethos, the Alkimos Train Station will incorporate a number of built form and placemaking initiatives designed to encourage alternative forms of transport to and from the station, discourage anti-social behaviour, create a 'sense of place', and implement natural wayfinding cues leading to the station entrance. The guiding principle for the station design is to deliver a functional, long lasting asset to the State at the greatest value for money and lowest whole of life cost. The following information demonstrates what is proposed for the Alkimos Station, and most importantly how the Alkimos Station meets these objectives.

#### **3.1. STATION WORKS SUBJECT TO THIS APPLICATION**

The station has been designed 'in cut' as it passes through the Alkimos Activity Centre, meaning that the station concourse is constructed at ground level, and the station platform will be sunk at a lower level. This station design maximises patron usability, and allows direct and level access to the train station forecourt from the surrounding area. This is recognised as an appropriate activity centre station design, as it acts to eliminate the railway as a barrier to the free movement of pedestrians from one side of the railway line to the other.

The specific works proposed by this development application include the following:

- The station building, with station entrances provided to all facades of the building.
- A bus interchange which includes 8 active bus stands for passenger pick-up/drop-off. The busway also contains 4 layover bus bays, allowing buses to park between services, and quickly recirculate as required.
- Two station platforms of 150m length, with weather protection provided for the majority of the platform via the concourse and forecourt level capping structure above.
- A Principle Shared Path (PSP) located along the western side of the railway alignment, with access to and from the station building level via ramps.
- Two secured bicycle shelters west and east of the station respectively. These shelters provide capacity to park up to 96 bicycle bays each. U-Rails will also be provided adjacent to the station entrance, designed for short-term use. Provisional for an additional two shelters is also provided, and will be rolled out as required.
- 'Kiss-and-ride' pick-up and drop-off area west of the railway alignment containing 25 bays.
- Long term 'park-and-ride' parking areas west and north west of the station, containing a total of 636 bays.
- Station amenities, including toilets within the station building (male, female, accessible and dedicated staff), water fountains and staff amenities.

Development plans for these station work are provided at **Appendix D** of this report.

##### **3.1.1. Ultimate Design (Subject to Further Design)**

As the ultimate design of the Alkimos Station is reliant on the construction of a number of local roads and at least one bridge by DevelopmentWA, a further development approval may be required to facilitate the ultimate design. This ultimate design is indicatively shown as future works on the development application plan package, and a summary of the required changes is provided in Table 3 below.

Table 3 Summary of Station Works Staging

<b>Design Stage</b>	<b>Summary Works</b>
Day 1 Operation (subject to this development application)	<ul style="list-style-type: none"> <li>• Station building.</li> <li>• Temporary Car Park 1 (352 Bays).</li> <li>• Permanent Car park 2 (284 Bays).</li> <li>• Bus interchange west of the railway line, with vehicle access via NS1.</li> <li>• Temporary pick-up/drop-off area west of the railway line, with vehicle access via NS1 (25 bays).</li> </ul>
Ultimate Design (subject to a further development application)	<ul style="list-style-type: none"> <li>• No modification to the station building.</li> <li>• Modified access to the bus interchange, with access to be provided via the local road network east of the railway line.</li> <li>• Removal of the western pick-up/drop-off.</li> <li>• Removal of car park 1 (reduction of 352 bays).</li> <li>• New permanent car park north east of the station (additional 361 bays).</li> <li>• New permanent drop-off area east of the station (28 bays).</li> <li>• Small modification to car park 2 (271 bays).</li> </ul>

As noted in the above table, the ultimate design will result in the removal of the car orientated infrastructure (car park and drop-off area) immediately west of station building to be placed in the ultimate footprint to the east of the station. The intent is for this land to then be redeveloped by DevelopmentWA. Given the adjoining NS1 road is intended to form a highly pedestrianised main street area, this measure will reduce the number of vehicle movements along this main street, and is a favourable outcome for the Alkimos Activity Centre.

A detailed summary of the car parking for ‘day one’ and ‘ultimate design’ is provided in Table 4 below.

Table 4 Parking Summary

<b>Parking Area</b>	<b>Day 1 Operation Bays</b>	<b>Ultimate Bays</b>
West drop-off (temporary)	25 bays	0 bays
East drop-off (final)	0 bays	28 bays
<b>Total Short-Term Bays</b>	<b>25 bays</b>	<b>28 bays</b>
Car Park 1 (temporary)	352 bays	0 bays
Car Park 2 (final)	284 bays	271 bays
Future Car Park	0 bays	361 bays
<b>Total Long-Term Bays</b>	<b>636 bays</b>	<b>632 bays</b>
<b>TOTAL</b>	<b>661 BAYS</b>	<b>660 BAYS</b>

Figure 6 - Station Works - Day 1 Operation (Red)

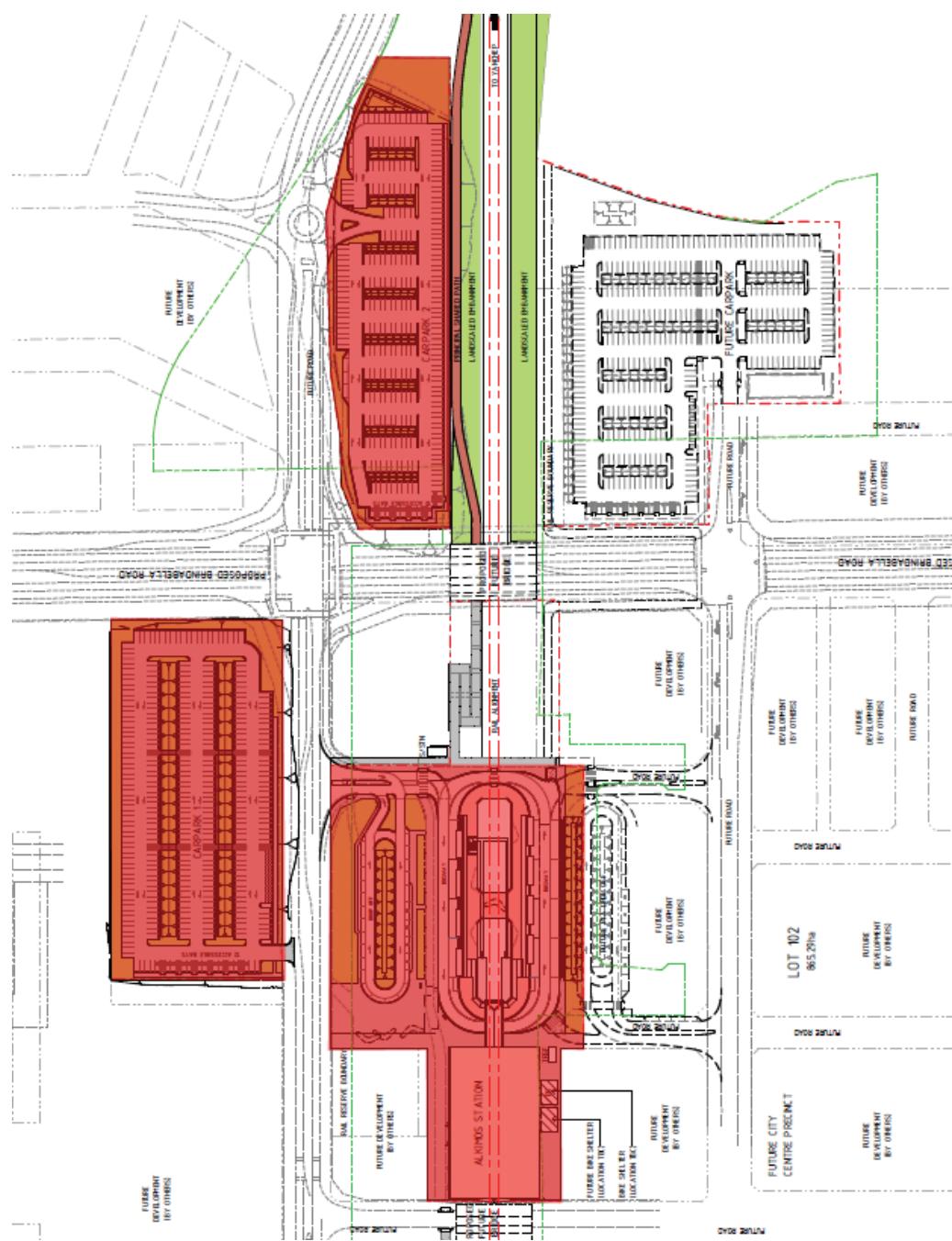
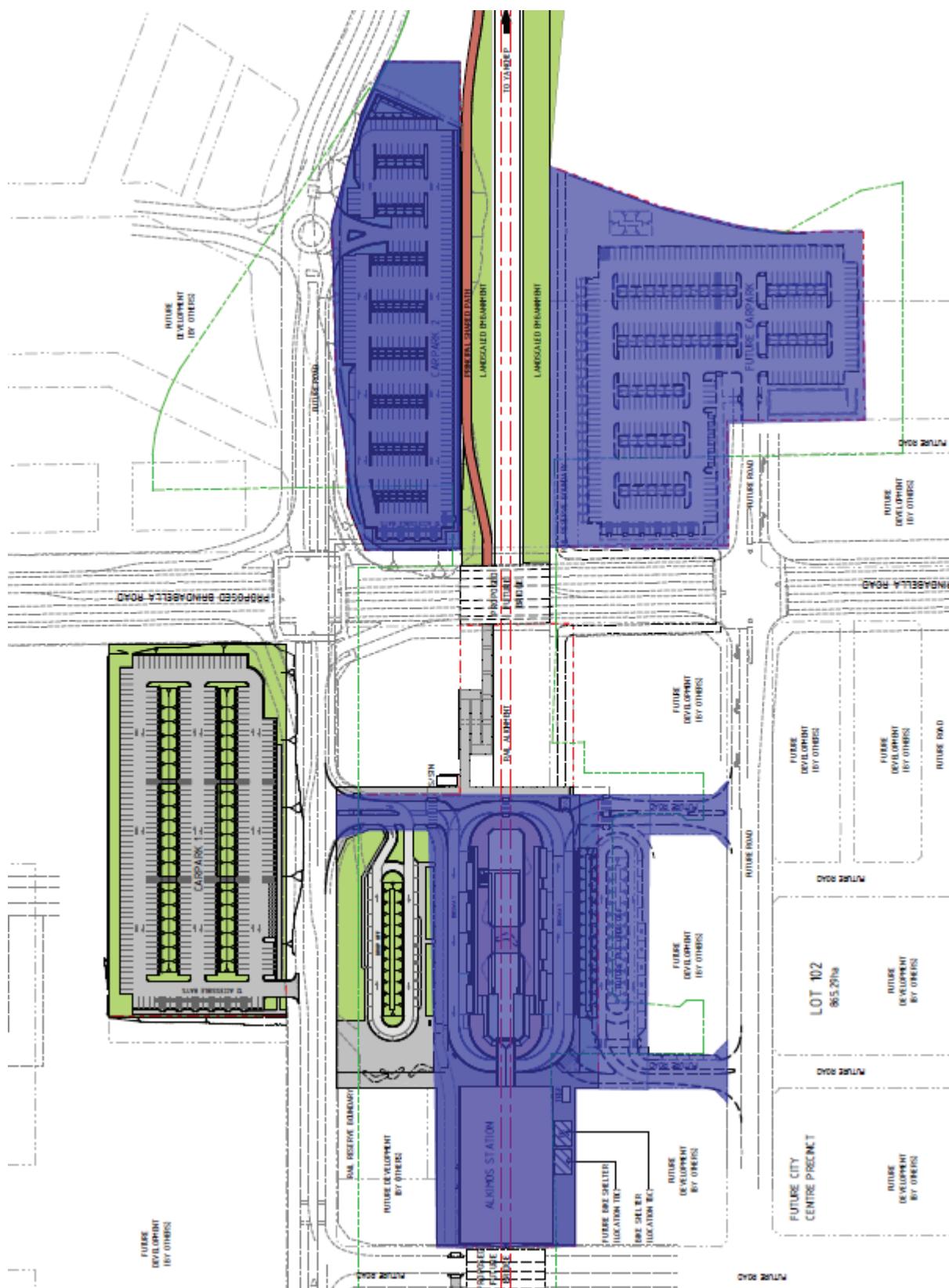


Figure 7 - Station Works Ultimate Design (Blue)



## 3.2. SUPPORTING WORKS (NOT SUBJECT TO THIS APPLICATION)

Given the greenfield context of the YRE extension, the new stations will logically require a substantial component of infrastructure to support functional operation. For the Alkimos Station, this will require a number of bridges and road connections to be completed by the third party landowners / developers, as well as other works which are exempt from the requirement of planning approval generally.

The following section outlines these supporting works, and the associated arrangements which are in place for the Alkimos Station.

### 3.2.1. Developer Bridges

The scope of the METRONET project may also include the completion of some works and infrastructure to be funded by the landowner / developer as a third party (in the case of Alkimos Station being DevelopmentWA), to include the following:

- Brindabella 'road over rail' bridge'
- Tuart Drive 'road over rail' bridge'; and
- An extension of the capping structure south of the future Tuart Drive bridge.

These development works are depicted in Figure 8 below.

At the time of drafting the DA, Development WA is funding the design of the above items to 85% design. Subject to Development WA receiving detailed costs, a decision will be made as to whether these works will be funded by Development WA for inclusion in the Yanchep Rail Extension project for Day 1 Operation of the Station, or for the works to be deferred to a future date post completion of Yanchep Rail Extension project.

Consultation with the METRONET office was undertaken in the early stages of this development application process, where it was determined that these bridges would not require development approval on the basis that they did not provide *direct* vehicle access into the station. The exemptions from planning approval available for this METRONET project is further detailed within Section 7.2 of this report.

Regardless of this exemption, it was agreed that a basic level of information for these structures should be provided within the development application report, for context only and not part of the formal approval documentation.

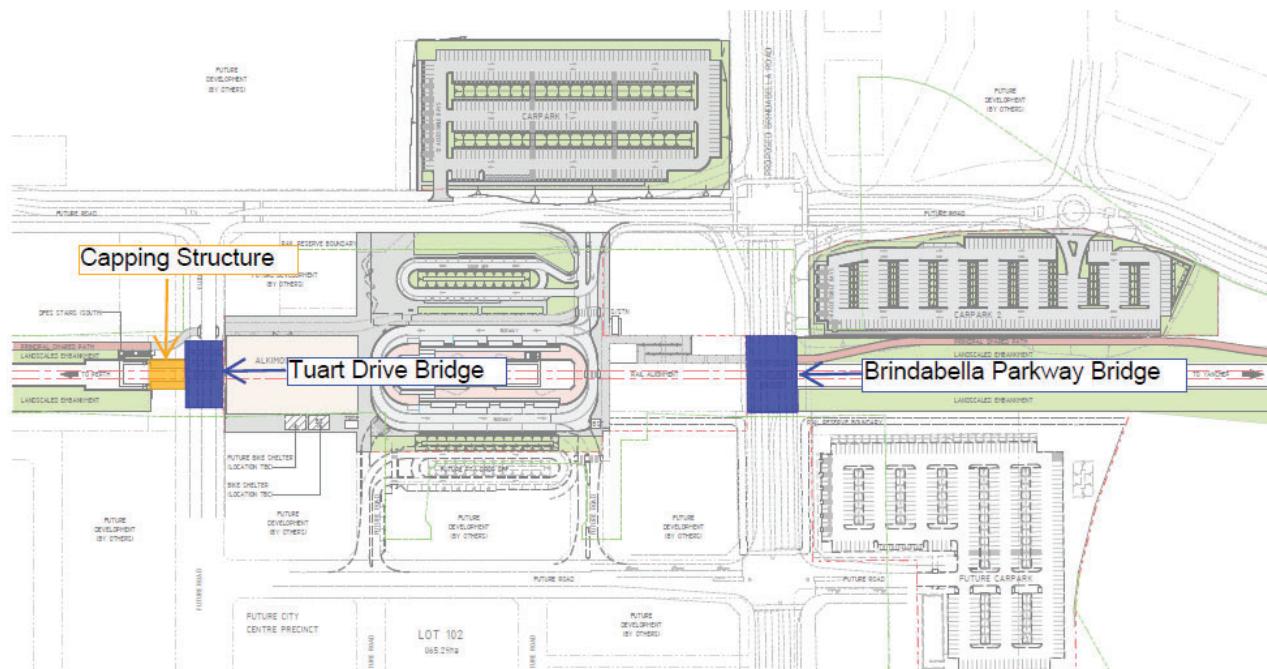
A summary of the detail for these surrounding works which will ultimately support the Alkimos Station are presented in Table 5 below. Early designs of these road bridges are provided at **Appendix E** of this submission, however it should be noted that these may be subject to change as the design advances.

Table 5 Surrounding Works

WORKS	RESPONSIBILE	DETAILS
Tuart Drive 'road over rail' bridge (as shown in Blue in Figure 8).	DevWA	<p>Specifications of the bridge are as follows:</p> <ul style="list-style-type: none"><li>• 17.5m overall width.</li><li>• 18.1m clear span.</li></ul> <p>The road configuration for Tuart Drive will be:</p> <ul style="list-style-type: none"><li>• Single 4m lane each way with no median (8.0m total)</li><li>• 6.0m wide southern verge</li><li>• 3.5m wide northern verge</li></ul>

WORKS	RESPONSIBLE	DETAILS
Brindabella Parkway and 'road over rail' bridge (as shown in Blue in Figure 8).	DevWA	<p>Specifications of the bridge are as follows:</p> <ul style="list-style-type: none"> <li>• 32m overall width.</li> <li>• 22m clear span.</li> </ul> <p>The road configuration for Brindabella Parkway is as follows:</p> <ul style="list-style-type: none"> <li>• Two lanes each way with right turn pockets and 2.5m median.</li> <li>• 2m shoulder cycle lane each way.</li> <li>• 3m shared path each side.</li> </ul>
Cut and Cover South of Station (as shown in Orange in Figure 8).	DevWA	<ul style="list-style-type: none"> <li>• Capping width – 20m overall</li> <li>• 18.1 clear span.</li> </ul>

Figure 8 – Supporting Third Party Station Works



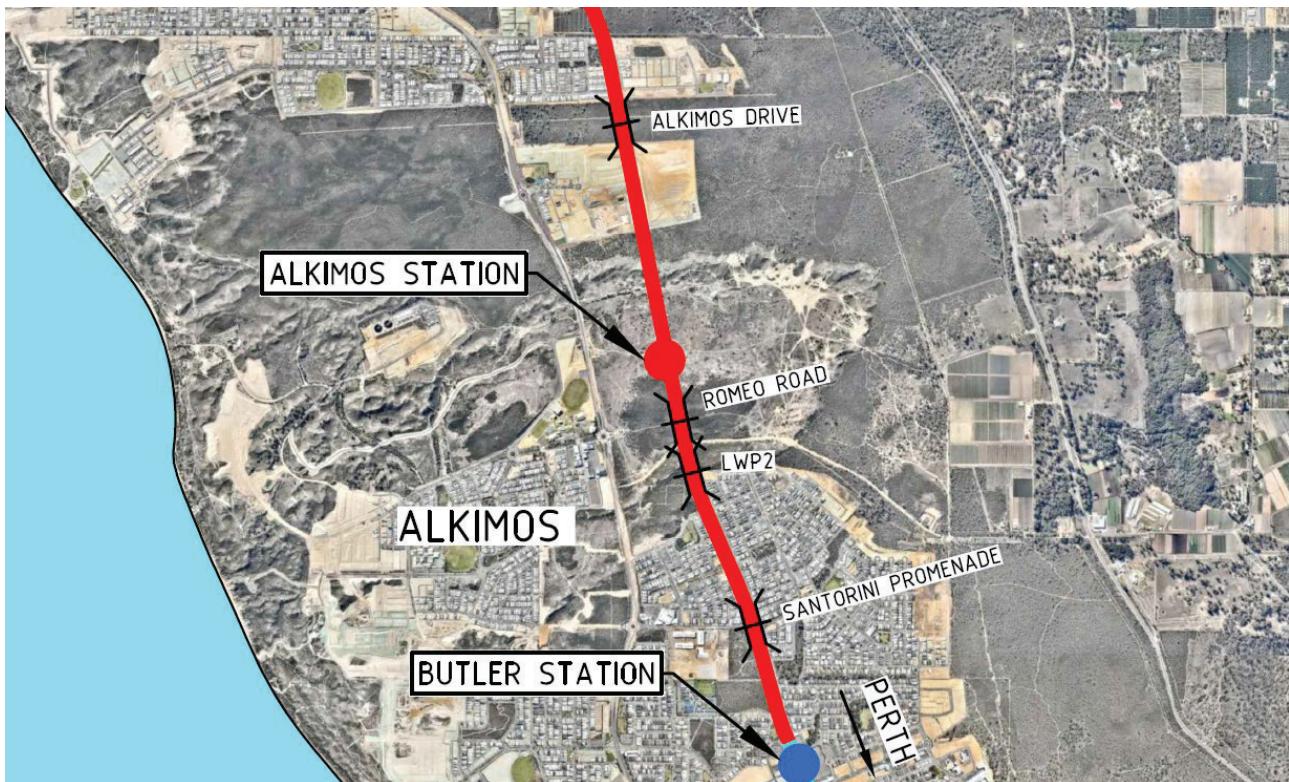
### 3.2.2. Other Road Bridges

The scope of the METRONET project will also include the completion of some works and infrastructure to be constructed by NEWest Alliance under the project SWTC. For the Alkimos Station, this will include the following, as depicted in Figure 9.

- Alkimos Drive
- Romeo Road
- LWP2
- Santorini Promenade

Given these bridge structures are not in any proximity to the Alkimos Station, these bridges are also considered to meet an exemption from planning approval. Regardless, these bridges are also provided in the package of plans at **Appendix E** of this report, and may also be subject to change as the design advances.

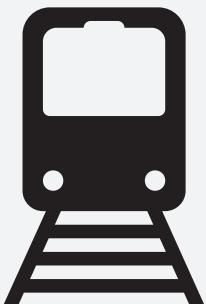
Figure 9 - Surrounding Road Bridges

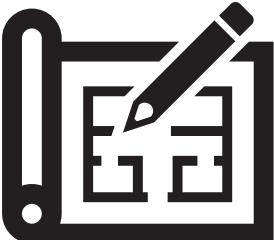


### 3.3. DESIGN PRINCIPLE AND INTENT

As noted within Section 1 of this report, the scope of works set by METRONET includes a number of qualitative design measures which must be met in the station design. Table 6 below provides detailed information on how these qualitative design measures have been interpreted and applied to the Alkimos station design.

Table 6 Proposed Works for Alkimos Station

PROPOSED	DETAILS
<b>Train Station Functionality</b> 	<p>The station in cut achieves many of the benefits of a tunnel style station, including providing a station entrance at street level, reduced visual impact of the station, and lower impact of noise and vibration compared to traditional grade station with elevated concourse. A section demonstrating the design of the station is provided at Figure 20 below.</p> <p>The Alkimos Station is unique for the YRE line as it provides a station entrance point at each façade. The location of the bus interchange to the north of the station building (covering the sunk rail and platform) is also unique to the Alkimos Station. Combined, these elements provide for a large station forecourt area and highly permeable pedestrian movement over the rail line.</p> <p>Alkimos will be an access-controlled station, meaning the station platform and select sections of the concourse level are fare controlled. Critically, the layout of the station building provides free access throughout the station</p>

PROPOSED	DETAILS
	<p>concourse as a means of passing over the railway line. Consistent with all PTA infrastructure, the station building will be designed to universal access standards.</p>
<b>Station Architectural Design and Identity</b> 	<p>A pavilion theme is common to YRE Stations. Alkimos Stations angled veranda soffit sits above the Stations façade. Vertical fins within façade glass and mesh valance supported from outward angled columns provide passive solutions to environmental design.</p> <p>A strong north south axis reflects the rail alignment with voids of varying extent to enhance the patrons entry experience to the station from the north and south entrances while providing natural light and ventilation to the platforms from centrally positioned skylights framing a linear feature ceiling. Visual connectivity between the Station and the public domain allows a safe and practical interchange between travel modes of buses, cycling, walking and vehicles with intuitive wayfinding.</p> <p><b><u>Natural Light and Ventilation</u></b></p> <p>Principles of natural light, ventilation and weather protection have informed this station architectural design, with the following noteworthy design points:</p> <ul style="list-style-type: none"> <li>• Predominantly glazed facades and/or openings at the concourse level along the external building facades.</li> <li>• Four separate entrances provide for breeze into and through the concourse level.</li> <li>• Glazed skylights incorporated in the roof structure.</li> <li>• Void space at the first floor concourse and within the bus interchange areas, improving ventilation and providing natural light infiltration to the station platform level.</li> <li>• The platform coverage achieves the 'Green Star – Railway Stations' requirement of 20% of the platform area to be shaded for the afternoon peak periods during the warmest half of the year.</li> </ul> <p><b><u>Station Identity</u></b></p> <p>To create a stronger link to the cultural context and create a unique identity, each new station under the YRE line adopts Gnala Biddi references within the overall architectural and finishes theme of the station.</p> <p>Design interpretation for Alkimos was derived from the Melaleuca Tree and surrounding Parabolic Dune that were significant to the Traditional Landowners of the Alkimos area providing a Station connection to the land expressed in colour, form, texture, and public art. The colour combination of the aluminium fins and spacers making up the façades of the Station building interpret the Melaleuca Tree. The valance and central feature ceiling identify with the surrounding Alkimos Parabolic dune.</p>

## Bus Interchange Design



The northern station entrance provides direct access to the busway, carparks and kiss-and-ride areas for all stages of this development approval. The interchange is 'at grade' with the street, meaning access to the station from the adjacent station or main street is direct and intuitive.

Bus stand locations will be clearly signposted and illuminated with a direct and convenient pedestrian accessway via canopy shelters linking the station and stands.

The bus interchange includes a continuous canopy weather shelter between the station entrance and bus stops. This canopy is a simply low-pitched roof design.

## Pedestrian / Cyclists Infrastructure and Wayfinding



The northern entrance provides direct access to the bus interchange, carparks, and drop and ride. Bus stand locations will be clearly signposted and illuminated with a direct and convenient pedestrian accessway via canopy shelters linking the station and stands.

The regional PSP pathway is aligned to the west of the railway line. The connection of this PSP to, from and around the station is summarised as follows:

- The network from the south will terminate at Tuart Drive, where the connection integrates into the station forecourt shared zoned.
- A shared path commences at the drop-off / busway area, which then connects further north to a ramp which allows the PSP to travel below the future Brindabella Road Bridge.

The PSP network will be at level with the permanent car park 2, meaning that the PSP may be used as a direct pathway between the park-and-ride bays and the station. However, the location of the long-term car parks outside of the station precinct also encourages pedestrians to move through the activity centre prior to accessing the station.

Pedestrian modelling has been assessed using the LEGION modelling tool for the peak 2031 customer patronage, which calculates pedestrian congestion based on a level of service performance criteria. This assessment concludes that the pedestrian network supports the projected patronage numbers.

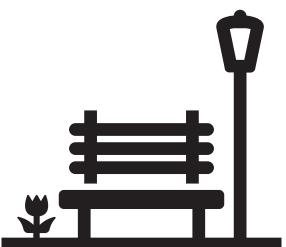
## Station Parking



The Alkimos Station will provide a mix of short-term 'kiss-and-ride' parking and long term 'park-and-ride' parking bays. As noted in earlier in this report, the ultimate parking facilities may be subject to change as funding and construction of the supporting road bridges by DevelopmentWA proceeds.

The 'Day 1 Operation' arrangement will see all parking facilities located west of the railway alignment, in recognition that the Brindabella Parkway and Tuart Drive 'road over rail' bridges may not be constructed at this point. It is also expected that the Alkimos activity centre will still be largely undeveloped at this stage, and therefore the parking areas take advantage of the short-term availability of land in proximity to the station, while providing early activation of the centre.

The 'Ultimate Design' will be implemented once Brindabella Parkway Bridge is constructed. This is outside of the scope of this development application.

	<p>At this point, the station car park and drop-off area west of the station will be relocated to the east of the rail line, centre. The key benefit of this ‘Ultimate Design’ is that it will remove the majority of the vehicle movements from the activity centre ‘main street’, as well as providing sites available for redevelopment for a use more suited to the main street of the activity</p> <p>This ultimate design also supports transit orientated development principles, as the long-term park-and-ride bays are located with greatest distance from the station entrances. This design serves two key purposes, being:</p> <ul style="list-style-type: none"> <li>• Encouraging pedestrian and bus transport ahead of private vehicle use; and</li> <li>• Encouraging ‘park-and-ride’ patrons to travel through the town centre to access the station to promote safety and activation.</li> </ul> <p>In accordance with the Transperth operational requirements, the car parking will only be made available to the Transperth patrons (similar to the management of all Transperth dedicated parking facilities across Perth). However, as parking is applied on a ‘day-rate’ basis, this still enables patrons to undertake incidental multi-purpose trips within the Alkimos town centre combined with their commute.</p>
<b>Other Station Amenities</b> 	<p>Public amenities and staff facilities are located at the north end of the concourse for direct access for Bus Drivers and Bus transfer. Equipment rooms, Bike Store and Kiosk are positioned at the South end of the Concourse. The Station Booth positioned central within the concourse provides surveillance to the four Station entrances. Importantly, essential public amenities such as toilets are provided in the non-fare areas.</p> <p>Figure 21 below outlines the unpaid zones which provide free public movement, and Figure 23 identifies the staff and public amenities at the concourse level.</p>
<b>Landscaping</b> 	<p>High quality hard and soft landscaping design has been proposed for the Alkimos Station. The key principles underpinning the landscape design are as follows:</p> <ul style="list-style-type: none"> <li>• Retention of vegetation where possible. For the Alkimos Station, this will include the transplanting of grass trees from surrounding cleared areas.</li> <li>• Reduction of heat island impacts. This includes tree planting within the central islands of the long-term parking area.</li> <li>• Low maintenance of vegetation, including minimising irrigation. This is achieved by using local natural species (such as Banksia and Eucalyptus varieties) where possible, supported by exotic species only where specific vegetation characteristics are required.</li> <li>• Paving and road materiality is used to create subtle wayfinding cues and define pedestrian priority areas. This includes the use of high-quality pavers around the station forecourt and key area of the</li> </ul>

	<p>busway to achieve a distinctly different feel to the thoroughfare areas.</p> <ul style="list-style-type: none"> <li>• Large quantities of seating is required, but must be delivered in a manner which minimises obstruction to key movement areas. In-situ seating incorporated into raised planters will be applied where possible to achieve this.</li> <li>• The 'station identity' colour and materials palette for the Alkimos Station will also be carried through in the hard and soft landscaping elements.</li> </ul> <p>The key challenge for the station landscaping is maximising canopy coverage whilst also ensuring vegetation does not restrict CCTV coverage. As a result, the landscaping design focuses tree coverage around the periphery of the station precinct, and provides only low-lying vegetation within the station forecourt and key activity areas.</p> <p>The landscape plan is provided at <b>Appendix F</b> of this report.</p>
<p><b>Crime Prevention Through Environmental Design (CPTED)</b></p> 	<p>Designing out crime and the creation of a perception of safety is recognised as an important consideration in the delivery of a contemporary public transport node. Whilst a thorough surveillance system and security presence is an important part of this, the design of the physical environment to incorporate CPTED principles plays an important role in providing basic foundations to manipulate human behaviour towards crime prevention, as and ultimately creating a safe environment for passengers.</p> <p>CPTED measures which may be pragmatically applied to the station design are broadly summarised as follows:</p> <ul style="list-style-type: none"> <li>• The station building contains four separate entrance points, meaning all facades generate activity and surveillance.</li> <li>• The north/south linear alignment of the Alkimos station building and adjacent bus interchange creates large station forecourt over the railway tracks. This large forecourt provides an unobstructed view corridor and limited closed off or entrapment spaces around the station and bus interchange.</li> <li>• The alignment of the station plaza with the adjoining bus interchange provides mutual surveillance between the two areas.</li> <li>• High activity facilities such as the busway and pick-up/drop-off area are located closest to the station entrance. More dormant uses such as the long-term car park is located towards the station precinct periphery.</li> <li>• Future development land parcels are provided immediately east and west of the station. These sites are likely to be developed with higher density built form orientated to the street, providing opportunity for street level activation and upper level passive surveillance over the station building.</li> <li>• Reducing large vegetation canopy around the station building to ensure CCTV view is not restricted. The landscape design will also incorporate hard landscaping elements (such as raised planters</li> </ul>

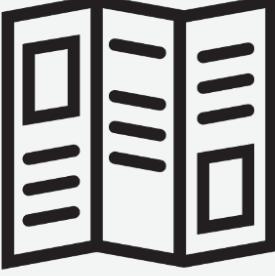
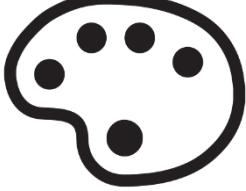
	<p>and street furniture) to enforce an anti-vehicle (hostile threat) environment around the station building to deter unwanted vehicles from entering pedestrian only spaces.</p>
<b>Supporting Bus Services</b>	 <p>To deliver an integrated transport solution which connects the key activity areas within the rail extension area, a comprehensive and supportive feeder bus network will be delivered. A number of future bus routes have been identified for further development that typically loop between the new stations and service the suburbs in between.</p> <p>The ultimate bus network (by 2031) includes new routes for Alkimos operating under the standard ‘station-to-station loops’ model, drawing from the success of the Joondalup and Mandurah lines model. Existing bus services will be extended from Butler Station to Alkimos Station and new routes introduced to link Alkimos Station with Eglinton Station, then with Yanchep Station.</p> <p>The bus services will increase the number of passengers arriving at Alkimos stations via public transport and reduce demand for station car parking.</p> <p>Final service specifications of the day one and ultimate scenarios will be subject to detailed planning, allocation of funding, and community consultation, which is ongoing.</p>
<b>Public Art</b>	 <p>Public art within the station will be delivered in accordance with the requirements of the WA State Government Percent for Art Scheme, which requires 1% of the construction budget for new works over \$2 million to be spent on artwork.</p> <p>This artwork will be delivered to be consistent with the themes of the wider ‘METRONET Public Art Strategy’ and associated ‘Yanchep Rail Extension &amp; Thornlie-Cockburn Link Projects Public Art Strategy’, with the thematic framework strongly built around the Gnarla Biddi story of ‘Our Pathways’.</p> <p>A summary of the scope of works for public art is provided at <b>Appendix G</b> of this report.</p> <p>The integration of this artwork into the station design will be further developed through the detailed design phase, and it is expected that an associated standard condition of approval will be applied.</p>

Figure 10 - Artists impression of western façade of station building



*Images are included for illustrative purposes only*

Figure 11 - Artists impression of southern façade of station building



*Images are included for illustrative purposes only*

Figure 12 - Artists Impression of north-west façade



*Images are included for illustrative purposes only*

Figure 13 – Artists impression of station building, as viewed from the northern entrance



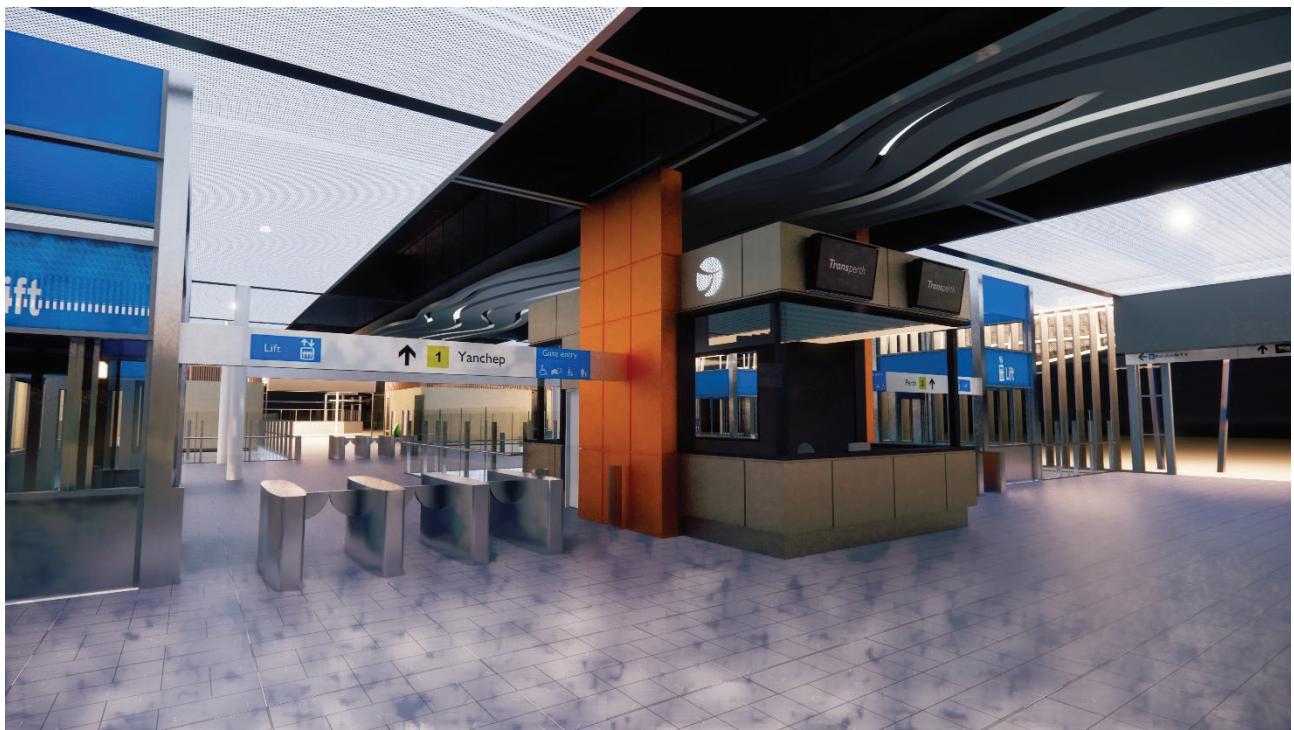
*Images are included for illustrative purposes only*

Figure 14 - Artists Impression of concourse level, as viewed from northern entrance



*Images are included for illustrative purposes only*

Figure 15 – Artists impression of PTA staff kiosk at concourse level



*Images are included for illustrative purposes only*

Figure 16 - Artists impression of station concourse



*Images are included for illustrative purposes only*

Figure 17 - Artists impression of bus interchange, as viewed from north-west



*Images are included for illustrative purposes only*

Figure 18 - Artists impression of external station lighting



*Images are included for illustrative purposes only*

Figure 19 - Artists impression of internal station lighting



*Images are included for illustrative purposes only*

Figure 20 - Station Section Plan



*Images are included for illustrative purposes only*

Figure 21 - Summary of non-fare zones (shown in green)



Figure 22 – Platform Coverage Plan

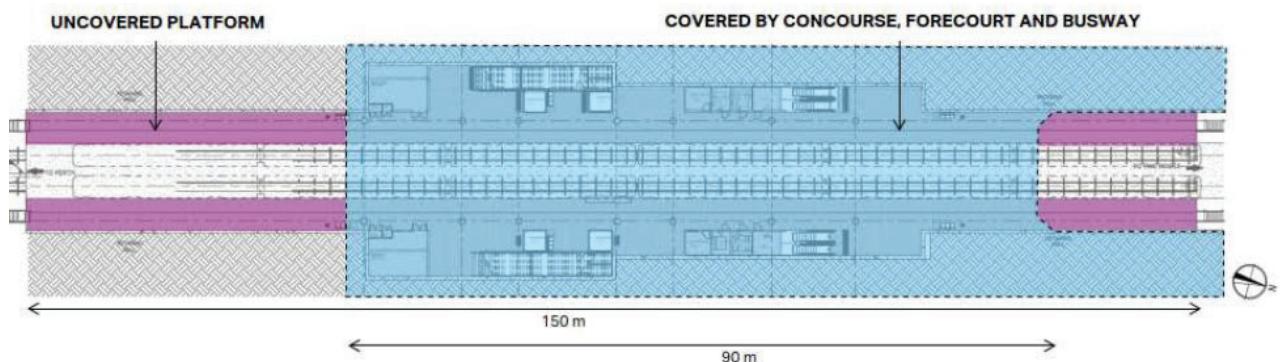
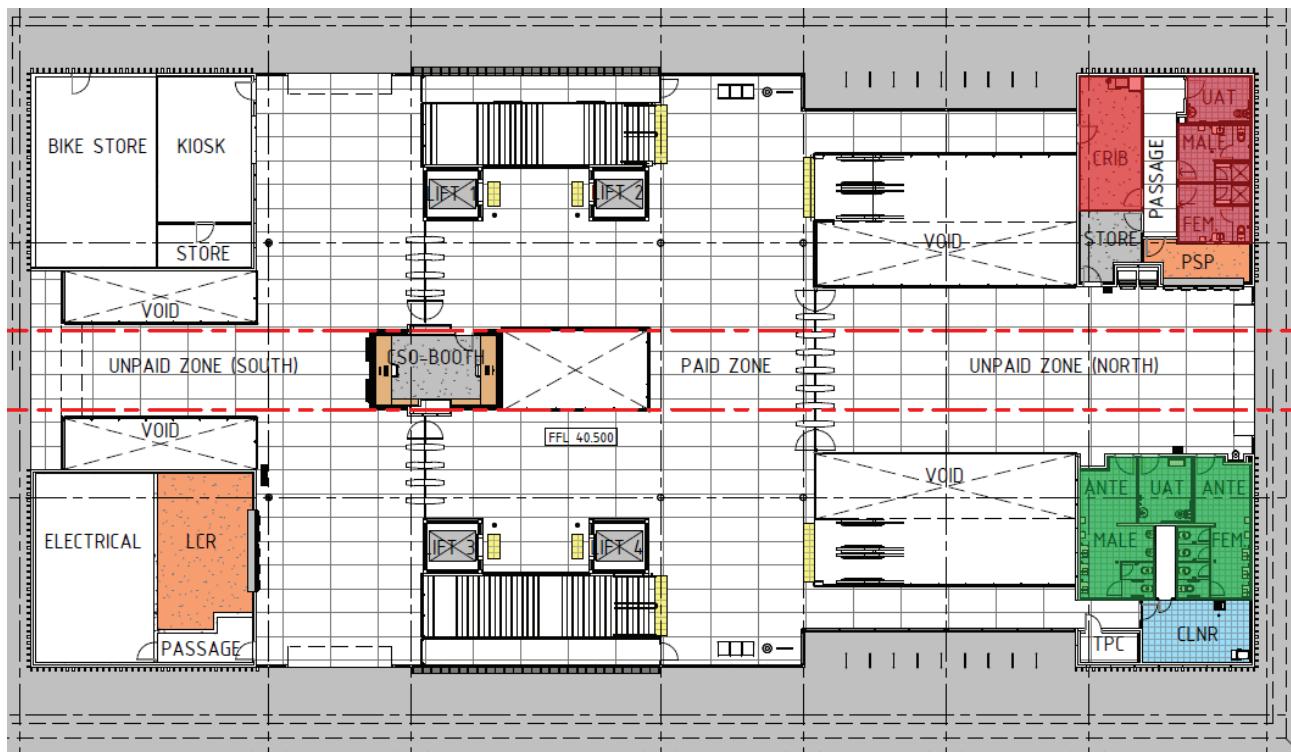


Figure 23 - Public (green) and staff (red) amenities within northern portion of station building



## 4. AGENCY AND STAKEHOLDER CONSULTATION

Since the formal announcement of the YRE line, the YRE line and associated stations have been the subject of significant public consultation and stakeholder sessions. A detailed summary of these consultations including key outcomes is provided at **Appendix H** of this report.

These consultations included two development application focussed pre-lodgement meetings conducted by Urbis on 14 July 2020 (focussed on Eglinton and Yanchep Stations) and 17 August 2020 (focused on Alkimos Station), which included discussion around the planning process and relevant planning considerations. Key outcomes of these meetings were as follows:

- Agreement that the application would be the subject of a 14-day consultation period conducted by the METRONET department of DPLH, and on this basis, no consultation period was required to be conducted by the local government directly.
- Formal referral to the City of Wanneroo's Council meetings was *not* required prior to the City making its recommendation to the DPLH. This decision was formed on the basis that the City is a referral agency only, and the DPLH is ultimately responsible for a decision on the application.

Importantly, the NEWest Alliance will continue to conduct regular public and stakeholder consultation sessions throughout this project, which will occur independent of this development application assessment process.

# 5. TECHNICAL REPORTS

## 5.1. CATCHMENT ANALYSIS

Given there is limited opportunity to 'retro-fit' the train station operations, an important consideration in the Alkimos Station design is the future-proofing of the station, including ensuring that the design of the station appropriately considers the long-term catchment and associated mode demands. To support this objective, the Alkimos Station has been the subject of a number of access planning studies and regional transport modelling, which has informed the SWTC and final station design.

The future catchment, including the likely mode transport mode, forms an important component of this catchment analysis and associated station design. The methodology applied to the various transport modes as part of this catchment analysis is as follows:

- A catchment distance of 800m to 1600m is applied to the future walkable catchment, which translates to a 10 to 20 minute walk.
- A 3km catchment distance is applied to the cyclable catchment, which is equivalent to a 10 minute cycle.
- A catchment distance of 400m is applied to indicative future bus routes.

The presumption for all modes is that patrons are most likely to travel down-stream to access the station, rather than back-tracking from the destination. For the Alkimos Station, this suggests that the future catchment will be predominately from the immediate surrounds, as well as a wider area to the west of Marmion Avenue, north-east and north-west. Patrons south of the immediate Alkimos Station are assumed to most likely to travel to Butler Station.

With the goal of encouraging transport orientated development in mind, higher weighting has been given to 'bus and ride', cycling and walking modes of transport in the catchment analysis. The resultant daily forecast patronage for the Alkimos Station is presented in Table 7 below.

Table 7 Alkimos Patronage

Patronage by Mode	2021	2031
Walking	152	486
Cycling	108	189
Bus	607	810
Kiss-n-Ride	433	405
Park-n-Ride	867	810

The analysis concludes that approximately 656 bays will be required at 2021, with demand reducing to 614 at 2031 when supporting infrastructure dedicated for alternative modes improves, and these travel modes become a more feasible option. This demonstrates that the car parking bays proposed for the Alkimos Station is sufficient to service the park and ride demand for Alkimos Station.

Refer to **Appendix I** for memo's summarising the Pedestrian Catchment Analysis and Mode Share Review.

## 5.2. TRANSPORT IMPACT ASSESSMENT (TIA)

A Transport Impact Assessment assessing the suitability of the road network is provided at [Appendix J](#) of this report. As a multi-modal station, this assessment has considered the following:

- The suitability and capacity of the road network to accommodate vehicle movements;
- Supporting bus routes and associated bus interchange servicing and design; and
- Pedestrian and cyclist access and connectivity.

The following sections provide a summary of the relevant information and key findings for each area.

### 5.2.1. Road Capacity

Given the currently lack of supporting road network, the assessment of the road network has been undertaken based on the two key project stages, being:

- 'Day 1 Operation', modelled at 2021 and assuming the Brindabella bridge is not constructed (refer Figure 24); and
- 'Assumed Road Network Under Future Scenario', modelled at 2031 accordance with the assessment requirements under the WAPC Transport Impact Assessment Guidelines (refer Figure 25).

The construction of these road connections are ultimately the responsibility of the landowner, in this case being DevelopmentWA. The precise timing of road constructions will therefore be determined by a third party. Importantly, at the time of writing this report, it was understood that DevelopmentWA were progressing a subdivision application which would include the creation of the 'Day 1 Operation' roads.

Figure 24 – Assumed Road Network at Day 1 Operation – without Brindabella bridge (2021)

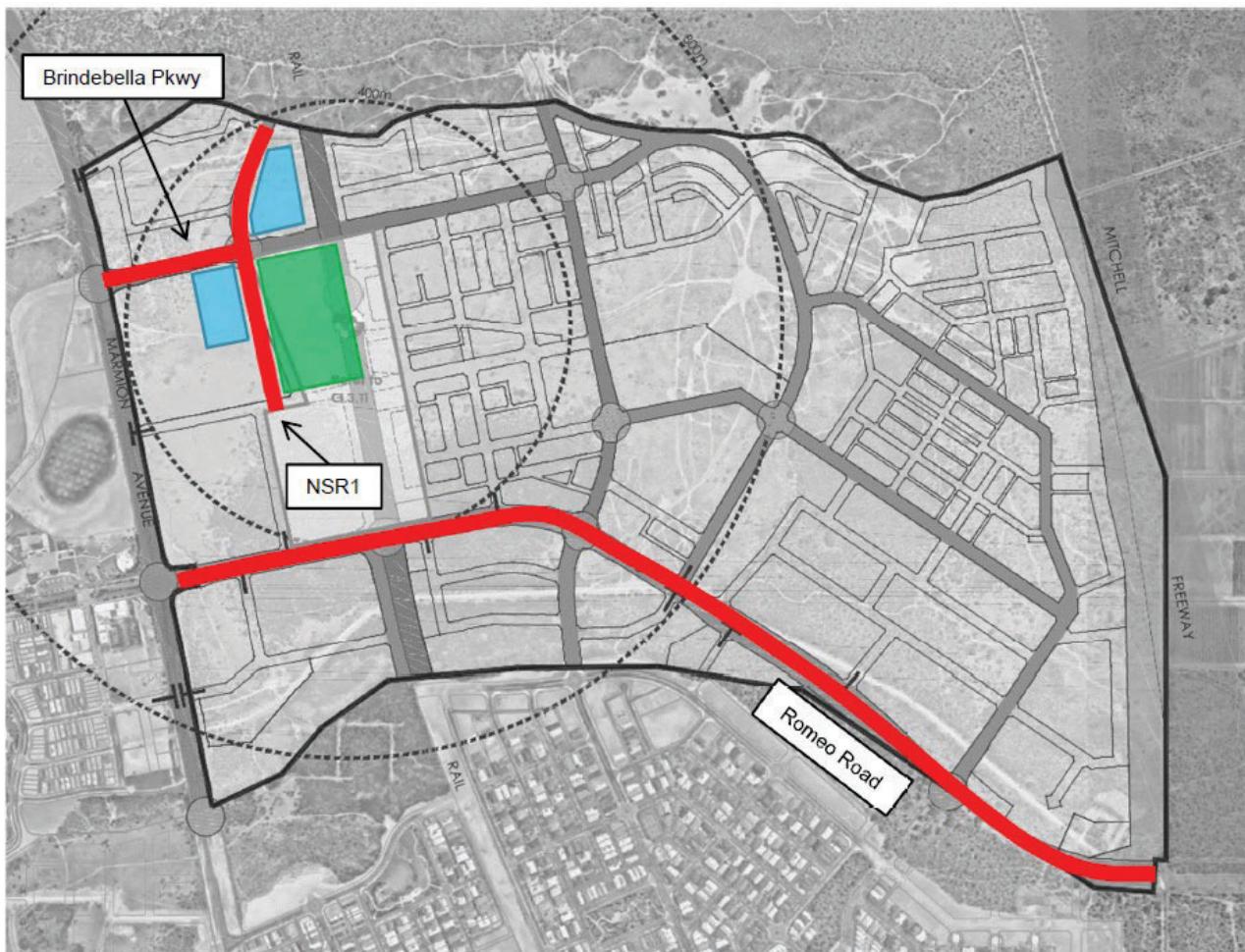
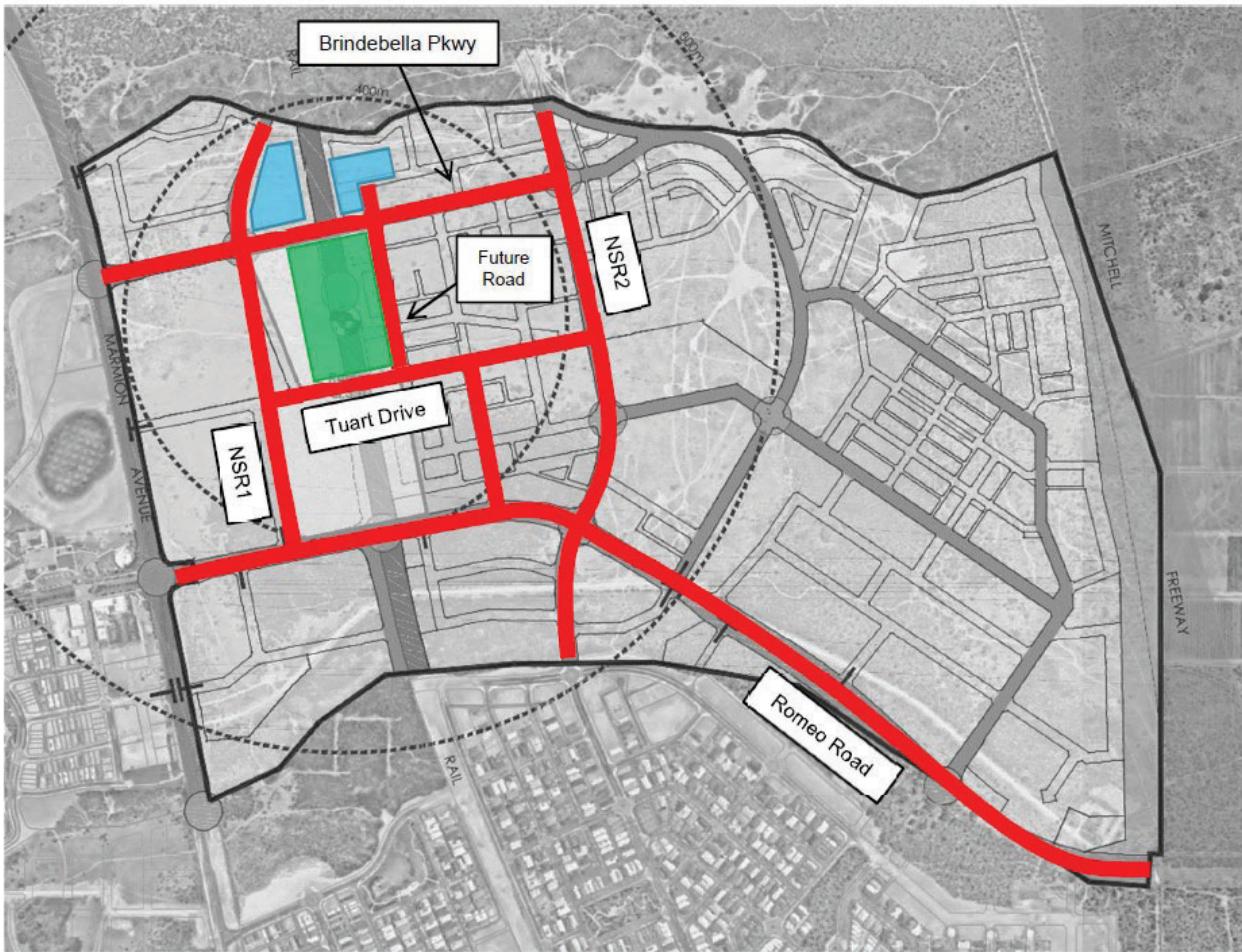


Figure 25 - Assumed Road Network Under Future Scenario – with Brindabella bridge (2031)



The AM/PM peak period for the Alkimos Station has logically been identified as 7:00 to 8:00am and 5:00 to 6:00pm respectively. Key findings of the TIA are as follows:

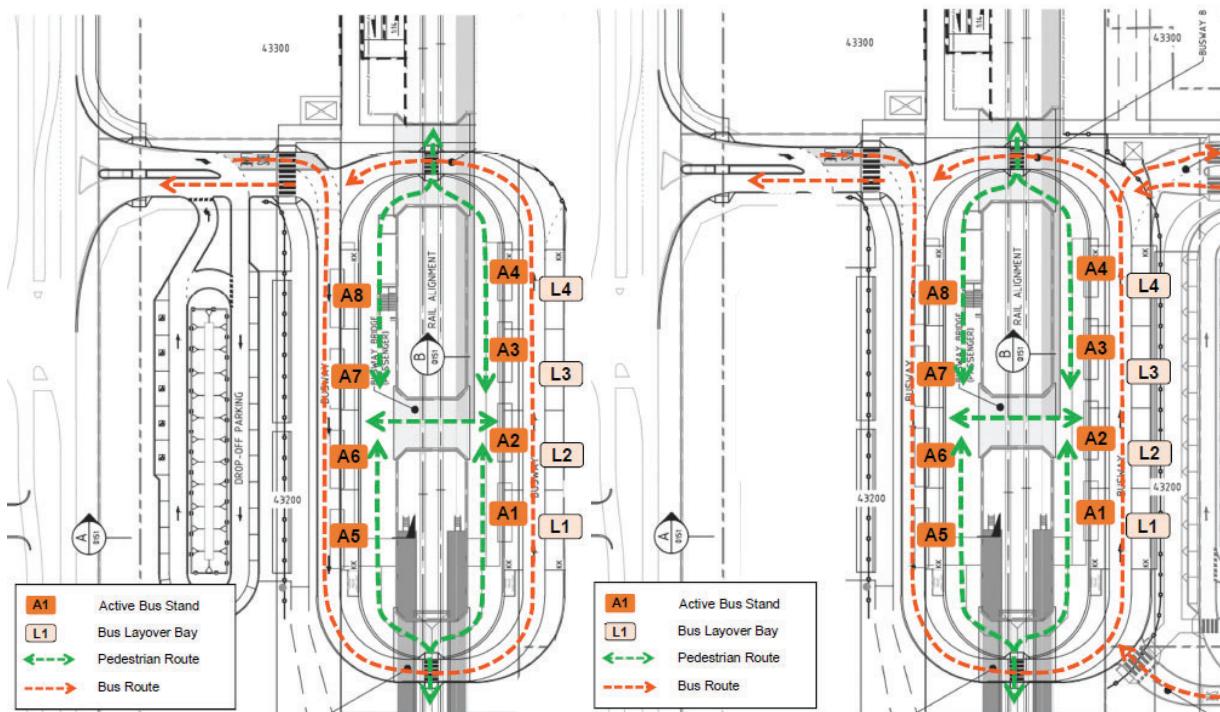
- Surplus capacity is provided for 'Day 1 Operation' with all intersections providing a Level of Service A result in the SIDRA analysis.
- Satisfactory capacity is provided for the established operation scenario, with the worst-case scenario resulting in a Level of Service C.

Overall, the modelling outcomes suggest a suitable outcome for a town centre environment, which appropriately meets the capacity requirements set by the SWTC (which requires a minimum LoS C) and the desire to not over-supply infrastructure for the private vehicle long-term.

### 5.2.2. Bus Servicing and Interchange Design

A summary diagram of both the 'Day 1 Operation' and 'Assumed Road Network Under Future Scenario' is presented in the following figures. As demonstrated in these figures, the 'Assumed Road Network Under Future Scenario' relies on access to the east of the railway track, and will occur following construction of the Brindabella Road Bridge.

Figure 26 - Bus Interchange for Day 1 (without bridge) and Ultimate Arrangement (with bridge)



### 5.2.3. Pedestrian and Cycling

A regional PSP connection will be established as part of the YRE project, which will provide a complete network extension from Butler Station to Yančep Station. The PSP will be a 4m pathway with 0.5m shoulders on each side, located west of the railway tracks within the railway corridor.

For the Alkimos Station, the PSP approach from the south will be provided with a ramp up to the station forecourt and integrate to the path network adjacent to the station, before ramping down again before recommencing the PSP connection. This was selected as the preferred design for Alkimos to allow direct access to the station building.

This PSP network will be supported by a number of local cycle routes planned to be implemented by Development WA as part of the wider Alkimos activity centre design. This includes east-west dedicated cycle lanes along Brindabella Drive and Romeo Road. The ability to connect these supporting networks into the PSP will be explored between DevelopmentWA and the PTA as detailed design progresses.

## 5.3. ENVIRONMENTAL NOISE AND VIBRATION MANAGEMENT PLAN

The PTA are committed to the management of airborne noise, ground-borne vibration and ground-borne noise arising from the operation of the new railway infrastructure. It is also a requirement of the SWTC for NEWest to design and build new stations to comply with both the *Environmental Protection (Noise) Regulations 1997*, as guided by State Planning Policy 5.4 – Road and Rail Transport Noise and Freight Considerations in Land Use Planning (**SPP 5.4**). The following provides a summary of the noise modelling outcomes applicable to the station itself, as well as the ongoing assessment which is being conducted by the PTA for the rail operation (which is not subject of this development application).

### 5.3.1. Station Operation Noise Modelling

The key acoustic issues associated with the station are predominantly environmental noise emission from station and entry buildings (including public address announcements and passenger movements), noise emission from car parking areas and bus movements. The report provided at **Appendix K** outlines the outcomes of this assessment.

A summary of the acoustic issues relevant to the station operations are as follows:

## **Mechanical Plant**

Environmental noise levels from the Alkimos station due to building services noise have not been assessed as the mechanical design has not sufficiently progressed to establish equipment selections. However, it is expected that standard noise control measures will be sufficient to control mechanical services plant noise in order to meet the required environmental noise criteria at adjacent noise-sensitive receivers.

## **Car Parking Areas**

The noise from the proposed western and eastern car parks has been assessed, based on the car park layout and pavement design undertaken by the civil consultant. The predicted noise levels at the noise-sensitive receivers nearest the car park were found to be below both the day time and night time environmental noise criteria.

## **Public Address System**

Noise levels at nearby noise-sensitive receivers from the station's PA system have not been assessed as the PA design has not sufficiently progressed to establish equipment selections. However, a limiting sound power level for the equipment has been established which should enable the environmental noise criteria to be achieved.

## **New Station Entry Road and Bus Movements**

The new Alkimos Station is to be accessed via Brindabella Parkway and the new internal access road. The connection road between the proposed new car park and these roads, the associated car park vehicles and buses using these roads, as well as the bus movements along the internal station area, are required to be assessed against the road traffic requirements of the SPP 5.4.

The noise from the proposed new car park connection roads, associated vehicles on the future road network and bus routes accessing the new bus station has been assessed. The predicted noise levels are predicted to achieve the SPP5.4 traffic noise targets at the nearest potentially-affected receivers to the south, but exceed the daytime targets at the nearest receivers to the north. However, no mitigation measures are proposed, as:

- Predicted traffic noise levels associated with the station alone are expected to be minimal and indiscernible when compared to traffic noise levels generated at this receiver from traffic in the larger development area
- The selected receiver locations may be overly conservative, with realistic worst-case receiver locations set further back from the road/rail corridors
- Construction of noise walls where there is currently no development is not required, as these future dwellings are expected to comply with the requirements of SPP5.4, and adopt quiet house design measures.

### **5.3.2. Rail Operation Noise Modelling**

Noise modelling for the rail operation will be completed independent of this development application process, given the rail and associated train operation is exempt from the requirement of planning approval. Preliminary noise modelling completed on the rail operation indicates that noise targets may be exceeded at a number of sensitive receiver locations. As a result, some degree of noise and vibration mitigation is intended to be incorporated into the rail corridor, likely in the form of acoustic walls and potentially ballast matting.

The PTA have also committed to a further operation noise monitoring program will be implemented within three months of the opening of the proposal, and again at 18 months. Further detail on these ongoing management measures is provided within Section 6 of this report.

## 5.4. OTHER TECHNICAL INPUTS

Table 8 - Summary of Technical Inputs

Input	Details
<b>Bushfire (Appendix L)</b>	<p>The Bushfire Attack Level (BAL) assessment provided at <b>Appendix L</b> of this report confirm that the post-development site conditions will still provide some habitable buildings within areas above a BAL-low rating. As a result, it is recognised that a Bushfire Management Plan (BMP) is required to support the development application, and this will be provided under a separate cover.</p> <p>The establishment of an Asset Protection Zone (APZ) requiring the ongoing management of vegetation surrounding the station building is also expected to be a requirement of this BMP. A preliminary design of this APZ is also provided at <b>Appendix L</b> of this report. The formal arrangements for the management of this vegetation to the APZ standards will be subject to ongoing negotiations between the PTA and the landowner. It is expected that any associated instruments which are required to be listed on the title will be delivered through a condition of development approval.</p>
<b>Aboriginal and European Heritage Review</b>	<p><u>Aboriginal Heritage</u></p> <p>An archaeological survey, heritage surveys and Aboriginal consultation has identified an area of limestone outcrops considered to have heritage value to the west of the rail corridor in Alkimos. This site, referred to as the 'Romeo Road Pinnacles,' has been lodged with the DAA as a potential heritage site.</p> <p>As a result, specialist Aboriginal monitoring personnel will be engaged during the initial stages of vegetation clearing at the station sites to further ensure there are no heritage sites or artefacts located within these areas.</p> <p>Although there are no registered Aboriginal heritage sites within the vicinity of the project area, a Section 18 approval under the <i>Aboriginal Heritage Act 1972</i> will however be sought to provide consent to impact the Romeo Road Pinnacles site that has been lodged with the Department of Aboriginal Affairs as a potential heritage site.</p> <p><u>European Heritage</u></p> <p>There are no State Heritage Places located within the route corridor, based on a search of the Heritage Council of Western Australia's database. Therefore, no investigations into European heritage will be undertaken for the project.</p>
<b>Stormwater Drainage Design (Appendix M)</b>	<p>Stormwater runoff from the precinct is captured, conveyed and discharged within five sub-catchments. Each of the sub-catchments aims to detain the 10% AEP storm event while providing an overland flow route for storms exceeding the volume of the design storm. All calculations have used a permeability rate of 2 m/day and a deep water table model. A preliminary stormwater design is provided at <b>Appendix M</b> of this report.</p> <p>The Perth Groundwater Atlas indicates that historical groundwater maximums are approximately 2-3 m AHD, at least 30 m below the lowest point of the precinct. Gross pollutant traps are provided upstream of all underground tanks and drainage basins to collect debris prior to the tank. Water sensitive urban design principles</p>

Input	Details
	<p>suggest that 2% of the development area should be allocated to biofiltration. As the precinct area is 6.4 ha, a total of 1280 m<sup>2</sup> of biofiltration area is required, which can be accommodated within the swales provided. All pits are typically either grated gully pits or manholes as per Main Roads standard details with 1200 mm diameter liners.</p>
	<p>Runoff from the western portion of the Station Building and Bus Interchange is captured in traditional pit and pipe networks and conveyed to an underground tank located to the east of the Bus Interchange. Two manholes to accommodate hydraulic connections are provided on the western side of the station building. Runoff from the paved area immediately west of the station building is captured in a strip drain located on the property boundary which is also discharged into these manholes. The drainage tank has been located to fall within the area between the future PTA boundary and the busway. During large storm events the tank is expected to surcharge via the northernmost pits with stormwater flowing westwards to the NSR1 road reserve. Future design will seek to discharge runoff from the station building to the rail corridor.</p>
	<p>The central space within the kiss-and-ride area has been utilised as a swale. The kiss-and-ride and surrounding areas are graded towards the swale. Threshold drainage on the boundary to the west of the kiss-and-ride is provided by grated trench drains located on the boundary, which is also discharged to the kiss-and-ride swale via a pit and pipe network. This swale is sized to store the 10% AEP storm with approximately 300 mm ponded depth. Drain blocks are required at regular intervals to maximise storage and infiltration within the swale. During large storm events the swale is expected to surcharge within the kiss-and-ride area, before overflowing to the adjacent road reserve via the kiss-and-ride access road.</p>
	<p>The drainage strategy for the Bus Interchange and kiss-and-ride parking is mostly mirrored on the eastern side of the rail corridor. Runoff from the eastern side of the station building is captured in a grated trench drain located on the station boundary. Runoff from the Bus Interchange is captured in traditional pit and pipe networks. Hydraulic connections are also provided on the eastern side of the station building. Pipe networks on the eastern side of the station all discharge into an underground tank located between the Bus Interchange and kiss-and-ride parking. This tank is also sized to accommodate runoff from the future bus interchange access roads. Similarly to the western kiss-and-ride, the future kiss-and-ride on the eastern side of the Bus Interchange accommodates a centrally placed swale, which is sized to accept runoff from the kiss-and-ride and adjacent areas. There is the opportunity to avoid building the drainage tank as part of the current works by utilising the future kiss-and-ride area as a drainage basin. This basin would only be utilised until the kiss-and-ride and future bus accesses are constructed, therefore requiring the underground tank to be constructed.</p>
	<p>The western carpark utilises two large centrally placed swales to reduce the amount of pipework required. The swales are sized to accommodate the 10% AEP storm event. The carpark has been graded to allow a breakout point for large storm events at the north-western corner of the carpark. A kerb opening is provided to prevent the carpark from ponding more than 200mm before overflowing towards</p>

Input	Details
	<p>Brindabella Parkway. Small bridge decking-structures are required at intervals to allow pedestrian access across the swales. Both swales will be fenced.</p> <p>The geometric constraints have caused the layout of the northern carpark to not accommodate swales. As a result, aggregate trenches are proposed instead, between the rows of parking bays. These aggregate trenches are 1 m wide to fit between the wheel stops of abutting parking bays. Analysis of the size of these trenches using PC Sump has indicated that a depth of approximately 1m would be required to accommodate the 63.2% AEP 1hr storm event. A grated pit located at the end of the trench is used to convey flows larger than the design storm event into the wider piped drainage system. Future design should seek to rationalise the depth of the aggregate trenches where possible and optimise for trees and lighting. The western aisle of the carpark is drained by a traditional pit and pipe network, which discharged to a conventional basin located at the northern extent of the carpark. Storm events larger than the 10% AEP will overtop the basin and stormwater will flow into the adjacent road reserve to the west.</p> <p>The majority of runoff from the future carpark to the north-east of the station is captured in swales, which infiltrate some of the 10% AEP storm volume. Catchpits are provided to convey ponded water depths of more than 300 mm to the basin located in the south-east corner of the carpark. During large storm events the basin is expected to surcharge via the northern swales to pond within the carpark. Ponding is limited to 200mm before stormwater is discharged out of the carpark via a kerb opening in the north-eastern corner. A smaller basin is provided to the north of the carpark to accommodate flows from a small piped network. During large storm events the basin is expected to overtop and runoff will flow north into the adjacent bushland.</p>

## 6. SUPPORTING APPROVALS AND MANAGEMENT PLANS

A number of environmental approval processes and associated management measures required to deliver the station have been progressed, which has occurred independent of this development application approval process. The following table provides a summary of those approvals.

Table 9 Summary of Supporting Approvals and Management Measures

CONSIDERATION	DETAIL
<u>Environmental Approvals</u>	<p>Ministerial Statement 1100 (Butler Station to Eglinton) has granted approval for the clearing and disturbance of vegetation associated with the construction of the extension from Butler Station to Eglinton, including the Alkimos Station.</p> <p>A condition of Ministerial Statement 1100 is the implementation of a management plan for the Alkimos Park and Recreation Reserve. This plan has been approved by the regulator.</p> <p>Five EPBC deeds are in place between PTA and adjacent land developers to use their Commonwealth environmental approvals under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>.</p> <p>Amendments to these approvals is likely to be required due to subsequent changes to the development envelopes, however these will be progressed independent of the development application process.</p> <p>Further details of the environmental management strategies is provided at <b>Appendix N</b> of this report.</p>
<u>Noise Monitoring Program</u>	<p>A noise monitoring program will be implemented within three months of the opening of the YRE line, and again at 18 months, to assess the effectiveness of noise mitigation. Specifically the program will:</p> <ul style="list-style-type: none"><li>• Confirm the as-built and operating railway achieves the Policy target LAeq (Day) 55 dB and LAeq (Night) 50 dB unless higher levels are permitted due to the incorporation of specified house facade protection.</li><li>• Assess the accuracy of the pre-construction noise modelling predictions that were used to determine noise reduction treatments.</li></ul> <p>The PTA also has existing procedures for receiving noise complaints, which will be extended to the YRE operations.</p>
<u>Out of Hours Work</u>	<p>Due to the nature and scale of the project, it is likely that some degree of 'out of hours' and 'night shift' work will be required during the construction stage of this project.</p> <p>An Out of Hours Construction Noise and Vibration Management Plan will be provided to the City of Wanneroo prior to these out of hours works occurring. Acceptance of this Construction Noise and Vibration Management Plan will meet the notification / approval requirements as required by the Environmental Noise Regulations.</p> <p>For the purpose of the planning approval process, we request that any condition of approval related to construction hours is worded in a manner that</p>

<b>CONSIDERATION</b>	<b>DETAIL</b>
	does not restrict these out of hours works (subject to acceptance of the Construction Noise and Vibration Management Plan).
<b><u>Construction Management Plan</u></b>	<p>A construction management plan will be delivered by the PTA / NEWest Alliance prior to works commencing on site, which is expected to be reflected through a condition of development approval.</p> <p>A summary of the YRE Construction Program is provided at <b>Appendix O</b> of this submission.</p>

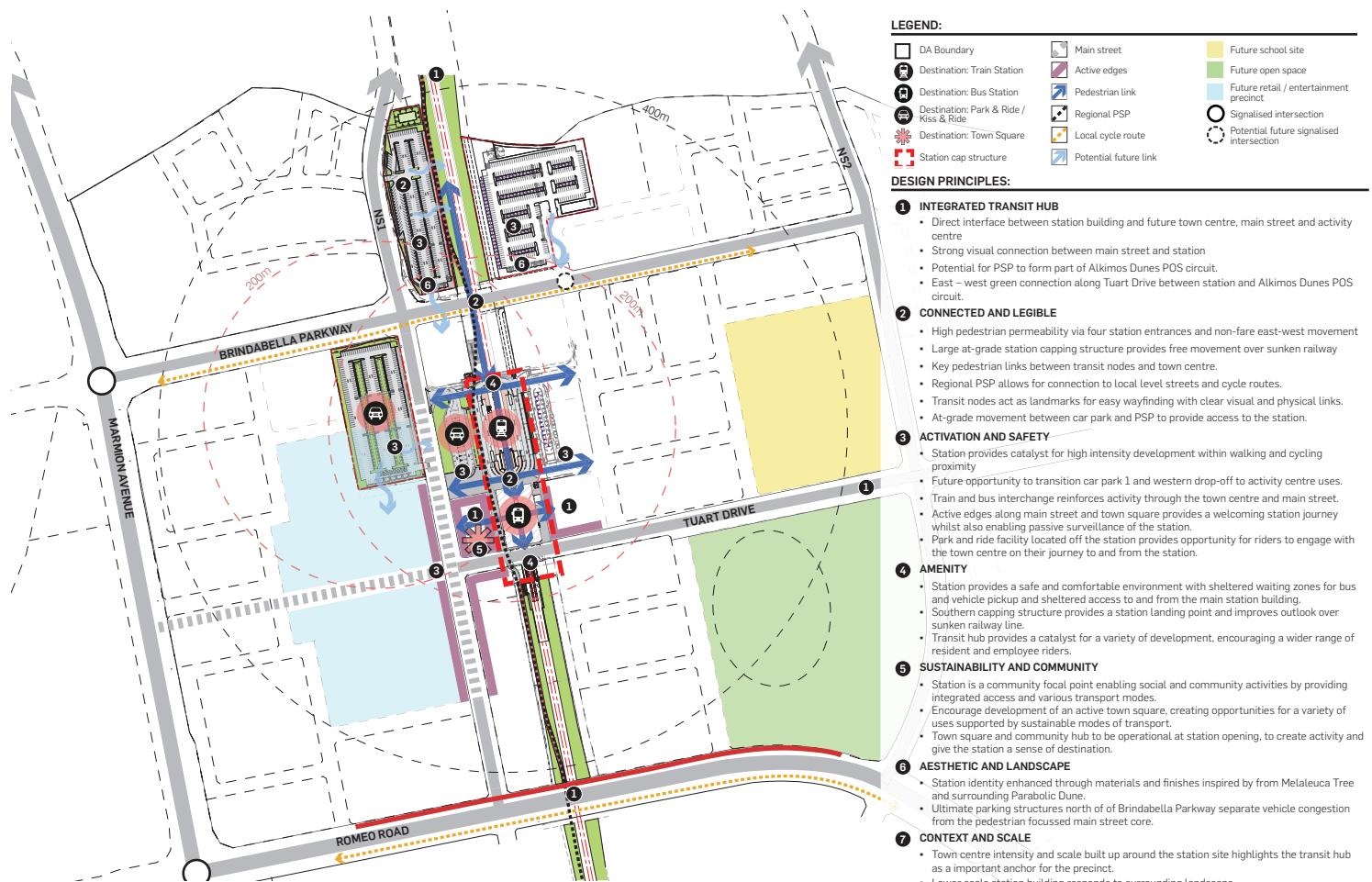
# **7. PLANNING ASSESSMENT**

## **7.1. STATION DESIGN PRINCIPLES AND DESIGN REVIEW**

DPLH State Planning Policy No. 7 – Design of the Built Environment (SPP7) provides a broad framework intended to facilitate qualitative performance-based assessment, with the ultimate aim of achieving desired quality outcomes. The framework is underpinned by the 10 design principles, which are considered and applied through the design assessment and review process.

The YRE project as a whole was subject to initial design comments from the Office of Government Architect (OGA) in February 2020, as well as a further State Design Review Panel (SDRP) review in June 2020. A summary of the comments, recommendations and associated modifications to the plans arising from these design review sessions is detailed at **Appendix P** of this submission.

Given all stations on the YRE line are placed within an activity centre, the alignment of the YRE station architectural design and layout with the future desired layout of the activity centre is essential. Figure 27 below provides the ‘Design Principles Plan’ demonstrates this alignment, and includes specification of the key principles underpinning the station’s design within its context.



## 7.1.1. METRONET Station Precinct Design Guide

The METRONET Station Precinct Design Guide provides specific design guidance aimed at the design and planning of station precincts, including objectives which are fundamental to the delivery of a METRONET station.

Importantly, the METRONET Station Precinct Design Guide emphasises that a ‘one-size-fits-all’ approach cannot be applied to station design, and instead a station must be designed on a case-by-case basis considering the transit function, context and development potential over time. This is particularly relevant to the YRE stations given the surrounding centres are in a state of transition, and the ultimate activity centre station design may vary as the supporting activity centre development evolves.

The Station Precinct Design Guide sets out 8 critical element objectives which require the specific planning response to support successful long-term station development. These requirements vary depending on the station precinct type. As Alkimos Station is a ‘Secondary Centre’ the station best being classified as a ‘SP3 - Town Centre’ form of station precinct type, with the following station precinct type description:

*Town centre station precincts are hubs for the immediately surrounding suburbs, and provide a range of shops, employment opportunities, community services and facilities to the local and wider area. They have significant transit oriented development potential, and support a variety of housing types including higher density residential in mixed use environment close to the station and centre amenities.*

Many of these ‘critical elements’ are most applicable to the development surrounding the station, and is beyond the scope of the Alkimos station development. However, the aspects which are applicable in some aspect are:

- Critical Element 3: Street Design and Movement Priority
- Critical Element 4: Intersections and Crossings
- Critical Element 5a: Transit Integration – Rail
- Critical Element 5b: Transit Integration – Bus
- Critical Element 6: Station Type
- Critical Element 7a: Station Dedicated Parking
- Critical Element 8: Public Realm and Public Open Space.

The following table applies these ‘Town Centre’ critical elements to the proposed Alkimos station design.

Table 10 Alkimos Station Design Principles

STATION CRITICAL ELEMENT	DETAILS
<b>Critical Element 3: Street Design and Movement Priority</b>	
<i>Preferred: balanced access ped/bike &amp; bus/car</i>	<p>The Alkimos Station aligns the station building and bus interchange in a north / south linear alignment over the railway corridor. This design is unique to Alkimos, and provides a number of pedestrian / cyclist benefits, such as:</p> <ul style="list-style-type: none"> <li>• Providing a larger station forecourt over the railway tracks, allowing for greater permeability and connectivity across the railway line; and</li> <li>• Allowing the station building to directly front future activity centre development to the east and west.</li> <li>• The hierarchy of transport mode design applied to the Alkimos station also demonstrated by the proximity to the station entrance. This hierarchy is as follows:</li> <li>• Pedestrian / cyclists infrastructure is closest to the station. Short term unsecured bicycle bays are provided adjacent to the station entrance, and long term secured parking is located East and West of the station entrance.</li> <li>• Bus interchange facilities are immediately adjacent, leading directly into the station.</li> <li>• Private vehicle infrastructure is located furthest from the station entrance. The 'kiss-and-ride' drop-off and pick-up area is located approximately 60m from the station entrance, and long term parking located beyond.</li> </ul> <p>This hierarchy encourages use of alternative means of transport, as these services are most convenient to the station entrance.</p>
<i>Shared zone (station interface area): 20km/hr</i>	Busways and internal driveways are designed to 15km/hr speeds.
<i>Local/ urban streets: up to 40km/hr</i>	The construction of all other local and arterials roads will be completed by the landowner consistent with the Alkimos Activity Centre Plan (as amended), and are outside of the scope of this development application.
<i>Urban Arterials (frame): 50km/hr</i>	
<b>Critical Element 4: Intersection and Crossings</b>	
<i>Preferred: controlled four way intersection, no splitter lanes. Micro roundabout</i>	<p>All intersections within the PTA car park and busway are sign-controlled intersections with no splitter lanes. The busway roundabouts are designed to the required swept path (noting that this area will accommodate over-sized articulated buses).</p> <p>This design is consistent with the preferred layout for a Town Centre station precinct.</p>

STATION CRITICAL ELEMENT	DETAILS
<b>Critical Element 5a: Transit Integration - Rail</b>	
<p><i>Preferred minimum rail integration type:</i></p>  <p><i>Underground Tunnel</i></p>  <p><i>Cut and Cover</i></p>	Alkimos Station will be a 'cut and cover' station, consistent with the preferred station design for a Town Centre station precinct.
<b>Critical Element 5b: Transit Integration – Bus</b>	
<p><i>Preferred: on street.</i></p> <p><i>Integrated/stacked interchange loop at grade</i></p>	The Alkimos station provides an at grade bus interchange immediately adjacent to the station building. This is consistent with the preferred approach.
<b>Critical Element 6: Station Type</b>	
<p><i>Preferred: integrated station, underground station.</i></p>	<p>The following design elements demonstrate that the Alkimos Station is best classified as an integrated station, consistent with the 'preferred' approach for a town centre station.</p> <p><u>Integrated into the streetscape / form a seamless part of the urban streetscape</u></p> <p>Multiple aspects of the station have been designed to appropriately interface with surrounding future development. This is best demonstrated in the Design Principles Plan at Figure 27 of this report.</p> <p><u>Avoid the creation of movement barriers</u></p> <p>The Alkimos Station alignment of the station building and bus interchange corridor over the railway corridor provides a larger station forecourt over the railway tracks. This provides for direct movement across the railway line.</p> <p><u>Streetscape to be dedicated for entry ways to the station</u></p> <p>The Alkimos station building has an entry point on each façade. The design directly fronts future activity centre development to the east and west.</p>
<b>Critical Element 7a: Station Dedicated Parking</b>	
<p><i>Preferred (Core): no park'n'ride</i></p> <p><i>Considered (Core): limited park'n'ride (stacked/decked)</i></p>	<p>The Alkimos station applies at-grade park-and-ride parking, which is not recognised as either a preferred or considered form of parking for a town centre station precinct type.</p> <p>As the Alkimos station is located in an emerging centre, this is considered an appropriate form of parking for this context. As at-grade parking requires the least structural investment, this form of</p>

STATION CRITICAL ELEMENT	DETAILS
	<p>parking is more conducive to urban redevelopment than constructing major structures to deliver stacked or decked parking.</p> <p>Importantly, the station layout places this at-grade parking area with furthest distance from the station entrance to ensure opportunities for alternative travel are still explored and prioritised. The opportunities to deliver a more consolidated form of car parking will be reviewed as the activity centre development progresses, and the 'highest and best use' of the land transforms.</p>

#### Critical Element 8: Public Realm and Public Open Space

<i>Preferred: people streets plaza/square, playspace urban park</i>	<p>The Alkimos Station building is located immediately adjacent to the town square and community hub, which is planned to be developed by DevelopmentWA as part of the Alkimos Activity Centre (as amended).</p>
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## 7.2. ASSESSMENT PROCESS AND APPROVAL REQUIREMENTS

### 7.2.1. Planning Control Area No. 131 (PCA132)

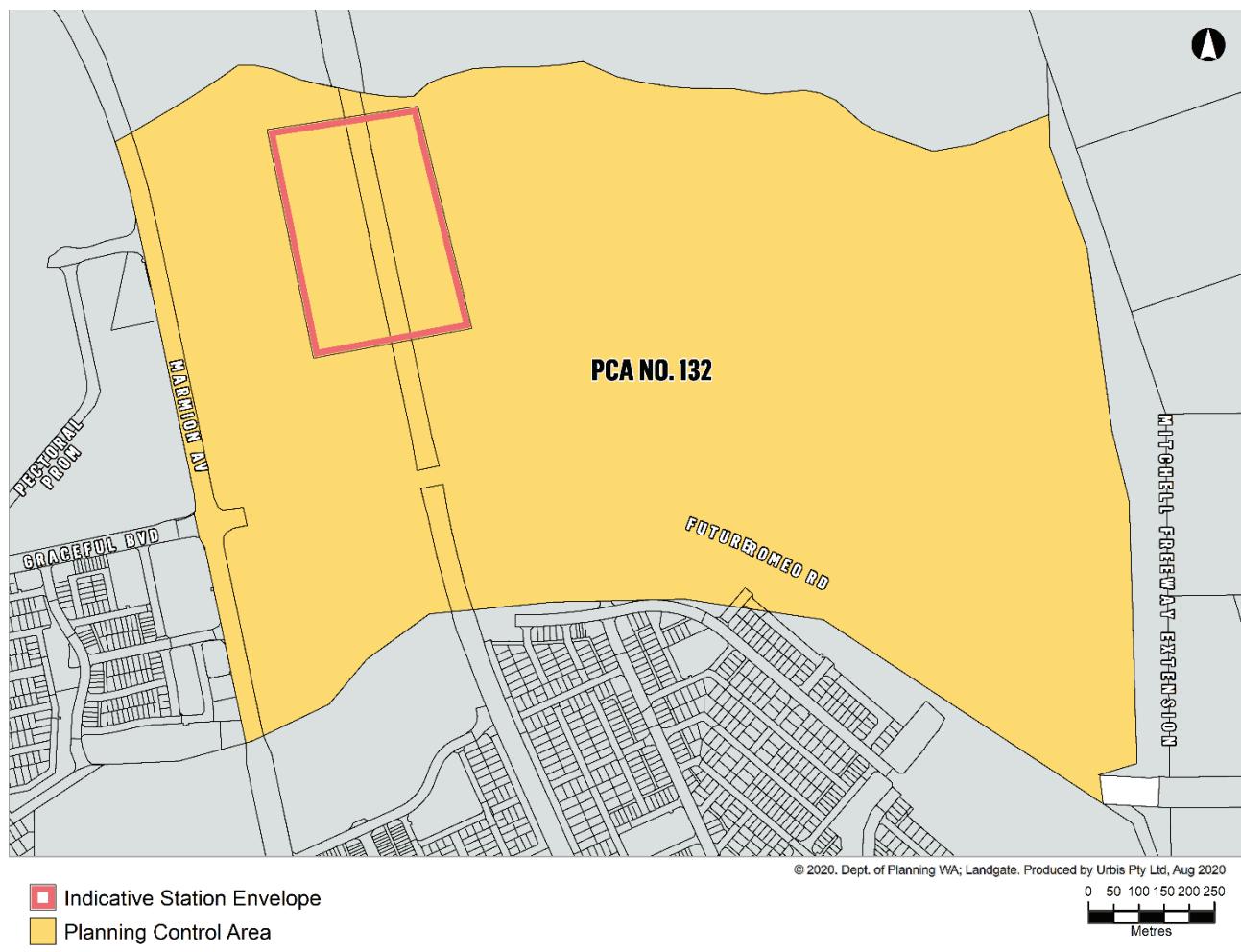
The proposed Alkimos Train Station works are wholly located within PCA132, which has been established for the purpose of facilitating the development of the land for the purpose of railways and related public purposes. Refer Figure 28 below.

The *Planning and Development Act 2005 (PD Act)* outlines the planning processes for a PCA. This process is summarised as follows:

- The development application is to be lodged with the local authority. The local authority is to forward the application and its recommendation to the WAPC within 30 days of receiving the application (Section 115(3) of the PD Act).
- A 60 day deemed refusal period applies to development in a PCA (Section 250(3) of the PD Act).

Under Section 130 of the PD Act, the PCA provisions prevail over every other provision of the PD Act, including any region planning scheme or local planning scheme. However, this alone does not negate the requirement to obtain approval under the region planning scheme or local planning scheme, where applicable.

Figure 28 - PCA Map



## **7.2.2. Railway (METRONET) Act 2018**

The *Railway (METRONET) Act 2018 (METRONET Act)* is the enabling legislation applicable to the construction of the METRONET railway extensions. Section 3 specifically provides the authority to construct the Yanchep Rail Extension. The legislation constitutes a special Act for the purposes of the *Public Works Act 1902*.

From a planning approvals perspective, this enabling legislation introduced a number of exemptions from planning approval beyond what is provided for within the PD Act and Metropolitan Region Scheme. Specifically, Section 6 of the METRONET Act provides the following exemption applicable to this application:

*Despite anything in the Metropolitan Region Scheme, the following development may be commenced or carried out without the approval of the Planning Commission —*

...

*(B) METRONET works on non-railway land.*

This clause will provide an exemption from planning approval for METRONET works which extend beyond the Railways reservation. Importantly, for the construction or alteration of a railway station, or any related car parks, public transport interchange facilities or associated means of pedestrian or vehicular access, the requirements under the Metropolitan region Scheme will apply.

As this development application fundamentally involves the construction of a railway station, a development application is required. However, some works ancillary to the station will be exempt from approval under this clause. A detailed summary of the exemptions is provided at Section 7.2.5 of this report.

For completeness and transparency, we have included detail on the full scope of works reasonably associated with the station within this application for context, which for the Alkimos Station includes the Brindabella Parkway, Tuart Drive and Romeo Road bridge.

## **7.2.3. Section 6 Public Works**

Section 6 of the PD Act states provides exemption for the requirement to obtain planning approval under the relevant local planning scheme for ‘public works’ or the taking of land associated with that public work.

To achieve this public works test, the following two tests must be met:

1. The authority undertaking the work is an agent of the crown; and
2. The scope of works meets the definition of ‘public work’ as defined by the *Public Works Act 1902*.

The PTA is considered an ‘Agent of the Crown’, and the NEWest Alliance acts on behalf of the PTA. The proposed forward works will therefore meet the first test of public works.

Section 2 of the *Public Works Act 1902* includes the following within the definition of ‘Public Work’.

- (2) any railway authorised by special Act or any work whatsoever authorised by any Act;*  
*(20) any road, stock route, viaduct, or canal;*

Given the proposed Alkimos station works are included within the scope of the METRONET Act enabling legislation, the proposed works also meet this second test.

The Alkimos Station works will thereby meet the Section 6 exemption, and does not require approval under the City’s local planning scheme.

## 7.2.4. Metropolitan Region Scheme (MRS) Exemptions

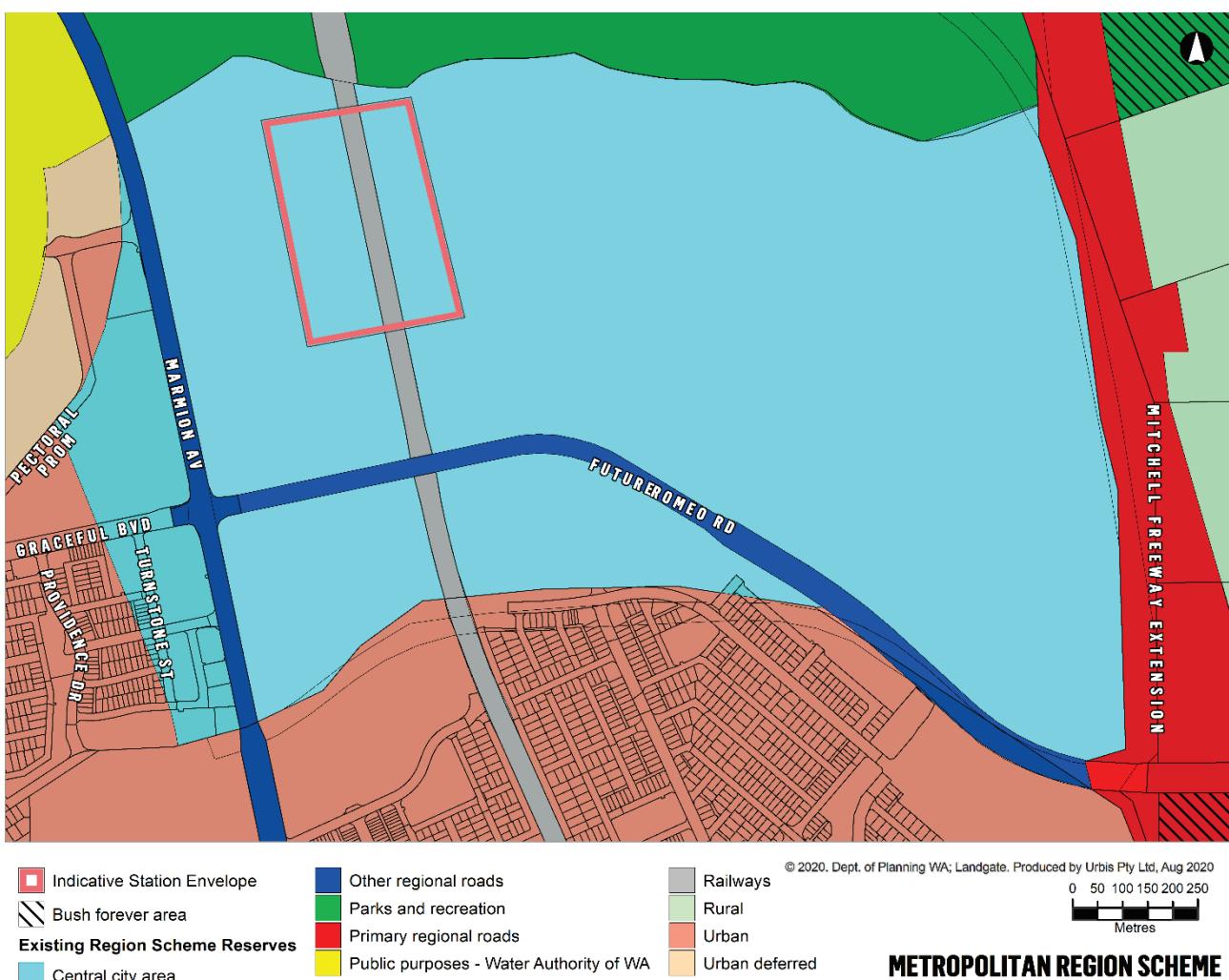
The site is identified within the 'Railway' reservation and 'Central City Area' zone under the MRS – refer to Figure 29.

Exemptions available under the MRS are provided through the following clauses:

- Reserved Land: Clause 16(1a), where the development is 'Permitted Development' or expressly authorised under an Act to be commenced or carried out without the approval of the WAPC.
- Zoned Land: Clause 24, which broadly enables a public authority to complete works in a local road. However in accordance with section 24(2)(a) of the Planning and Development Act, this exemption does not extend to development within a PCA.

Under Section 24(2)(a) of the MRS, the exemptions for planning approval cannot be applied to land which is declared under Section 112 of the *Planning and Development Act 2005* – i.e. a Planning Control Area. This means that the MRS does not provide any exemptions from planning approval for zoned land. However, for this METRONET project, the enabling legislation of the METRONET Act re-instates the majority, but not all, of these exemptions.

Figure 29 – Metropolitan Region Scheme (Extract)



## 7.2.5. Summary of Exemptions

The following table provides a summary of the METRONET Act and MRS exemptions, and associated conclusions regarding the scope of works which require formal development approval.

Table 11 – Summary of Exemptions

MRS Zone / Reservation	Exemption	Conclusion
'Railways' Reservation	<p>Clause 16(1a) of the MRS states that development approval is <b>not</b> required for development on reserved land owned or vested in a public authority, and are:</p> <p><i>works on land reserved for railways for the purpose of or in connection with a railway, not including the construction or alteration of a railway station or any related car parks, public transport interchange facilities, or associated means of pedestrian or vehicular access;</i></p>	<p>The conclusion drawn from this is clause as follows:</p> <ul style="list-style-type: none"> <li>• The Railway track works and any associated noise walls within a 'Railway' reservation will <u>not</u> require planning approval.</li> <li>• The bridges including Brindabella Parkway, Tuart Drive do not provide direct access to the station, and therefore are exempt under this clause.</li> <li>• The majority of the remaining station works which are available for public access will require approval.</li> </ul>
'Central City Area' Zoning	<p><i>Despite anything in the Metropolitan Region Scheme, the following development may be commenced or carried out without the approval of the Planning Commission —</i></p> <p>...</p> <p><i>(B) METRONET works on non-railway land.</i></p> <p>'METRONET Works' are defined as:</p> <p><i>means works for the purpose of, or in connection with, a METRONET railway but does <u>not</u> include the construction or alteration of a railway station, or any related car parks, public transport interchange facilities or associated means of pedestrian or vehicular access;</i></p>	<p>The conclusion drawn from this clause is as follows:</p> <ul style="list-style-type: none"> <li>• Station works which are generally available for public access will require approval.</li> <li>• Any other works and infrastructure included within the scope of this METRONET project will <u>not</u> require formal approval.</li> </ul>

## 7.3. PLANNING FRAMEWORK ASSESSMENT

### 7.3.1. State Framework Assessment Summary

Table 12 State Framework Assessment Summary

STATE FRAMEWORK	DETAILS
<b>Perth and Peel @ 3.5 Million (PP@3.5) AND North-West Sub-Regional Planning Framework (Sub-Regional Framework)</b>	<p>PP@3.5 and the associated Sub-Regional Framework identifies the Alkimos Station area as a 'District Centre' within the surrounding land being Urban. This is consistent with the status of the site within the Metropolitan Region Scheme and State Planning Policy 4.2 – Activity Centres for Perth and Peel.</p> <p>The Sub-Regional Framework identifies all METRONET Stage 1 works within the framework, including the Alkimos station. This proposal is therefore entirely consistent with the outcomes sought through the Sub-Regional Framework.</p>
<b>Metropolitan Region Scheme (MRS)</b>	<p>As noted in section 7.2 above, the proposed Alkimos station will be located within the 'Railways' reservation and 'Central City Area' zone under the MRS.</p> <p>The Alkimos Station is appropriately placed within these reserves and zones for the following reasons:</p> <ul style="list-style-type: none"> <li>• The development of a railway station within a 'Railways' reserve is indisputably consistent with the intent of the reserve.</li> <li>• The construction of an interchange railway station within the 'City Centre' zone is entirely complementary with contemporary urban development principles as it enables development to progress without creating a reliance on the private vehicle. This transport orientated form development is widely accepted as best practice planning for a contemporary urban area.</li> </ul>
<b>State Planning Policy No. 7 – Design of the Built Environment (SPP7)</b>	<p>As identified in Section 7.1 of this report, the Alkimos Station appropriately addresses the relevant design principles of SPP7, and has been the subject of SDRP comment consistent with this policy.</p>
<b>State Planning Policy No. 4.2 – Activity Centres for Perth and Peel (SPP4.2)</b>	<p>The Alkimos Station is located within the Alkimos Activity Centre, which is identified as an 'emerging' Secondary Centre under the activity centres hierarchy of SPP4.2.</p> <p>Key themes and objectives of SPP4.2 which are directly applicable to this development application are as follows:</p> <ul style="list-style-type: none"> <li>• Accessibility to public transport, and planning in line with transport oriented development principles.</li> <li>• Prioritising mode-shift towards public transport, walking and cycling, and reducing reliance on private cars.</li> </ul> <p>The design principles outlined in preceding sections of this report have demonstrated the various ways in which the Alkimos Station has met these objectives.</p>

STATE FRAMEWORK	DETAILS
<b>State Planning Policy No. 5.4 – Road and Rail Noise (SPP5.4)</b>	<p>SPP5.4 guides the interface of noise sensitive development and major road and rail transport routes, with the overall aim of protecting significant transport routes whilst minimising the adverse impact of transport noise on sensitive development.</p> <p>As all new proposed railways are required to meet the specified noise targets of SPP5.4, a noise and vibration assessment has been completed in support of the Alkimos Station (refer to Section 5.3 and <b>Appendix K</b> of this report).</p> <p>Importantly, the PTA has also committed to undertaking further operational modelling to ensure the modelled noise outcomes are accurate (refer to Section 6 of this report).</p> <p>As the area immediately surrounding the train station is currently undeveloped, the provisions of SPP5.4 will also apply to any new noise sensitive development proposed within 100m of the rail alignment, which will likely result in ‘quiet house’ design standards being applied to this subsequent development.</p> <p>This ‘belt and braces’ approach to noise mitigation effectively meets the objectives of SPP5.4.</p>
<b>Development Control Policy No. 1.6 – Planning to Support Transit Use and Transit Oriented Development (DCP1.6)</b>	<p>The key objective of DCP1.6 is to encourage the co-location of development and transportation, to serve the mutual benefit of increasing patronage on the public transport system, as well as decreasing reliance on the private vehicle.</p> <p>The Alkimos Station indisputably supports transport orientated development principles, given it provides a multi-modal station with the core of a future secondary level activity centre. But the detailed station design remains an important component to ensuring these TOD principles come to fruition.</p> <p>In summary, the following design components of the Alkimos Station support TOD principles:</p> <ul style="list-style-type: none"> <li>• The modal hierarchy of the station design places active modes of transport first, and locates long-term parking to the periphery of the station precinct.</li> <li>• The co-location of the bus interchange and station building, combined with a comprehensive future bus network makes multi-modal trips more desirable for passengers.</li> <li>• The station will ultimately be supported by a high quality pedestrian and cyclists network, which includes the Dunal POS connection as proposed by DevWA.</li> </ul> <p>Combined, these supporting measures expand the reach of TOD beyond simply development in proximity to the station, and creates real opportunities to decrease car dependence.</p>

## 7.3.2. Local Planning Assessment

As noted earlier in this report, the proposed development meets the categorisation of 'Public Works' and is exempt under Section 6 of the *Planning and Development Act 2005*. Regardless, as the interface between the Alkimos Train Station and surrounding Alkimos Secondary Centre is an essential consideration in the successful station planning design, the driving principles and objectives of the have been considered for this application.

In this respect, the City of Wanneroo Local Planning Framework which is indirectly applicable to the Alkimos station is the Alkimos City Centre Activity Centre Plan No. 89 (Alkimos ACP). The following sections provide a contextual summary of the Alkimos ACP, as it applies to the proposed development.

### 7.3.2.1. Alkimos ACP (as adopted)

SPP4.2 identifies Alkimos as an 'Secondary Centre' in accordance with the activity centre hierarchy, and requires an activity centre plan prior to development occurring. The Alkimos ACP was prepared in 2018 on behalf of the then LandCorp (now DevelopmentWA) to guide development within the Alkimos Secondary Centre.

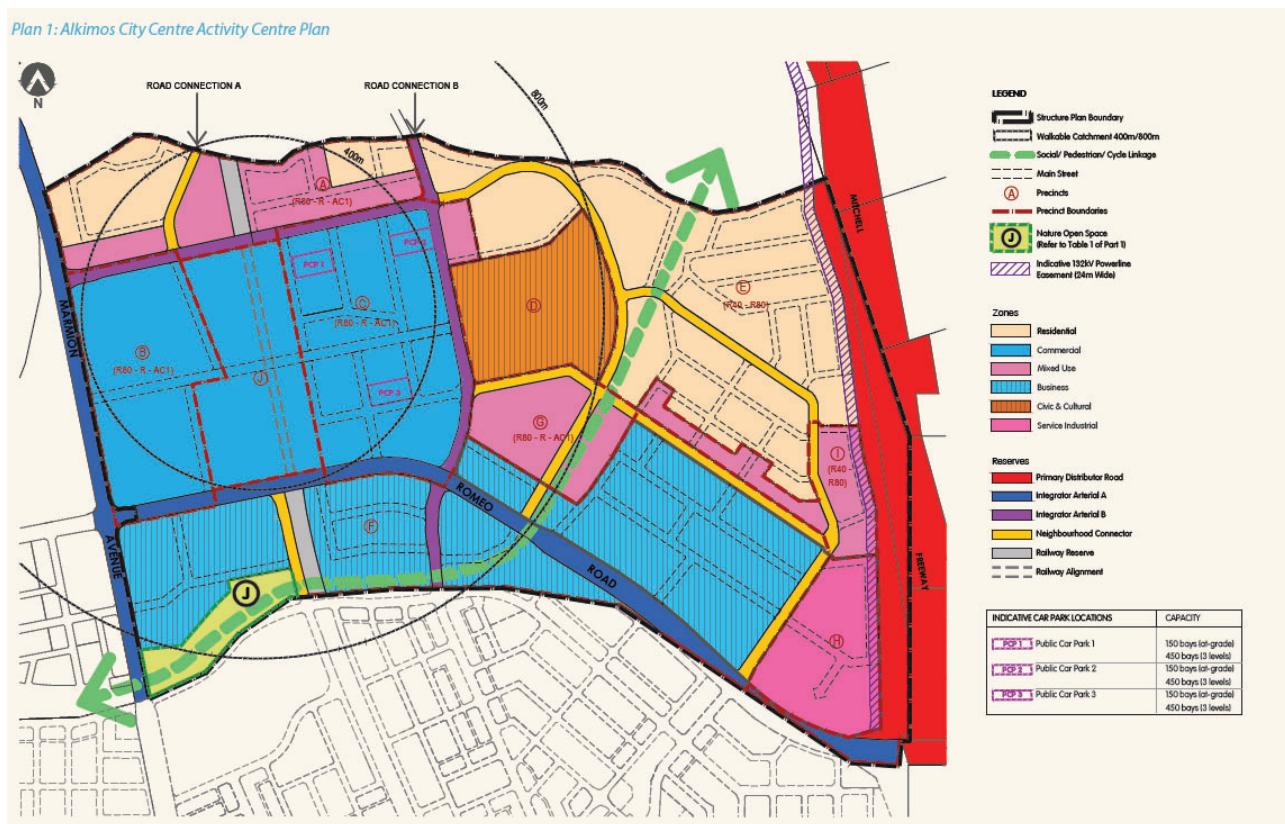
An amendment to Alkimos ACP was being prepared on behalf of DevelopmentWA at the time of writing this report. However, as no document has been advertised to trigger a 'seriously entertained' proposal, the Alkimos ACP technically provides the applicable guiding framework.

The Alkimos ACP Part 1 map identifies the planned Alkimos Station site and immediate surrounds within the 'Commercial' zone, and within 'Precinct J' as depicted within Figure 30 below. The following text summarises the design guidance provided for 'Precinct J':

Table 13 Alkimos ACP Assessment

ALKIMOS ACP PROVISION	DETAILS
<b>Part 3.0 – Subdivision and Development Requirements</b>	
Precinct J – Station	Precinct objectives to be submitted as a later change in accordance with cl. 3.11.
3.11 – Station Precinct	Further detailed subdivision and development provisions for the Station Precinct are required to be provided and approved by the Western Australian Planning Commission in accordance with Clause 40 of the Deemed Provisions of the <i>Planning and Development (Local Planning Schemes) Regulations 2015</i> . Further information required includes: <ol style="list-style-type: none"><li>Precinct Objectives;</li><li>Application of Building Typologies;</li><li>Public open space and public realm treatments; and</li><li>Movement network.</li></ol>
Other requirements	Acoustic assessment to be implemented via a condition of any subdivision approval

Figure 30 – Alkimos ACP Plan



As demonstrated in the above table and figure, the current Alkimos ACP provides limited design guidance for the land immediately surrounding the Alkimos Station, which is understood to be the result of the then pending announcement of the METRONET YRE project.

The Alkimos ACP also requires an acoustic assessment to be implemented via a condition of any subdivision approval. This requirement demonstrates that all future lots and associated dwellings within the Alkimos ACP area would likely be designed with 'quiet house design' acoustic measures to mitigate rail noise from the planned railway line, which is a relevant consideration for the ongoing noise modelling being completed as part of this project.

### 7.3.2.2. Alkimos Activity Centre Plan (indicative amendment)

At the time of writing this report, DevelopmentWA was in the process of completing a substantial amendment to the Alkimos ACP. Whilst this amendment has yet to be 'seriously entertained' and therefore does not form part of the assessment framework, it does provide valuable insight in the outcomes sought for the station precinct and surrounding context, which were not outlined in the currently ACP.

The following table summarises the key amendments which will likely result from the amended framework.

Table 74 Indicative Amendments to ACP

Precinct / Area	Amendment
City Core	Consolidation of area by approx. 50%, to around 25ha and envisioned retail floor area of up to 67,000sq.m. The updated plan also focusses the retail and entertainment precinct to west of the railway line, including main street linkages.
Bulky Goods / Service Commercial	Rationalised from 36ha to 23ha, with around 45,000sq.m of large format retail envisioned.
Open Space	Increase from 22ha to 28ha, including the delivery of a POS circuit formed around the dunal system.

Precinct / Area	Amendment
	The opportunity to connect the Alkimos Station PSP path into this POS network has been identified in this project, and will be explored between DevWA and the PTA through detailed design.
Residential	Increase from 23ha to 55ha, with an envisioned population of around 7,000. This is likely to include a reduced focussed on apartment style dwellings, but with a more condensed centre providing residential areas closer to the station.
Town Centre and Community Hub	<p>DevWA have identified the land immediately adjacent to the western entrance of the Alkimos Station building as the Alkimos town centre, including community hub containing opportunities for food and beverage operations and other supporting community based uses.</p> <p>It is understood that DevWA intends for this community hub to be operational at commencement of the Alkimos Station. The co-location of this space with the station entrance is flagged as an area of mutual benefit, with the station providing activity and patronage to the community hub, and the community hub providing a sense of place and surveillance for the station.</p>

The outcomes and opportunities which arise from this amended framework are detailed within the Design Principles Plan provided at Section 7.1 of this report.

## 8. CONCLUSION

The METRONET Yanchep Rail Extension from Butler Station to Yanchep set out to implement best practice urban design and transport planning principles to the emerging north west corridor of Perth. The Alkimos Station is an exceptional example of this approach, which by placing the Alkimos multi-modal station within the planned Alkimos Secondary Centre creates the foundations for successfully achieving transport orientated development, and embedding opportunities for urban development without creating sole reliance on the private vehicle.

But the successful application of transport orientated development extends beyond simply placing a train station within an activity centre. Instead, a well thought out station design also requires careful consideration of desire lines, convenience and opportunities for engagement with the activity centre. This report concludes that the Alkimos Station achieves these essential pillars of a contemporary station, as evidenced through the following:

- A pedestrian first approach to the station building design. Specifically, the ‘cut and cover’ design of the Alkimos Station creates an ‘at-grade’ entrance experience to the station concourse, and enables the station building and adjacent forecourt to form a seamless link across the railway line.
- The co-location of the bus interchange and station building reduces the total journey time for multi-modal trips, making bus-to-train transport a more practical and feasible option for patrons. This bus interchange is also located above the railway line for Alkimos, which results in a large station forecourt with highly permeable movement over the railway line.
- Providing essential pedestrian connecting infrastructure, including an extension of the existing PSP network from Butler Station to Yanchep Station, travelling through the Alkimos station forecourt.
- Recognising the need for park-and-ride facilities for a train station in an emerging urban centre, but deliberately locating these facilities beyond the immediate station precinct. This approach encourages movement through the activity centre on the way to and from the station, as well as reducing the number of vehicle movements within the immediate station area.
- Co-location of the station with the future town square, and opportunities for green links and public open space network connections to improve the travel experience from the surrounding future residential areas.

Whilst the development application is for ‘public works’ and has limited statutory assessment controls, this has in no way resulted in a compromised design outcome for the Alkimos Station. As demonstrated via a planning assessment against the qualitative controls of SPP7, the METRONET Station Design Guide and other relevant State and local planning frameworks, the Alkimos Station is designed to be fit for purpose, and will be the catalyst for further supporting high quality development within Alkimos.

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All surveys, forecasts, projections and recommendations contained in or associated with this report are made in good faith and on the basis of information supplied to Urbis at the date of this report, and upon which Urbis relied. Achievement of the projections and budgets set out in this report will depend, among other things, on the actions of others over which Urbis has no control.

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

## **APPENDIX A**

## **SUMMARY OF METRONET YANCHEP RAIL EXTENSION PROJECT**

# Yanchep Rail Extension

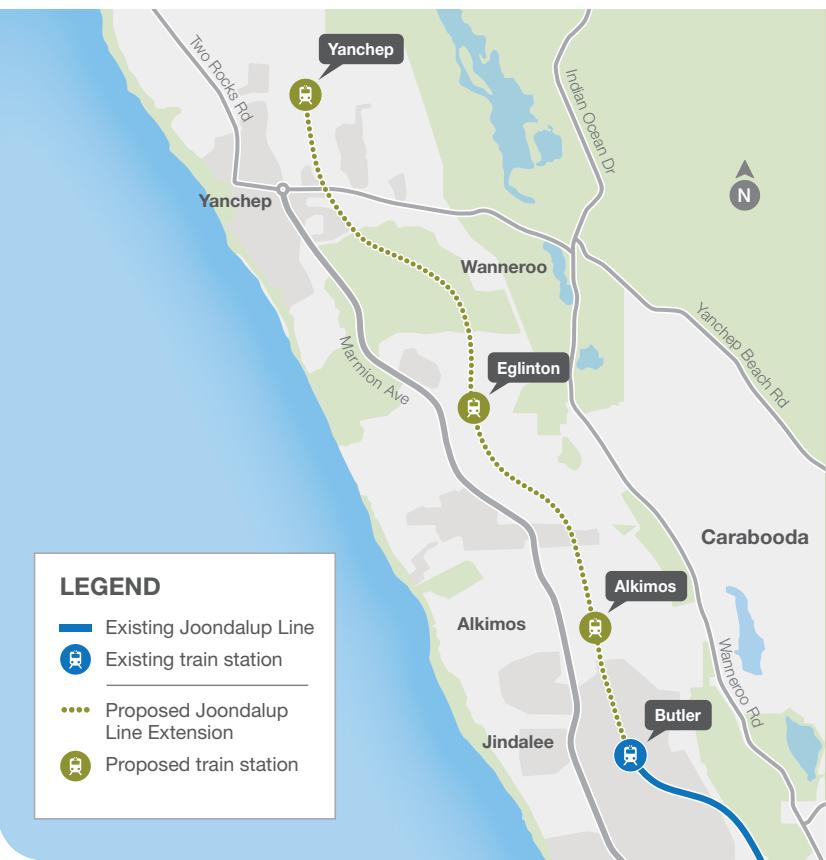
The 14.5 kilometre Joondalup Line extension is essential in managing the planned growth of Perth's northern suburbs, addressing road congestion and creating the focus for progressive mixed use development that will provide local amenity, services and employment.

## The project addresses three key local issues:

Worsening urban congestion due to a lack of efficient transport alternatives.

Continued land development that promotes private vehicle use and limits opportunities to create higher density residential areas.

Social inequality and lower levels of opportunity for people who do not own or are unable to use a private vehicle.



## Project snapshot\*

**19,440** Total daily boardings (2031)

**2,000** Total parking bays

**49 min** Train journey from Perth to Yanchep

**30** Total u-rails and

**6** Total bike shelters

**30** Total bus stands

**14.5 km** Joondalup Line extension

**5** Fauna underpasses

**13.8 km** Principal-shared path

**9** Road-over-rail bridges

**3** New stations at Alkimos, Eglinton and Yanchep

Bus stowage depot at Alkimos

Modifying Butler Station into a through station

\*Final details are subject to detailed design and may change.

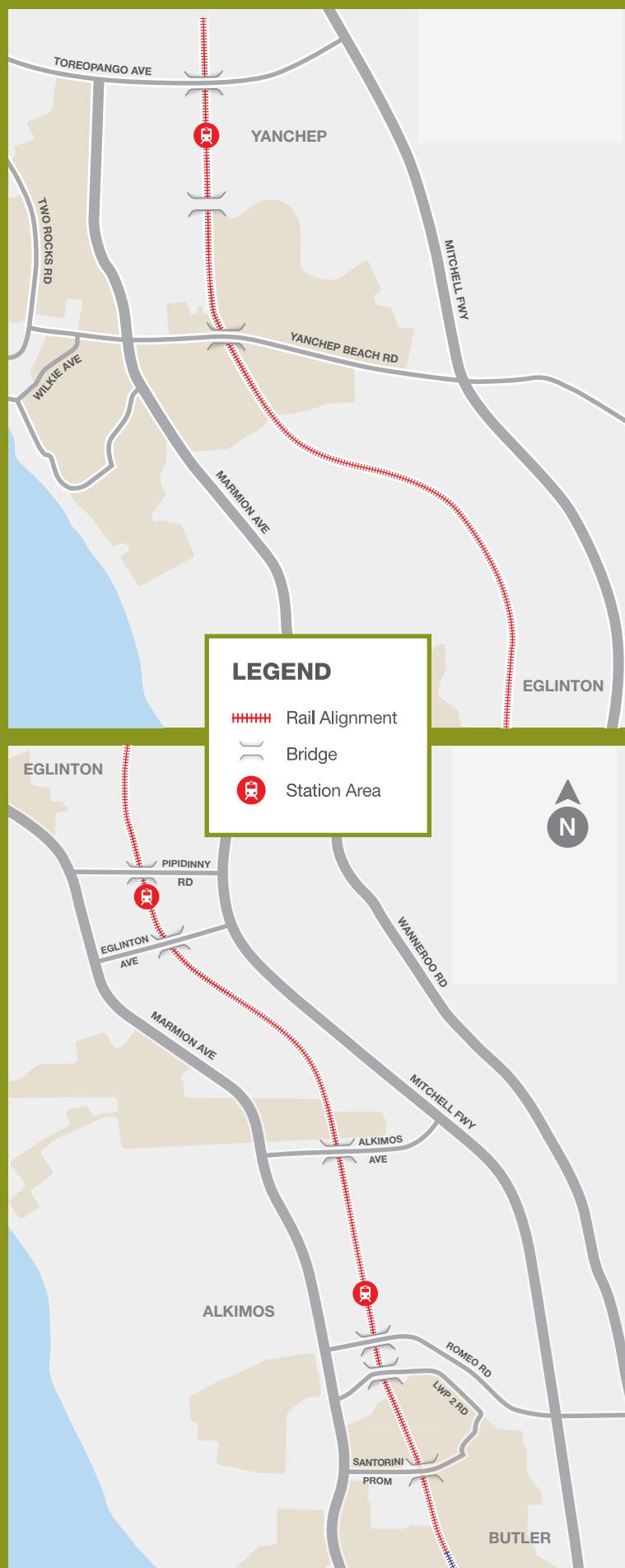
# Rail alignment

The majority of the 14.5 kilometre rail extension will be in a cutting to support community connections and integration, reduce noise and improve overall amenity.

The Yanchep Rail Extension will deliver nine road-over-rail bridges, which will also support access and early staging of development around the stations. Eleven potential crossings are identified along the route as part of longer term development intentions. These have been future proofed in the design, but are subject to further planning and delivery by third parties.

The rail alignment will travel through some Parks and Recreation sites and a Bush Forever area. While every effort was made to avoid these areas, including careful consideration of alternative alignments, the undulating landscape, tight rail curve (not conforming to strict railway design standards) and impact on existing and future residents meant this was not viable.

One Parks and Recreation site will have a fauna underpass and four fauna underpasses will be built through the Bush Forever area. In these areas every effort will be made to minimise impacts.



# The Project

The Yanchep Rail Extension's transport infrastructure will be delivered by the Public Transport Authority and includes:



14.5 kms of new dual-track to extend the Joondalup Line.



Alkimos Station with a cut-and-cover tunnel construction, including parking, bus interchanges, passenger amenities and cycling facilities to cater for approximately 3,616 daily boardings (2031) and offering an approximate 41-minute journey to Perth.



Eglinton Station including parking, bus interchanges, passenger amenities and cycling facilities to cater for an estimated 4,792 daily boardings (2031) and offering an approximate 46-minute journey to Perth.



Yanchep Station with a cut-and-cover tunnel construction, including parking, bus interchanges, passenger amenities and cycling facilities to cater for an estimated 11,032 daily boardings (2031) and offering an approximate 49-minute journey to Perth.



Two stow roads north of Yanchep Station for four six-car trains.



Nine road-over-rail bridges.



New bus stowage depot at Alkimos.



Noise and vibration mitigations measures.



Modifying Butler Station into a 'through' station.



13.8 kms of new shared path for cyclists and pedestrians adjacent to the rail line.

As a result of the integrated METRONET approach the Yanchep Rail Extension will also promote and encourage higher-density development surrounding the stations.

The METRONET Office will continue to work closely with stakeholders and landowners to ensure planning for these new urban centres makes the most of the public transport infrastructure.

## Walk, cycle, bus and share

While ample parking will be provided, the Yanchep Rail Extension will look to encourage passengers to access the stations by walking, cycling, bus and drop-off.

The METRONET Office is working with stakeholders to plan the area around the station with a diverse mix of uses and density that support walkable communities that are safe and accessible.

Along the western side of the rail extension will be a 13.8 kilometre principal shared path (PSP) that will follow the natural ground levels, except where it passes under road bridges, to ensure a continuous and safe option for pedestrians and cyclists. This path will be connected to existing local pathways and to the future stations.

Each station will have dedicated passenger drop-off areas, secure bicycle parking shelters, bike u-rails and the ability to add additional secure bicycle parking shelters in the future.

The area's existing bus services will be reviewed to create a comprehensive feeder bus network that will see routes 'loop' between train stations. Final service details will be determined closer to when rail operations begin following detailed planning and community consultation.

## Minimising noise and vibration

To minimise noise and vibration impacts on the surrounding proposed residential developments, the majority of the Yanchep Rail Extension will be in a cutting. Other measures to be investigated when the contractor is appointed include:

- noise walls;
- ballast matting;
- encouraging developers neighbouring the railway to have appropriate setbacks from the rail reserve via road reserves or public open space; and
- encouraging homes yet to be built in the 'first row' facing the route to implement 'quiet house design'.

## TIMELINE Transport infrastructure delivery



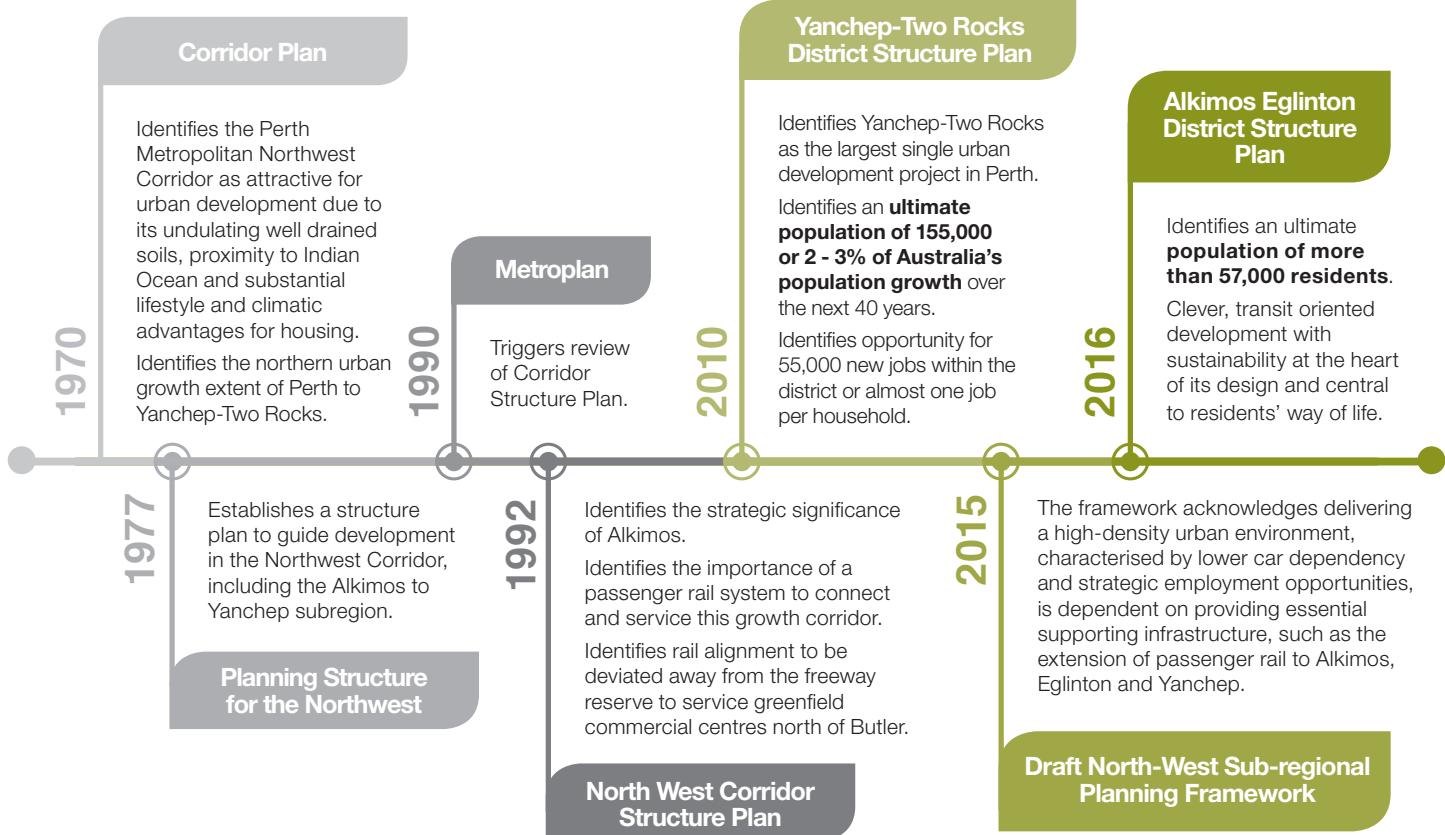
**Transport projects can be planned and delivered in a relatively defined timeframe.**

## Land development delivery

However, the associated development around a station can take 30 to 40 years (or longer) to reach target densities and is often not within the State Government's control. In addition, land uses are impacted by planning, investment and policy factors beyond the investment in transport infrastructure alone.

For the Yanchep Rail Extension, the METRONET Office will continue to work with state agencies, local governments and the private sector to help transition the areas around Alkimos, Eglinton and Yanchep stations into mixed-use centres over time.

## Planning history in Perth North-West sub-region



## MORE INFORMATION

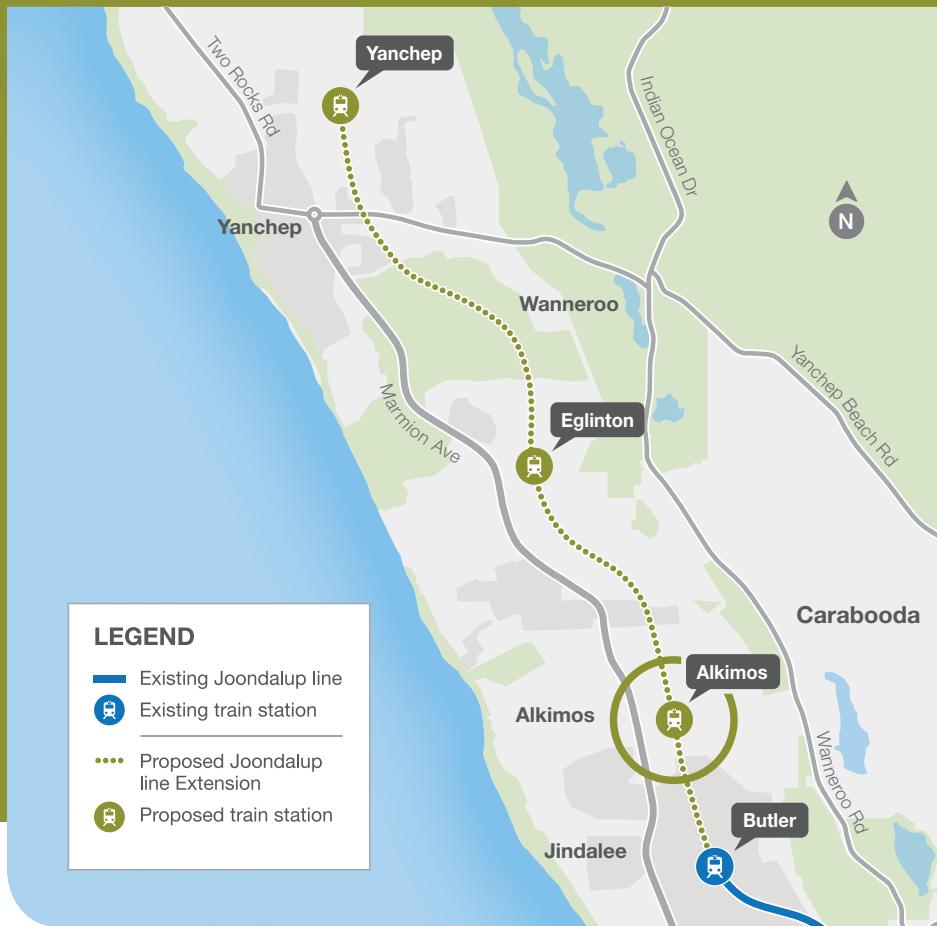
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**METRONET**

# Alkimos Station

Approximately 41 minutes from Perth by train, Alkimos Station will serve the future Alkimos Central development, which has been master planned by LandCorp to provide much needed service amenities to the area.



## Station snapshot\*

**3,616**  
Daily boardings (2031)

**41 min**  
Journey to Perth

**600**  
Parking bays

**8**  
Bus stands

**10 + 2**  
U-rail      Bike shelters

Passenger toilets

Lifts, escalators and stairs

Universal access



## Location

Alkimos Station will be located within LandCorp's Alkimos Central development, on the corner of Romeo Road and Marmion Avenue, west of Wanneroo Road.

\*Final details are subject to detailed design and may change.

# Station design

The early station design work looked into the location, scale and general features of the future station. This work detailed how the station fits within LandCorp's master planned development and caters for passengers on day one of operations.

That is why the station's flexible design allows consideration for:

- **Option A** – bus stands in the centre of the interchange, providing convenient access to a northern train station entrance by crossing the bus way.
- **Option B** – integration within the broader community with a southern station entrance facing the main street, which will serve as the primary pedestrian route and mixed-use development corridor.



A ground-level concourse and station building will include an unpaid zone to connect both sides of the development, with two platforms located in a cutting.

## Features of the universally accessible station:



### Passenger amenity

Public toilets, public services (such as vending machines), kiosk, passenger ticketing/information, staff amenities, station administration offices, storage/cleaning and operational facilities.



### Pedestrian/cycle access

Well connected to a principal-shared path west of the station, with two secure bicycle parking shelters, bike u-rails and ability to add two additional secure bicycle parking shelters in the future.



### Bus interchange

Six stands with weather protection, seating and information facilities. The interchange includes four layover bays.



### Vehicle access

Dedicated passenger drop-off area and approximately 600 parking bays.

*The station architecture and final design will be developed when a contractor is appointed.*

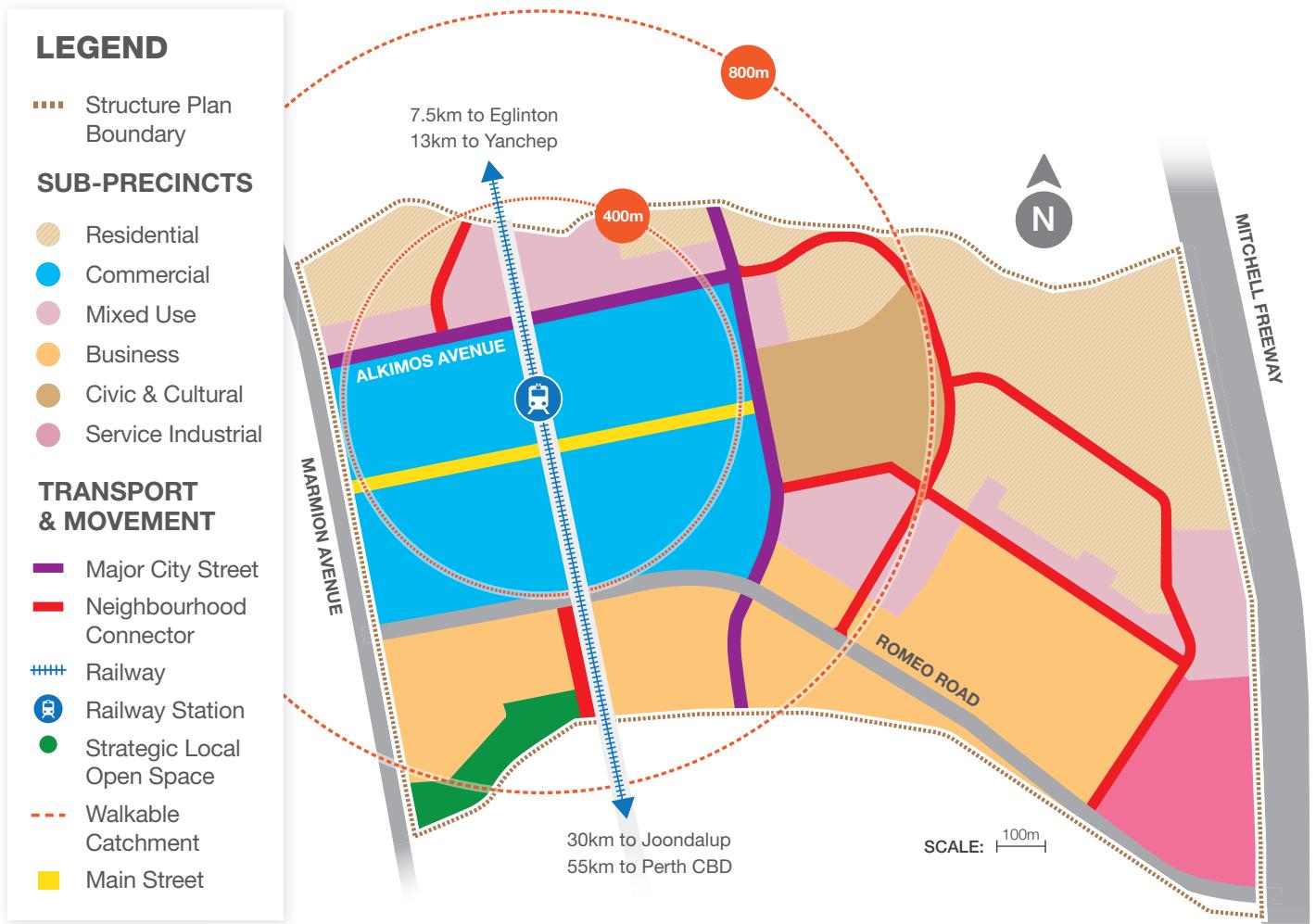
# Precinct development



Located between the strategic metropolitan activity centres of Joondalup and Yanchep in the heart of the northern coast corridor, Alkimos Central is an emerging secondary activity centre that is planned to include amenities for the fast growing area, including a significant retail area, mixed density residential development, business and service industrial precincts, civic and cultural zone and playing fields, indoor recreation centre and educational facilities.

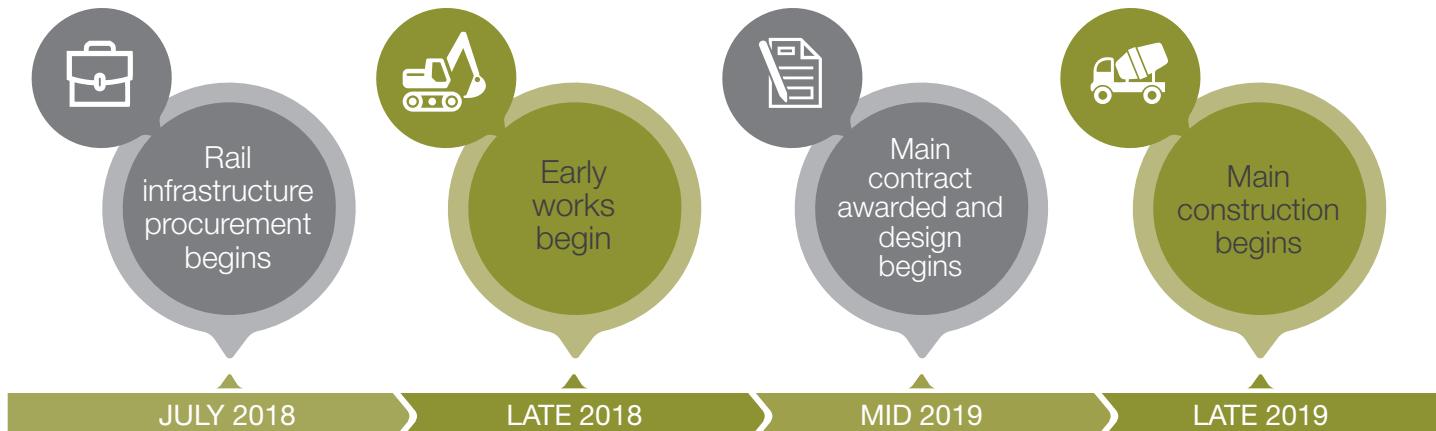
The 212 hectare development area, owned by the State Government's LandCorp, provides an opportunity to coordinate the timely development of the station with the station precinct.

Alkimos Central is an integral development in LandCorp's master plan for the area, which comprises of four individual yet interconnected developments. Alkimos Central is the city scale development, Alkimos Vista and Alkimos Beach, developed in conjunction with Lendlease, are residential developments, and the future Alkimos foreshore development will be a vibrant ocean front village community.



# TIMELINE

## Transport infrastructure delivery



## Alkimos Station Precinct Planning Phase

	Structure Plan	In development	Lodged	Advertised	Modified	Approved
	Subdivision (Stage 1 Station Precinct)	Further Information	Lodged	Conditionally Approved	Conditions Satisfied	Titles Issued
	Land Sales	Lots released to market	Offer & Acceptance	Settlement		Lots sold
	Development	Conceptual Design	DA Lodged	DA Assessment (WAPC)	DA Approved	Construction & Occupation

## About the project

METRONET's Yanchep Rail Extension extends the Joondalup Line 14.5 kilometres north with new stations at Alkimos, Eglinton and Yanchep. Connected by a 13.8 kilometre principal shared path, nine road-over-rail bridges and a comprehensive bus feeder network, the project is the catalyst for progressive mixed use development around each station that will provide local amenity, services and employment.

### MORE INFORMATION

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## **APPENDIX B**

## **ALKIMOS SWTC DESIGN REQUIREMENTS**

### 19.1.2 Alkimos Station – Description

- 19.1.2.1 Alkimos Station – description is to be read in conjunction with section 19.1.5 Alkimos Station – Schedule of Accommodation & Specific Requirements – Town Centre Option (below) in determining scoped items.
- 19.1.2.2 Alkimos Station is to be located approximately 40km north of Perth on the new YRE line. Being the first station on the new line, after Butler Station it will allow for public transport access from surrounding areas to the emerging Strategic Metropolitan Centre of Yanchep. The station must be a multi-modal interchange station ie: bus interchange and rail station located north of Romeo Road, east of Marmion Avenue and west of Wanneroo Road within the future Alkimos secondary centre. The station is to be located centrally to both the main retail and commercial areas of the future Alkimos secondary centre and will be easily accessible to those users who rely most heavily on public transport.
- 19.1.2.3 The station must provide passenger parking, bus transfer passenger drop-off by bus and car, and pedestrian/cycle access with the station building at concourse level forming a connection over the new rail line. The station incorporates two marginal platforms at rail level with a concourse over providing access to the bus interchange located north of the station over the rail corridor.
- 19.1.2.4 Station car parking must include two long-term car parks, both north of the station, with one on the west side of the rail line and one on the east side of the rail line. A dedicated drop-off area including Short Term Parking is located west of the station in close proximity to the station northern entry.
- 19.1.2.5 Pedestrian and cyclist access will be from future shared street/road footpaths east and west of the station and the PShP west of the station with bicycle parking facilities located immediately adjacent to the station entry points.
- 19.1.2.6 The station must incorporate 657 car bays including long-term car parking bays, long-term accessible car parking bays, long-term motorcycle/scooter parking bays, Short Term Parking, accessible Short Term Parking, drop-off bays and accessible drop-off bays.
- 19.1.2.7 Car park facilities must include parking ticketing/information facilities (Smart Parker Machines & PVMS). A bus interchange with eight (8) active bus stops and four (4) bus layover bays to both sides of a dedicated two lane busway with continuous canopy shelters to each line of bus stop stands and crossing the busway provides full and continuous weather protection to patrons boarding/alighting bus services and transferring to rail services through the northern station entry.
- 19.1.2.8 The bus interchange is to be accessible in a two way direction from the east / west roads located south and north of the station. Bus interchange facilities must include seating with weather protection screening at each dedicated bus stand and passenger information facilities (BID and information modules).
- 19.1.2.9 Bicycle parking facilities including two secure bicycle parking shelters (shelters with door access control and CCTV coverage) and bike u-rails are located

immediately adjacent to the station entry points with the provision for two (2) additional secure bicycle parking shelters to be added in the future.

- 19.1.2.10 The station building must provide access from both the south, east and west sides of the rail line, forming one of two un-paid concourse areas of the station. A second un-paid concourse area, also within the station building is located between the centrally located paid zone and the northern entry. The southern un-paid concourse area includes public toilet facilities (male toilet, female toilet & unisex accessible toilet), public service facilities (automatic teller machine, vending machines and pay phones), passenger ticketing/information facilities (CIDs, PSP with TVMs, information modules & help phones), staff amenity facilities (crib room, male toilet, female toilet, unisex accessible toilet & staff changing areas), station administration/office facilities (SBs & CSO), station operational facilities (transformer room, Communications room, electrical room & mechanical plant room), station storage/cleaning facilities (cleaners room & store room).
- 19.1.2.11 Central to the station building are the AFGs, immediately adjacent to the SB providing access control to the paid concourse area of the station and the vertical transport elements of the station including four lifts, four escalators and four sets of stairs all providing access to the platforms below. AFGs are also located at the juncture of the paid zone and the northern unpaid zone leading to the northern entry. Retail facilities (kiosk & kiosk store) are located on the building edge with opening under concourse roof.
- 19.1.2.12 The 150m long platforms catering for car trains below the station concourse must provide access to train services to and from Perth with both platforms having approximately 50% of platform length in cover providing weather protection to patrons. Both platforms must include passenger safe zones (dedicated seating central to platform), passenger information facilities (PIDs & PSMs), staff amenity facilities (driver's toilets), station administration/office facilities (staff offices), station storage/cleaning facilities (cleaner's rooms & store rooms) and station operational facilities (Communications rooms, electrical rooms, escalator control rooms & mechanical plant rooms).
- 19.1.2.13 Elements depicted on drawings SK0108-C (Book 3 - Part A - Clause 21.2.3.1) and 14-A-191-AR0041-G (Book 1 - Part B - Clause 1.2.2.1.i), specifically bus bridges and pedestrian/cycling crossings over the rail alignment, are part of the scope of works to be undertaken by the Alliance. All elements outlined in the SWTC, either directly or indirectly, by reference to a drawing/documentation, are to be delivered as part of the Alliance scope of Works unless otherwise stated in the SWTC. The busway design for Alkimos Station is referred to in Book 3 Part A Clause 19.1.2.3. The Alliance Proponent is expected to design appropriate loadings, lanes, path and bridge widths as part of the station precinct design. Design requirements for bus bridges are provided in Book 4 Part A Section 11.3.2 "Rail and Bus Bridges". The bus bridges and related circulation spaces are integral to the station precinct design.

### 19.1.5 Alkimos Station

**Table 4: Schedule of Accommodation & Specific Requirements – Town Centre Option**

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
<b>1.0</b>	<b>PATRONAGE</b>			
<b>1.1</b>	Patronage Forecast	Yes	Forecast Year 2021 - 2167 daily boardings. Forecast year 2031 - 2700 daily boardings	
<b>2.0</b>	<b>ACCESS</b>			
	Pedestrian Access		<p>Provide sufficient pathways:</p> <ul style="list-style-type: none"> <li>a) from all passenger transport infrastructure delivered as part of the Works to the station entry;</li> <li>b) from all existing, created and anticipated/known future pedestrian and cycle pathways in the local area to the station entry building;</li> <li>c) make all connections to and through the Station Precinct to the station entry; and</li> <li>d) make all connections to and through the Station Precinct;</li> <li>e) accessible pathways as required to link the station with the surrounding community; and</li> <li>f) access for the disabled to be in accordance with DSAPT, AS 1428 (all parts) &amp; BCA (NCC).</li> </ul>	
<b>2.2</b>	Bicycle Access	Yes.	<p>Provide sufficient pathways:</p> <ul style="list-style-type: none"> <li>a) to the station - from all existing, created and anticipated/known future pedestrian and cycle pathways in the local area to the bicycle shelters and u-rails;</li> <li>b) through the station - from all existing, created and anticipated/known future pedestrian and cycle pathways in the local area to connect with the same through the Station Precinct along desired travel pathways; and</li> <li>c) make all connections to and through the Station Precinct to the station bicycle facilities.</li> <li>d) Do not create cross flows with pedestrian traffic.</li> </ul>	
<b>2.3</b>	Shared Paths	Yes.	As required to link the station to all existing / future PShPs.	
<b>2.4</b>	Vehicle Access	Yes.	Vehicle access to all parking facilities and drop off areas directly from future main roads.	
<b>2.5</b>	Bus Access	Yes.	Bus access to busway directly from future main roads.	
<b>2.6</b>	Taxi Access / Drop-off	Yes.	Within drop-off area with immediate access to the station entry.	

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
2.7	Universal Access / Drop-off	Yes.	Within drop-off area with immediate access to the station entry.	
2.8	Rubbish Removal Access / Pickup	Yes.	Access from future public road network for rubbish removal vehicles.	
2.9	Emergency and Service Access	Yes.	Access from future public road network for emergency and operational vehicles.	Close proximity to station entry / forecourt is required.
<b>3.0 STATION FACILITIES</b>				
3.1	<b>Bus Interchange</b>			
3.1.1	Bus Bays (Active)	Yes.	8 No. Active bays including: – 8 No. rigid bus bays Prioritise location of active bays as close as possible to station entry Minimise land take wherever possible.	
3.1.2	Bus Bays (Layover)	Yes.	4 No. layover bays including: – 4 No. rigid bus bays. Travel between bus layover areas and bus stands must be prioritised. Minimise land take where possible.	
3.1.3	Busway and Recirculating Route	Yes.	Buses to re-circulate within station busway. Enable buses to circulate from set down to layover to pick up bays with minimum circulation movement.	
3.1.4	Bus Stands	Yes	Number to suit active bus bays. Each bus stand to have: – standard seating & bins – lighting and CCTV coverage to PTA standards / requirements. – TGSlIs in accordance with PTA Bus Stand Guidelines.  Ensure that bus stands have sufficient shelter from rain and sun and that the shelters can be maintained without the need for traffic management.	
3.1.5	Busway Clearances	-	1.0m min horizontal clearance of structures from busway kerb 3.7m min vertical clearance of structures from busway pavement.	Except for bus stop module / sign.

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
3.1.6	Secondary Transit Service	Yes	System by land developer but to be integrated into bus interchange.	
<b>3.2 Vehicle Parking</b>				
3.2.1	Car Parking	Yes.	657 car bays in total minimum.	
3.2.2	Long-term parking	Yes	Long-term parking including: – 22 No. 'Accessible' parking bays. – 20 No. 'Motorcycle' parking bays. – 2 No. 'Taxi' parking bays. – 2 No. 'Electric Car' charging bays.	Close proximity to station entry / forecourt.
3.2.3	Drop-off Parking	Yes.	Drop-off parking including: – 32 No. 'Drop-off' bays. – 7 No. 'Accessible' drop-off bay. – 1 No. 'Accessible Taxi' drop-off bay.  Universal/taxi set down bay is not required to be covered.  Co-locate service bays and emergency bays.	With immediate access to the station entry. Drop off parking must not be at 45 degrees. Drop-off bays must be placed on the left of the path of travel to ensure safety of alighting passengers.
<b>3.3 Service &amp; Staff Parking</b>				
3.3.1	Emergency Vehicles		2 No. bays (Ambulance & State Transit Police).	Close proximity to station entry / forecourt.
3.3.2	Fire Brigade		1 No. bay to DFES requirements. Location to suit fire services infrastructure ie: booster cabinet.	Close proximity to station entry / forecourt.
3.3.3	PTA Staff		4 No. bays (including car park attendant).	Close proximity to station entry / forecourt.
3.3.4	PTA Services		2 No. bays	Close proximity to station entry / forecourt.
3.3.5	Kiosk Tenant		1 No. bay and 1 No. loading bay.	Close proximity to Kiosk
<b>3.4 Bicycle Parking</b>				
3.4.1	Bike Lockers	No.		

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
3.4.2	Bike U-rails	Yes.	10 No. U-Rails. Equally located to both sides of rail reserve. Refer PTA standard detail.	Close proximity to station entry / forecourt.
3.4.3	Secure Bike Parking Shelters	Yes.	2 No. 96-bike secure bicycle parking shelter. Equally located to both sides of rail reserve. Refer PTA standard bike shelter design / specifications, drawing 00-A-09-0138.	Provide shelters as separate structures to station entry building. Located adjacent to station building.
			Bicycle storage to accommodate 2.6% of expected patronage (calculated up to 4 years in advance).	Located to enhance the public domain space planning and minimise conflict of cycle and pedestrian traffic. Located on natural pathways to the station entry.
			Install Velopa easy lift bike racks within each secure bicycle parking shelter (refer <a href="https://www.youtube.com/watch?v=6qrBR9341bw">https://www.youtube.com/watch?v=6qrBR9341bw</a> ).	Potentially 2 locations with future expansion capabilities. Installed and future shelters are to be within 100m of the station entry. Minimum two PTZ CCTV cameras within each shelter. Provide gates at either end of shelters.
			Provision for expansion of each bike shelter.	Provide a PSM-style unit with full two way emergency telephone for communications with the CMR .
3.4.4	Bike Showers / Change	No.		
3.4.5	Motorcycle Bays	Yes	5 No bays maximum	
3.5	<b>Public Amenities</b>			

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
3.5.1	Public Toilets	Yes.	Male Toilet (22.5m <sup>2</sup> enclosed floor area) including: – 2 No. Urinals. – 2 No. WC pans and cubicles including 1 No. pan / cubicle for ambulatory patrons compliant with AS 1428 (all parts). – 3 No. hand basins. – No. airlock.	Located at concourse level.
		Yes.	Female Toilet (21.5m <sup>2</sup> enclosed floor area) including: – 4 No. WC pans and cubicles including 1 No. pan / cubicle for ambulatory patrons compliant with AS 1428 (all parts). – 3 No. hand basins. – No. airlock.	Located at concourse level
3.5.2	Accessible Public Toilet	Yes.	Unisex Accessible Public Toilet (7.0m <sup>2</sup> enclosed floor area) including: – 1 No. baby change facility. – to comply with AS 1428 (all parts). – no airlock.	Located at concourse level.
3.5.3	Water Drinking Fountain	Yes	– 1 No. water drinking fountain (recessed, plumbed alcove, tiled).	Locate along wall of station entry building.
3.6	<b>Staff Amenities</b>			
3.6.1	Staff Crib Room	Yes	Shared Bus & Train staff crib room (19.4m <sup>2</sup> enclosed floor area) including: - 4 seated at dining table, kitchenette which includes hot/cold filtered and boiling water, sink, 1 PC, power and data provisions, TV, vending machines, pie warmer, microwave, 1 x 450L upright fridge, under bench and over bench storage cupboards. – 6 No. double lockers (in passage area).	Located at concourse level.
3.6.2	Staff Toilets	Yes.	Male Toilet (9.5m <sup>2</sup> enclosed floor area) including: – 1 No. WC pan and cubicle. – 1 No. shower and cubicle. – 1 No. hand basin. – 5 No. double lockers.	Located at concourse level.

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
		Yes.	Female Toilet (10.5m <sup>2</sup> enclosed floor area) including: – 1 No. WC pan and cubicle. – 1 No. shower and cubicle. – 1 No. hand basin. – 5 No. double lockers.	Located at concourse level.
		Yes.	Unisex Accessible Staff Toilet (6.8m <sup>2</sup> enclosed floor area) including: – 1 No. WC pan. – 1 No. shower (incl fold down seat). – 1 No. hand basin.	Located at concourse level.
		Yes.	1 No. toilet required to platform 1 No. unisex cubicle and WC pan, 1 hand basin Minimum area of 3.0m x 1.5m (with airlock)	Located at platform level on each platform.
3.6.3	Staff Change Areas	Yes.	Part of Staff Male & Female Toilets.	Located at concourse level.
3.6.4	Drivers Sign-on Facilities.	No		
3.6.5	Transit Guard Sign-on Facilities.	No.		
3.7	<b>Administration / Office Facilities</b>			
3.7.1	Station Booth	Yes.	1 No. (24.5m <sup>2</sup> enclosed floor area) including: – bench space for two (2) workstations and connections for computers, phone / data facilities. – reverse cycle air-conditioning, fire extinguisher and CCTV monitoring equipment.	Located at concourse level.
3.7.2	Customer Services Office	No.		
3.7.3	Staff Office(s)	Yes.	1 No. per platform (9.5m <sup>2</sup> enclosed floor area each) including: – bench space for one (1) workstation and connections for computers, phone / data facilities. – reverse cycle air-conditioning and fire extinguisher.	Located at platform level on each platform.
3.7.4	CAB	No		

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
3.7.5	Drivers Sign-on Facilities.	No.		
3.7.6	Transit Guard Sign-on Facilities.	No.		
3.8	<b>Operational Facilities</b>			
3.8.1	Electrical Substation.	Yes.	1 No. at Carpark Ground Level (minimum of 25m <sup>2</sup> ground area)	Electrical accommodation to comply with Western Power requirements.
3.8.2	Transformer Room	Yes.	1 No. at Station Entrance Level (In accordance with Section 17.6.2.3)	Electrical accommodation to comply with Section 17.6.2 of Book 4A.
3.8.3	Main Electrical Room	Yes.	1 No. at Station Entrance Level (minimum of 50m <sup>2</sup> enclosed floor area).	Electrical accommodation to comply with Section 17.6.2 of Book 4A.
3.8.4	Signalling Equipment Room	No.		
3.8.5	Fire Control Room	No.		
3.8.6	Communications Room	Yes.	2 No. at Platform Level (Room 1 – minimum of 40m <sup>2</sup> enclosed floor area, including a minimum of 5m <sup>2</sup> allowance for an Electrical Distribution Board, Room 2 – minimum of 20m <sup>2</sup> enclosed floor area, including a minimum of 5m <sup>2</sup> allowance for an Electrical UPS Distribution Board).	Electrical accommodation to comply with Section 17.6.2 of Book 4A.
3.8.7	Concourse Communications Room	Yes	1 No. at Concourse Level (minimum of 21m <sup>2</sup> enclosed floor area, including a minimum of 3m <sup>2</sup> allowance for an Electrical UPS Distribution Board.).	Electrical accommodation to comply with Section 17.6.2 of Book 4A.
3.8.8	Electrical Room	Yes	2 No. at Platform Level (minimum of 6m <sup>2</sup> enclosed floor area on each platform).	Electrical accommodation to comply with Section 17.6.2 of Book 4A.
3.8.9	Mechanical Room	No.		
3.8.10	Third Party Cupboard	Yes.	1 No. at concourse level (2.0m <sup>2</sup> enclosed floor area).	
3.8.11	GSS Cupboard(s)	Yes.	1 No. at platform level (1.0m <sup>2</sup> enclosed floor area) as required for gaseous fire suppression system.	To be located adjoining Communications room

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
3.8.12	Sewer Pump	Yes.	1 No. below platform level.	
3.8.13	Vending Machine Recess	Yes.	1 No. at concourse level (2.5m <sup>2</sup> enclosed floor area).	
3.9	<b>Storage &amp; Cleaning Facilities</b>			
3.9.1	Bulk Bin Store	Yes.	Truck access to bulk bin store required – To be remote from station entry, but easily accessible by staff & kiosk tenant. – To include hose tap & floor drainage.	
3.9.2	Internal Bin Store	No.		
3.9.3	Kiosk Store Room	Yes.	1 No. at concourse level (8.0m <sup>2</sup> enclosed floor area).	To be connected to kiosk & building exterior.
3.9.4	Cleaners Store Room	Yes.	<ul style="list-style-type: none"> <li>– 1 No. cleaners room at concourse level within station entry building (12.0m<sup>2</sup> minimum enclosed floor area) including:           <ul style="list-style-type: none"> <li>– stainless steel cleaner's sink with sand filter.</li> <li>– room to be mechanically ventilated.</li> <li>– accommodate scrubber filling and discharge.</li> <li>– store 1 scrubber cleaners and all cleaning equipment.</li> <li>– note: scrubbers not required if floor tiles are not used.</li> <li>– provide storage for all consumables.</li> <li>– provide power for recharging scrubber batteries.</li> </ul> </li> <li>1 No. cleaners cupboard at platform level (3.0m<sup>2</sup> minimum enclosed floor area) including:           <ul style="list-style-type: none"> <li>– stainless steel cleaner's sink with sand filter.</li> <li>– room to be mechanically ventilated.</li> <li>– provide storage for all consumables.</li> <li>– provide power for recharging scrubber batteries.</li> </ul> </li> </ul>	
3.9.5	Store Room(s)	Yes.	1 No. per platform (21.0m <sup>2</sup> enclosed floor area).	
3.10	<b>Other Facilities</b>			
3.10.1	Shopping Trolley Rack	No.		

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
<b>4.0 STATION EQUIPMENT</b>				
4.1	Smart Parker Machines	Yes.	2 No.	Close proximity to station entry / forecourt.
4.2	Parking Vending Machine	Yes.	1 No.	Close proximity to station entry / forecourt.
4.3	SmartRider Card Pole	Yes.	1 No.	
4.4	Passenger Service Module	Yes.	2 No. modules (1 No. per platform within a designated safe zone area). Modules to include: – emergency help telephone facility. – PSM. – audio loops. – Customer Information Voice Announcer.	To be located centrally at platform rail level.
4.5	Passenger Services Panel Suite	Yes.	1 No. Panel Suite	Located at concourse level close to the SB in the un-paid zone.
			To be part of CCR and include audio loops. Suite to include: – 2 No. TVMs. – emergency help telephone facility. – PSM. – Communications equipment.	
4.6	Automatic Fare Gates	Yes.	9 No. Automatic Fare Gates	Located at concourse level as part of station single point of entry.
4.7	Manual Fare Gate	Yes.	3 No. manual fare gate.	
4.8	Public Telephone(s)	Yes.	1 No. Public Telephone.  Telephone must be accessible to people with disabilities and allow access as per AS 1428.2.	Located at concourse level in un-paid zone.

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
4.9	Emergency Telephones	Yes.	3 No. ETs contained within PSP & PSMs.	station entry
4.10	Staff Telephones	Yes.	To CSO and SB, staff offices, staff crib room, all plant rooms and all offices.	
4.11	Station System Master Clock	Yes	To be integrated with PIDs, CIDs and BIDs	
4.12	DAVS	Yes		Design of DAVS locations to avoid shadows, low light etc., and position should be split screen or best sighting distance along platform.
4.13	AV System	Yes	- Local PA announcements. - Remote PA announcements.	
<b>5.0 STATION SERVICES</b>				
5.1	Water, Fire and Sewerage	Yes.		
5.2	Stormwater Drainage	Yes.	Stormwater drainage to station building, bus interchange, accessways and car parks.  Designed in accordance with the Annual Exceedence Probability requirements outlined in Specification 8803-000-005 Rev 1.00 – Stations and Buildings Civil Works.  Service inlets designed to prevent ponding and silt removal 'in-ground' service pits.	
5.3	Lighting & Power Systems	Yes.	To all buildings, functional areas, pedestrian access ways & pathways, illuminated signage.  In accordance with PTA electrical standards.  Lighting levels to comply with PTA standards.  Luminaire selection to be in accordance with PTA lighting standards.  Platform lighting will include 5.0m to 6.5m 'Break' type lighting columns.  Conduits & cabling in accordance with PTA standards.  Ducting and pits within platforms to ACA standards. Cable pits on platforms to remain accessible.	

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
5.4	Fire Detection & Alarm Systems	Yes.	FIP located at station entry / foyer.	
5.5	Gaseous Fire Suppression System	Yes.	Gaseous fire suppression system to all electrical & Communications rooms.	
5.6	Communications Systems	Yes.	Systems include DAVS, passenger information, ticketing systems / modules and bike parking shelters.	
			Conduits & cabling to be provided / included in accordance with PTA standards.	
			Ducting and pits within platforms to ACA standards. Cable pits on platforms to remain accessible.	
5.7	CCTV System	Yes.	Full CCTV coverage of station is required.	
			Local and remote monitoring of CCTV is required.	
5.8	Audio System	Yes.	CCTV coverage of the following locations is required: – platform(s). – concourse. – lifts / escalators. – entry foyers & ticketing areas. – bus transfer areas. – bus stands (1 camera per stand capable of facial recognition). – drop-off areas. – all parking areas (including access / paths to parking areas). – bike parking shelters and bike U-rails with “Home View”.	
			System to allow / include: – local PA system announcements. – remote PA zoned announcements for all passengers. – audio loops to be provided when there is a PA. – bike parking shelters.	
			Required to all doors and bike parking shelters.	

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
5.10	Duress Alarm System	Yes.	<p>Alarm alerts to go back to CMR with mirror in station booth</p> <p>Visual display light outside universal access toilet</p> <p>Duress alarm buttons must be accessible to people with disabilities and allow access as per AS 1428.2.</p>	<p>Locations where applicable to this SoA:</p> <p>Universal Access toilet;</p> <p>Passenger Service Modules;</p> <p>Passenger Service Panels;</p> <p>Passenger Lifts;</p> <p>Station Booths</p> <p>Staff Office Cubicle (on platform); and</p> <p>Secure Bike Parking Shelters.</p> <p>Car Parks at safe locations – when car bays are at 150m distance or more from the station entry. Note: safe locations in the car park means a location with good lighting and CCTV coverage, for example, generally where the car park ticket machines are, where there is already a congregation point.</p> <p>Provide a PSM-style unit with full two way emergency telephone for communications with the CMR for car park duress alarm purposes.</p> <p>Provide two way emergency telephone for communications with the CMR for PSMs, PSPs, Passenger Lifts and Secure Bike Parking Shelters.</p>
5.11	Building Intruder Alarm System	No.		

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
5.12	Mechanical Systems	Yes.	<p>Air-Conditioning to:</p> <ul style="list-style-type: none"> <li>– SB.</li> <li>– CSO.</li> <li>– staff office(s).</li> <li>– crib room.</li> <li>– CCR.</li> <li>– Communications room(s) &amp; electrical room(s).</li> <li>– escalator control room(s).</li> <li>– platform staff room</li> </ul> <p>Exhaust Ventilation to:</p> <ul style="list-style-type: none"> <li>– male, female &amp; accessible public toilets.</li> <li>– staff toilets and CCR.</li> </ul> <p>Natural / Mechanical Ventilation to:</p> <ul style="list-style-type: none"> <li>– cleaner's store room(s).</li> <li>– store room(s).</li> </ul> <p>Kiosk air conditioning and / or ventilation by tenant.</p>	
5.13	Diversion of Ex. Services	Yes.	As required.	Review with existing Third Party Utility Providers.
<b>6.0 STATION SITE</b>				
6.1	Forecourt(s)	Yes.	<p>To be located immediately adjacent to station entry.</p> <p>Forecourts to include:</p> <ul style="list-style-type: none"> <li>– public activation / interaction to integrate into surrounding urban precinct.</li> <li>– hard &amp; soft landscaping feature (raised planter boxes / seats, shade structures etc.).</li> </ul>	
6.2	Pathways	Yes.	<p>From all existing, created &amp; anticipated / known future pedestrian &amp; cycle paths in the local area to the station entry.</p> <p>Slip resistant concrete or brick paving.</p> <p>Tree root guards.</p> <p>Wheel stops to be provided where car bays are adjacent to pathways.</p>	Make all connections to and through the Station Precinct.

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
6.3	Shared Paths	Yes.	Minimum 3.0m wide and red asphalt surface. From all existing, created and anticipated/known future pedestrian and cycle pathways in the local area to the bike shelter. PShP must not route through station entry areas.	Make all connections to and through the Station Precinct.
6.4	Landscaping (Soft)	Yes.	Low maintenance native landscaping. Area specific and attractive landscape treatment. Low and open to maintain sight lines and not obscure lighting or CCTV. Create safe environment for passengers. Enhance the approach to the Station Precinct and the station building from the surrounding area. Landscaping to be reticulated with reticulation controllers housed in lockable cabinets. Integrate station planting with surrounding development planting.	
6.5	Rail Reserve Landscaping	Yes		
6.6	Irrigation	Yes.	To irrigated plant stock, minimise as much as possible. Source from a bore and/or suitable recycled water sources if able.	
6.7	Rail Reserve Fencing	Yes.	1.8m high black PVC coated linkmesh to Station Precinct only.	Accommodate isolation panels as necessary to provide for EEZ between WPC and Traction Power earthing systems.
6.8	Station Precinct Fencing	Yes.	1.2m high black PVC coated linkmesh.	Accommodate isolation panels as necessary to provide for EEZ between WPC and Traction Power earthing systems.

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
6.9	Station Carpark Fencing	Yes.	1.2m high black PVC coated linkmesh.	Accommodate isolation panels as necessary to provide for EEZ between WPC and Traction Power earthing systems.
6.10	Stormwater Basin Fencing	Yes.	1.8m high black PVC coated linkmesh.	Accommodate isolation panels as necessary to provide for EEZ between WPC and Traction Power earthing systems.
6.11	Muster Points	Yes.	As required by station FEB.	To be located at ground level.
<b>7.0 STATION BUILDING</b>				
7.1	Entry Building / Foyer	Yes.	Station required to be secure when closed (out of hours).	
7.2	Ticketing / Access Control	Yes.	Single point of entry required for access to platform from concourse, alongside CSO booth.	
7.3	Afterhours Access	Yes.	Staff afterhours access point required.	
7.4	Materials / Finishes / Colours		In accordance with PTA Doc No. 8803-000-002. Colours from the Australian Standard Colour Palette and Paint Systems to be used. Luminance contrasting required for patrons with vision disabilities.	
<b>8.0 ROOFS, CANOPIES &amp; SHELTERS</b>				
8.1	Station Building Roofs	Yes	Cover to station entry building, pedestrian overpass & station concourse. Roof structure to be designed to accommodate loading and installation of future solar panels (by others). Cover to all vertical circulation elements. Cover provided must as a minimum ensure no wind driven rain or associated runoff affects or touches pedestrian stairs, escalators, lifts, fare gates, ticketing machines, dedicated platform safe zones etc unless otherwise agreed in writing by PTA.	
8.2	Platform Roof /	Yes.	Cover required to minimum 50% of platform.	

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
	Canopy		Cover provided must as a minimum ensure no wind driven rain or associated runoff affects or touches pedestrian stairs, escalators, lifts, fare gates, ticketing machines, dedicated platform safe zones etc unless otherwise agreed in writing by PTA.	
8.3	Busway Walkway Canopies	Yes.	Continuous cover from station entry to all active bus stands including cover to all active bus stand seating.	
8.4	Busway Crossing Canopy	Yes.		
8.5	Drop-off Parking Canopy	Yes.	Continuous cover from the station entry to drop-off bays including universal accessible area / taxi drop off bay	
8.6	Motorcycle Parking Shelter	Yes.	Roof cover to all motorcycle parking bays 300mm high 'u-rail' hitching rails at front of each motorcycle bay to securely chain motorcycles to.	Close proximity to station entry / forecourt.
8.7	Smart Parker Machines & PVM Shelter	Yes.	Shelter for queuing space that will not cast any shadow on the Smart Parker Machine and PVM solar panels.	
9.0	<b>PLATFORM</b>			
9.1	Configuration		2 No. marginal platforms.	
9.2	Length		150m (to suit 6 car set).	
9.3	Width		4.0m marginal platform without structures and/or 6.5m marginal platform with structures.	Refer PTA Standard Drawing 00-C-04-1398.
9.4	Horizontal Distance		1550mm + / - 5mm gap tolerance (horizontal distance from track centreline to platform edge).	Refer PTA Standard Drawing 00-C-04-0076.
9.5	Vertical Distance		1085mm + / - 5mm gap tolerance (vertical distance from top of rail level to platform edge).	Refer PTA Standard Drawing 00-C-04-0076.
9.6	Materials		Platform wall / edge detail to PTA's requirements.	
9.7	Form / Profile		Platform wall / edge detail to PTA's requirements. – Minimum overhang of 750mm and maximum 900mm.	NGCoP

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
9.8	Surface		Brick pavers generally with tiles on concrete for platform edge zones. Minimum P5 rating for slip resistance. Tiled surface to be subjected to an accelerated wear test and achieve a minimum BPN of 44 (P5) after 5000 scrubs by a NATA approved testing laboratory in accordance to AS 4586 and Handbook 198-2014.	
			Platform surface material should be suitable for easy cleaning, strong to withstand the wear and tear of foot traffic and mobile plant used in the maintenance of lighting and high level infrastructure, slip resistant. Tactile and directional pavers in accordance with AS 1428.4.	
			Ceramic tiling (platform edge zone).	
			Minimum cross fall of 1:100.	NGCoP
9.9	Drainage	Yes	Contained within platform. Platform surface to fall away from platform edge.	
9.10	Wash down Taps	Yes.	To enable washdown of platform and stairs with 20m hose.  Taps at 40m centres on platforms, secured behind stainless steel recessed wall boxes with key lock doors or purpose made, free standing, stainless steel tap boxes with key lock door (where not recessed in walls).	Locate next to column or light pole, not stand-alone.
9.11	Platform End Balustrade(s)	Yes.	Galvanised steel balustrade with emergency egress gate at each end of platform.	To be located at each end of platform.
9.12	Platform End Stairs	Yes.	Galvanised steel stairs & handrails to platform end for emergency access to rail reserve.	To be located at each end of platform.
9.13	Primary Door Position	No.		
9.14	Railcar Stopping Positions	Yes.	2, 3, 4 & 6 car stopping positions.	
9.15	Safe Zone	Yes.	Centrally located on platform in front of ticketing facilities and include CCTV coverage and an audio loop.	
9.16	Planter Boxes & Tubs	No.		
<b>10.0 VERTICAL CIRCULATION</b>				
10.1	Passenger Stairs	Yes.	Minimum width of 1.8m clear width or as required by BCA and / or FEB and passenger modelling	
			Enable direct and intuitive passenger movement.	

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
			Enable even loading and unloading of platforms.	
10.2	Emergency Egress Stairs	Yes.	2 No. stairs per platform.	From platform level to concourse level (ground level).
10.3	Passenger Lifts	Yes.	2 No. lifts per platform. Lifts at platform levels are to be fully protected from wind driven rain In accordance with PTA lift specifications 8880-000-003. Machine room less, walk thru type lifts.	From platform level to concourse level (ground level).
10.4	Passenger Escalators	Yes.	2 No. escalators per platform. In accordance with PTA escalator specifications 8880-000-004.	From platform level to concourse level (ground level).
11.0	<b>SIGNAGE and WAYFINDING</b>			
11.1	Signage and Wayfinding	Yes.	All signage & wayfinding to be to PTA standards and developed in conjunction with PTA. All signage & wayfinding to be accessible to people with disabilities where required. Alternatives to print signage to be provided for people with print disabilities. Braille and tactile signage to comply with the BCA and DPI transport requirements.	
11.2	Passenger Information Displays	Yes.	Displays to include: – 4 No. PIDs with 2 No. to each platform (PIDs back to back). – 2 No. CID located on wall of concourse above PSP. –BIDs at each bus stand.	
11.3	Car park Information Displays	No.		
11.4	PTA Signage	Yes.	All applicable signage as required by the PTA Signage Guide.	
11.5	Statutory Signage	Yes.	As required.	
11.6	Rail Signage & Markers	Yes.	Signage to face of platform walls for 2, 3, 4 & 6 car stopping positions.	
11.7	Road Signage	Yes.	To provide wayfinding on local road networks to the stations and as required.	

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
11.8	Car park Signage & Linemarkings	Yes.	As required.	
11.9	Emergency Exit Signage	Yes.	As required.	
11.10	Directional Signage	Yes.	As required.	
11.11	Passive Information Systems	TBC	To be confirmed. All passive information systems must be accessible to people with disabilities.	
12.0	<b>PUBLIC ARTWORK</b>			
12.1	Murals, Mosaics, Sculpture	Yes.	In consultation with PTA public artist.	
13.0	<b>STATION FURNITURE</b>			
13.1	Station Furniture	Yes.	<p>Furniture to comply with the requirements of:</p> <ul style="list-style-type: none"> <li>– DSAPT.</li> <li>– AS 1428 (all parts) – Design for Access &amp; Mobility.</li> </ul> <p>All furniture to have a 30% luminance contrast with the surrounding material.</p>	
13.2	Stainless Steel Seating	Yes.	<ul style="list-style-type: none"> <li>a) Platform – for 9 persons per platform</li> <li>b) Bus Stands</li> <li>c) As required for universal access compliance (ie. every 60 metres along accessible paths of travel within station site)</li> <li>d) Under cover in close proximity to drop off parking area</li> </ul>	Refer PTA standard seat details.
13.3	Stainless Steel Rubbish Bins	Yes.	Adjacent to all seating.	Refer PTA standard bin details.
13.4	Cigarette Bins	Yes.	Incorporated into bollards outside entry to Station Precinct To be located on all approaches at least 20m away from station entry.	Entire station is non-smoking environment.
14.0	<b>RETAIL SERVICES</b>			
14.1	Advertising	TBC	To be confirmed.	

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
14.2	Kiosk (Leased)	Yes.	<p>1 No. (32.1m<sup>2</sup> enclosed floor area) including / allowing:</p> <ul style="list-style-type: none"> <li>– open when station opens.</li> <li>– shell only with kiosk fit out and mechanical services to be provided by tenant.</li> <li>– walk-in style kiosk rather than external counter displays.</li> <li>– kiosk facilities must not intrude into the clear accessible path of travel.</li> <li>– concrete floor, fair face masonry walls, plasterboard panel ceiling and roller shutter.</li> <li>– sewer, water and electrical connections, with a small electrical switchboard.</li> <li>– Communications (telephone &amp; other comms services).</li> <li>– sink and hand basin, 3-phase electric hot-water system and floor waste.</li> </ul>	To be located at concourse level adjacent to station entry.
14.3	Vending Machine(s)	Yes.	2 No. machines.	To be located at concourse level adjacent to station entry in unpaid zone.
14.4	Automatic Teller Machine(s)	Yes.	1 No. machine.	To be located at concourse level adjacent to station entry in unpaid zone.
14.5	Additional Retail Facilities	No.		
<b>15.0 RAILWAY INFRASTRUCTURE</b>				
15.1	Track Centrelines	-	5.20m.	
15.2	OLE Level (contact wire)	Yes	5.250m.	From top of rail.
15.3	Station Structure Clearance	-	<p>6.30m min from top of rail to underside of concourse / structure adjacent to and over platforms.</p> <p>3.00m minimum clearance of structures on platform from platform edge for structures on platform that are 0-3m in length (parallel to edge of platform) as per PTA drawing 00-C-04-1399</p> <p>3.35m minimum clearance from platform edge for structures on platform that are 3m -14m in length (parallel to edge of platform) as per PTA drawing 00-C-04-1399</p> <p>4.00m minimum clearance of columns on platform from centreline of track.</p>	

No.	Element	Applicable (Yes / No)	Minimum Requirements	Notes
15.4	Structural Clearance (Urban)	-	2140mm minimum structural clearance from Track Centreline, except for platform edge.	Structural Clearance & Rolling Stock Outlines – Narrow Gauge Lines.
			5200mm minimum structural clearance from top of rail level.	Structural Clearance & Rolling Stock Outlines – Narrow Gauge Lines.
15.5	Station Railway Signalling	No.	Not part of station works.	
15.6	Station Railway OLE	No.	Not part of station works.	
15.7	Pedestrian Crossing	No.		
15.8	Earthing & Bonding of Structures	Yes.	Earthing & Bonding at passenger stations in accordance with PTA Specification.	
15.9	Overhead Wire Protection	Yes.	Overhead wire protection in accordance with PTA Specification.	
			Screen protection including walls or 1.8m high glass screens to concourse and overpass.	
			All glass screening to have a luminance contrasted strip at eye level.	

# **APPENDIX C**

# **CERTIFICATES OF TITLE**

WESTERN



AUSTRALIA

REGISTER NUMBER  
**2000/DP409771**DUPLICATE  
EDITION  
**N/A**DATE DUPLICATE ISSUED  
**N/A**VOLUME  
**2914**FOLIO  
**420**

## RECORD OF CERTIFICATE OF TITLE UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

**LAND DESCRIPTION:**

LOT 2000 ON DEPOSITED PLAN 409771

**REGISTERED PROPRIETOR:  
(FIRST SCHEDULE)**

WESTERN AUSTRALIAN PLANNING COMMISSION OF 140 WILLIAM STREET PERTH WA 6000  
(T N475343 ) REGISTERED 3/11/2016

**LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:  
(SECOND SCHEDULE)**

1. \*EXCEPT AND RESERVING METALS, MINERALS, GEMS AND MINERAL OIL SPECIFIED IN TRANSFER 7033/1940.
2. \*L342687 EASEMENT BURDEN FOR ACCESSWAY PURPOSES TO ELECTRICITY NETWORKS CORPORATION - SEE SKETCH ON DEPOSITED PLAN 409771 REGISTERED 11/6/2010.
3. \*L390876 EASEMENT TO WATER CORPORATION WATER CORPORATION FOR PIPELINE PURPOSES - SEE SKETCH ON DEPOSITED PLAN 409771 REGISTERED 3/8/2010.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.  
 \* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.  
 Lot as described in the land description may be a lot or location.

---

 END OF CERTIFICATE OF TITLE
 

---

**STATEMENTS:**

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:

DP409771

PREVIOUS TITLE:

2819-691, 2819-692

PROPERTY STREET ADDRESS:

NO STREET ADDRESS INFORMATION AVAILABLE.

LOCAL GOVERNMENT AUTHORITY:

CITY OF WANNEROO

RESPONSIBLE AGENCY:

WESTERN AUSTRALIAN PLANNING COMMISSION

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING  
N475324

WESTERN



AUSTRALIA

REGISTER NUMBER

**2/DP419385**DUPLICATE  
EDITION  
**N/A**

DATE DUPLICATE ISSUED

**N/A**VOLUME  
**2985**FOLIO  
**162**

## RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LOT 2 ON DEPOSITED PLAN 419385

**LAND DESCRIPTION:**
**REGISTERED PROPRIETOR:**  
 (FIRST SCHEDULE)

WESTERN AUSTRALIAN LAND AUTHORITY OF LEVEL 2 40 THE ESPLANADE PERTH WA 6000  
 (AF O438265 ) REGISTERED 30/6/2020

**LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS:**  
 (SECOND SCHEDULE)

1. \*EXCEPT AND RESERVING METALS, MINERALS, GEMS AND MINERAL OIL SPECIFIED IN TRANSFER 7033/1940.
2. \*L342687 EASEMENT TO ELECTRICITY NETWORKS CORPORATION FOR ACCESSWAY PURPOSES - SEE DEPOSITED PLAN 419385 REGISTERED 11/6/2010.
3. \*L390876 EASEMENT TO WATER CORPORATION FOR PIPELINE PURPOSES - SEE DEPOSITED PLAN 419385 REGISTERED 3/8/2010.
4. \*EASEMENT BURDEN CREATED UNDER SECTION 167 P. & D. ACT FOR WATER PURPOSES TO WATER CORPORATION - SEE DEPOSITED PLAN 419385 AS CREATED ON DEPOSITED PLAN 400279
5. \*N223106 EASEMENT TO WATER CORPORATION FOR PIPELINE PURPOSES - SEE DEPOSITED PLAN 419385 REGISTERED 11/1/2016.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.  
 \* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.  
 Lot as described in the land description may be a lot or location.

---

 -----END OF CERTIFICATE OF TITLE-----
**STATEMENTS:**

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND:

DP419385

PREVIOUS TITLE:

2976-573

PROPERTY STREET ADDRESS:

2570 MARMION AV, ALKIMOS.

LOCAL GOVERNMENT AUTHORITY:

CITY OF WANNEROO

RESPONSIBLE AGENCY:

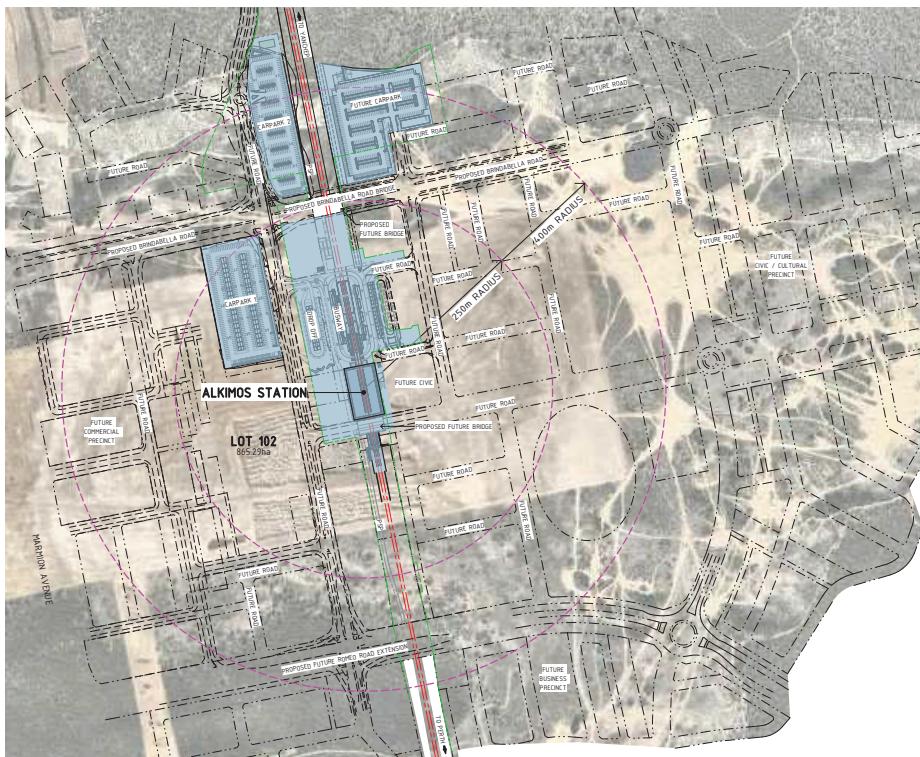
WESTERN AUSTRALIAN LAND AUTHORITY

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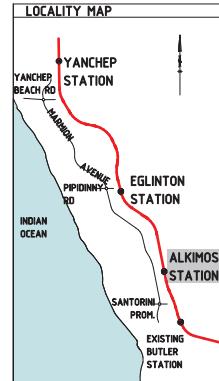
## **APPENDIX D**

## **PROPOSED STATION WORKS**





SITE ANALYSIS AND CONTEXT PLAN OVERALL LAYOUT  
SCALE 1: 2500



#### NOTES

1. ALL FUTURE ROADS AND BRIDGES ARE SHOWN FOR INFORMATION PURPOSES ONLY.
2. PROPOSED ROAD RESERVE BOUNDARY IS SUBJECT TO CHANGE BASED ON FURTHER DESIGN AND INVESTIGATION.

#### LEGEND

<span style="color: green;">—</span>	EXISTING CADASTRAL BOUNDARIES
<span style="color: red;">—</span>	RAILWAYS RESERVE BOUNDARY
<span style="color: red;">—</span>	LOT BOUNDARIES STATION
<span style="color: red;">—</span>	BUTLER TO YANCHEP RAIL
<span style="color: black;">—</span>	FUTURE ROADS BY OTHERS
<span style="background-color: #4682B4; width: 20px; height: 15px;"></span>	PROPOSED ALKIMOS STATION

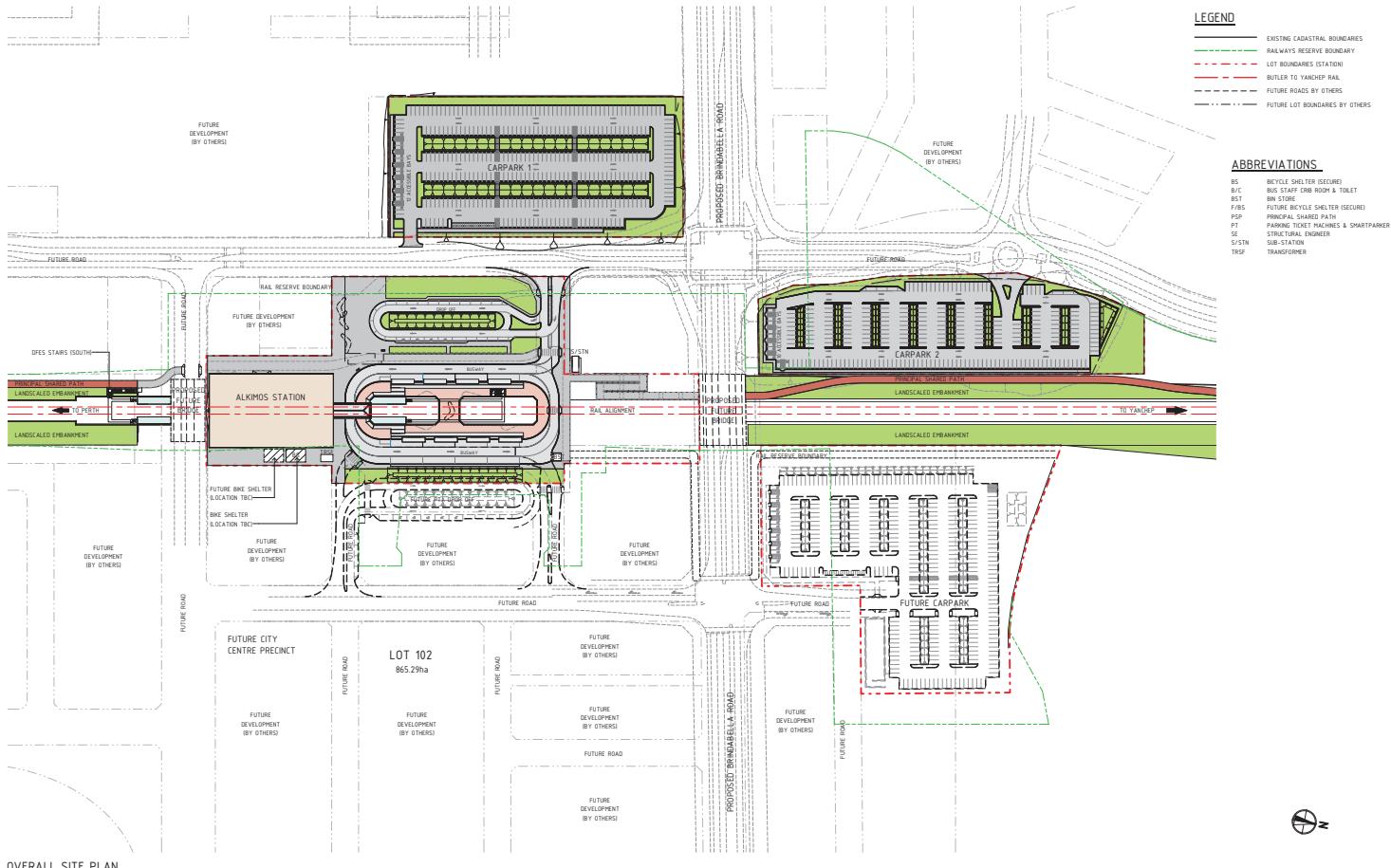
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TCY-CAP-YSA-AR-DRG-01

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DATUM :			CHECKED	A. WHEELER
HORIZONTAL: PCG20			APPROVED FOR ISSUE	
VERTICAL: AHDT1				
PTA ACCEPTANCE STAMP	=		EXECUTIVE DIRECTOR	PTA Survey / Strategic Survey
			DATE	

Government of Western Australia  
Public Transport Authority  
ALKIMOS STATION  
SITE ANALYSIS AND CONTEXT PLAN OVERALL LAYOUT  
PTA Drawing No: REV: B



OVERALL SITE PLAN  
SCALE 1:1000

### DEVELOPMENT APPLICATION



TCY-CAP-YSA-AR-DRG-02

REFERENCES		SCALE :	DESIGNED
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		VERTICAL: AHD01	APPROVED FOR ISSUE
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		=	DATE

Government of Western Australia

YANKEP RAIL EXTENSION

ALKIMOS STATION

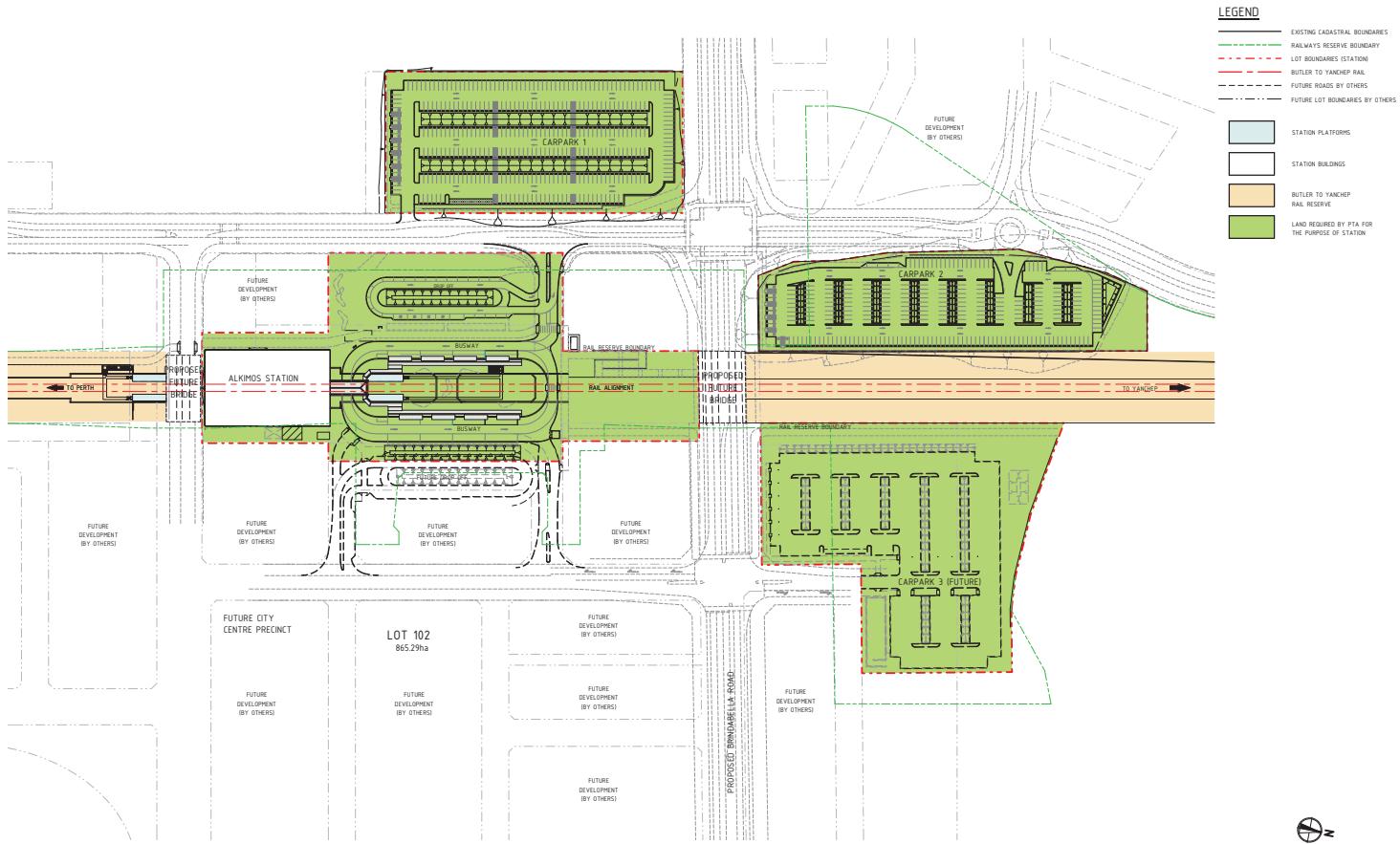
SITE PLAN

PTA Drawing No:

REV: B

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REV. DATE		AMENDMENT	DSN	DRN	OKD	APP		
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#### LAND REQUIREMENTS & SITE INFORMATION PLAN

SCALE 1 : 1000

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REV. DATE		AMENDMENT		DSN	DRN	OKD	APP		
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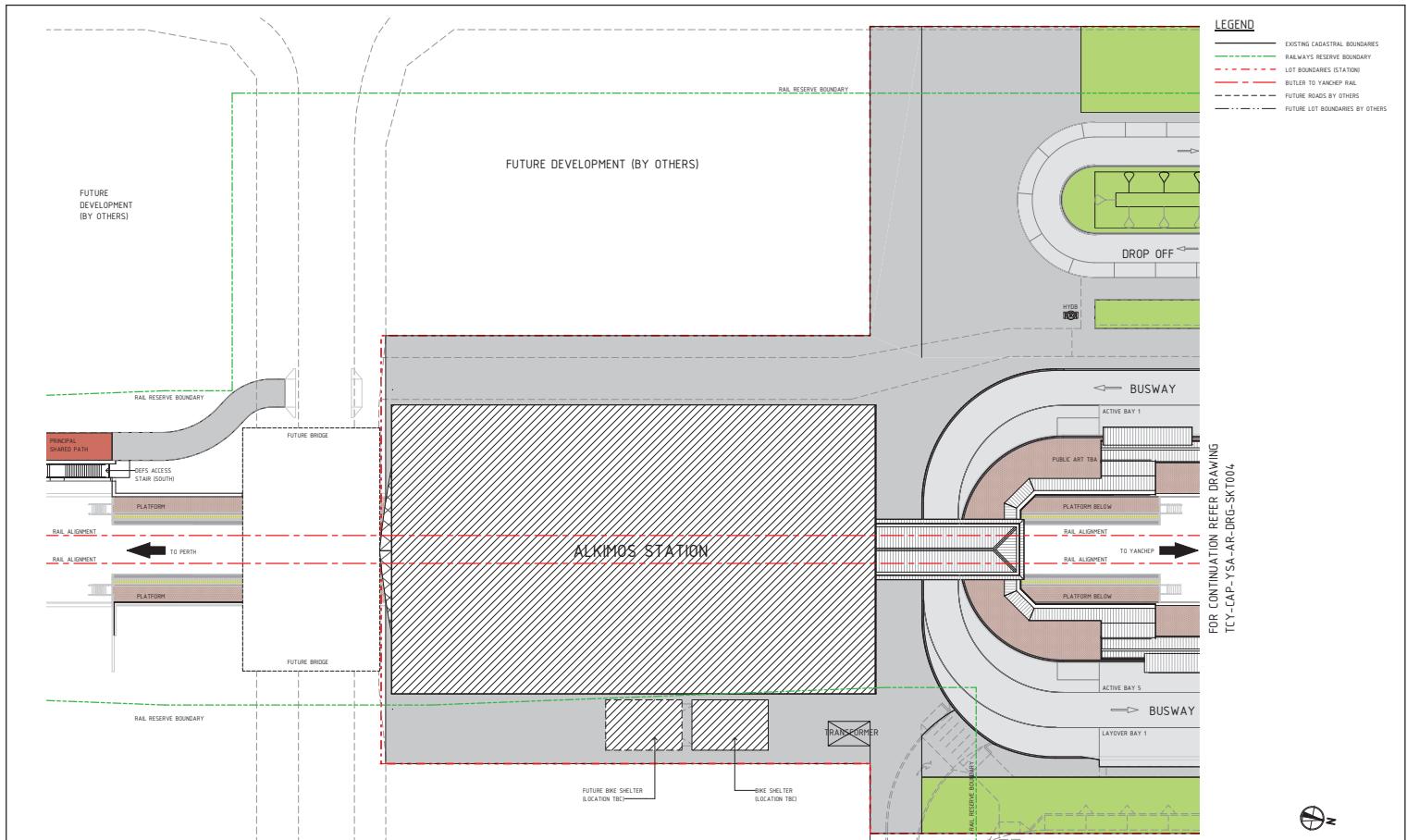


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PTA ACCEPTANCE STAMP	=	PTA DIRECTOR	PTA Drawing / Electronic Copy
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#### DEVELOPMENT APPLICATION

Government of Western Australia	YANCHEP RAIL EXTENSION
Alkimos Station	LAND REQUIREMENTS & SITE INFORMATION PLAN
PTA Drawing No:	
REV:	B



FOR CONTINUATION REFER DRAWING  
TCY-CAP-YSA-AR-DRG-SKT04



PART SITE PLAN  
SCALE 1 : 250

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REV. DATE		AMENDMENT	DSN	DRN	OKD	APP
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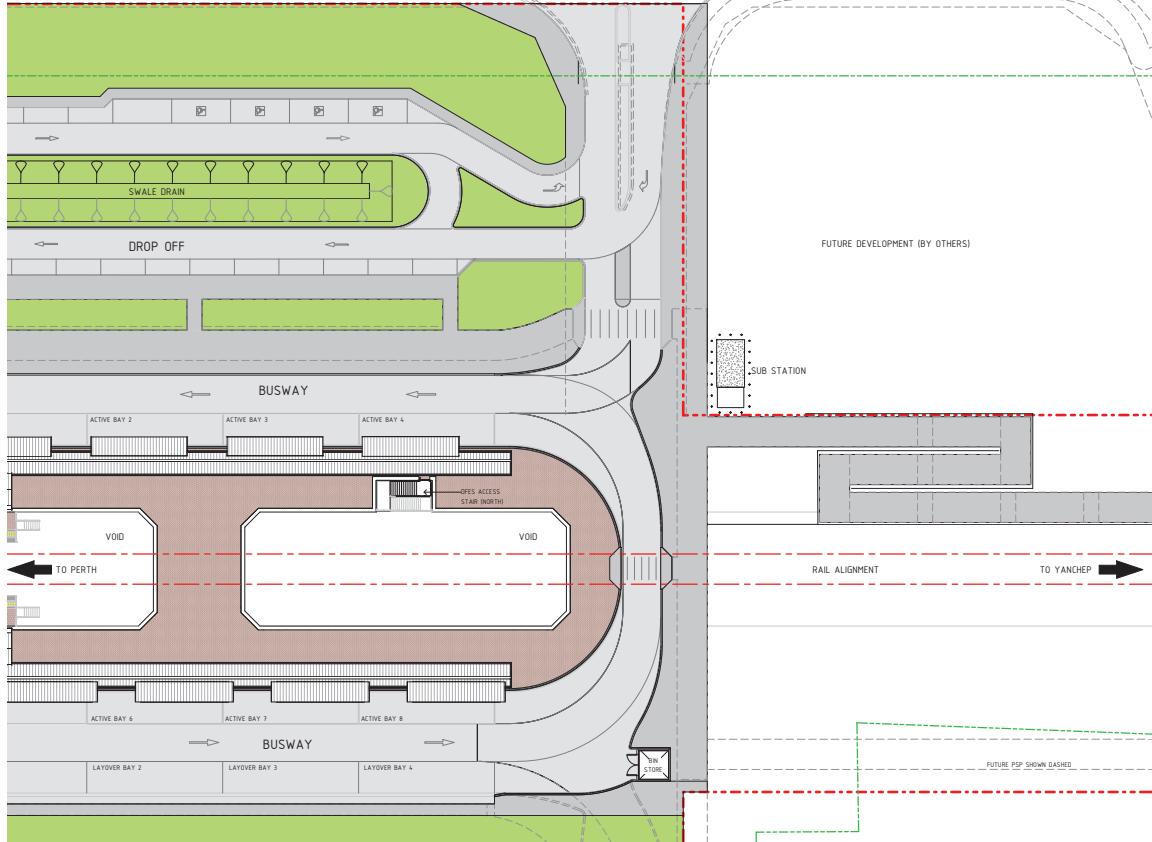
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PTA ACCEPTANCE STAMP	=		EXECUTIVE DIRECTOR	
			PTA Drawing No:	
			DATE	REV: A

## DEVELOPMENT APPLICATION

Government of Western Australia  
Transport Department  
YANKEP RAIL EXTENSION  
ALKIMOS STATION  
PART SITE PLAN (PART 1 OF 2)  
PTA Drawing No:  
DATE

FOR CONTINUATION REFER DRAWING  
TCY-CAP-YSA-AR-DRG-SKT003



PART SITE PLAN  
SCALE 1: 250



### DEVELOPMENT APPLICATION

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		=	DATE

Government of Western Australia  
Public Transport Authority  
YANCHEP RAIL EXTENSION  
ALKIMOS STATION  
PART SITE PLAN (PART 2 OF 2)

PTA Drawing No:

REV: A

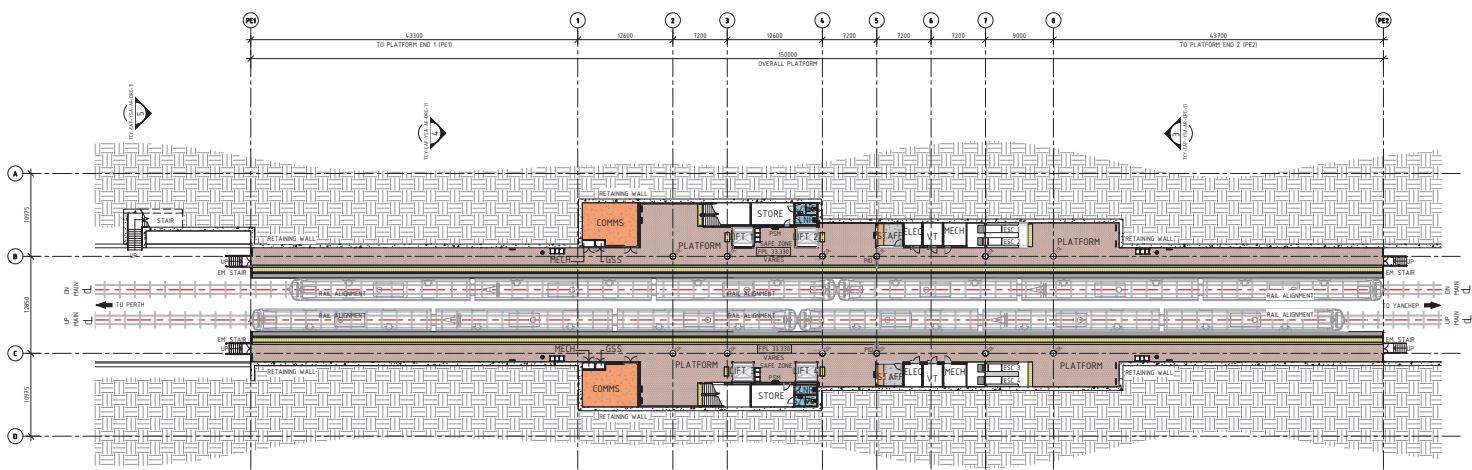
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PLATFORM PLAN - OVERALL  
SCALE 1 : 250

FLOOR FINISHES

9650.02 VINYL TYPE 2 ANTI STATIC	2780.08 MASONRY PAVERS TO PTA'S STANDARDS
9650.02 VINYL TYPE 2 ON SCREED	9650.10 TILE - PLATFORM EDGE
9300.03 CERAMIC TILES ON SCREED	9650.06 TILE - TACTILE - WARNING - 300X300



### DEVELOPMENT APPLICATION

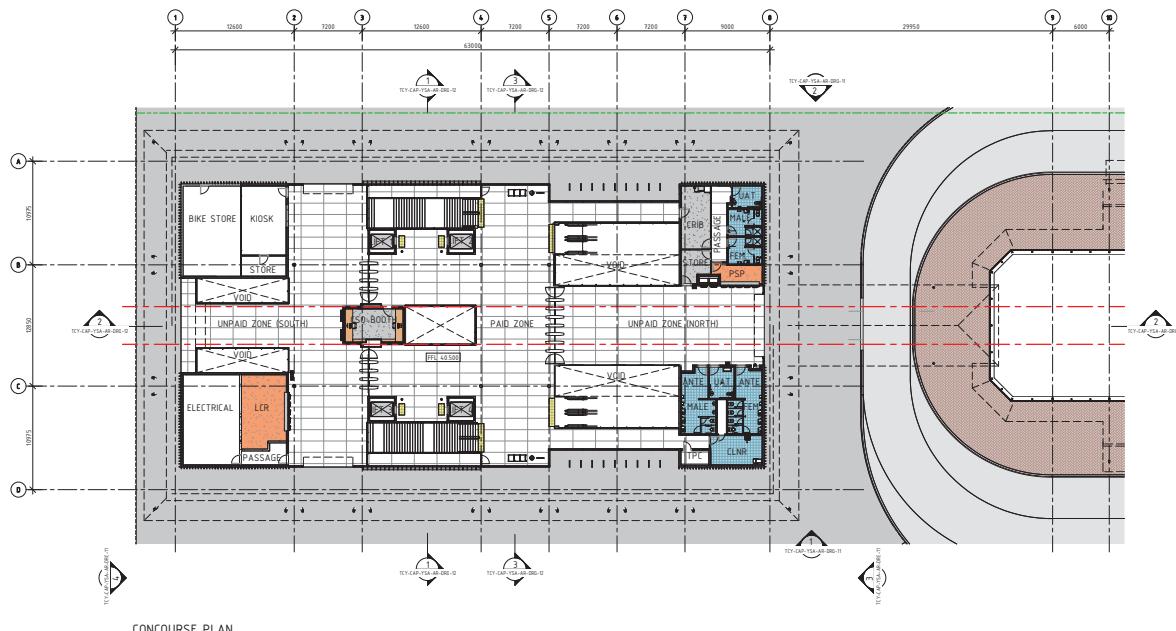
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Government of Western Australia  
Public Transport Authority  
YANCHEP RAIL EXTENSION  
ALKIMOS STATION  
PLATFORM LEVEL PLAN  
PTA Drawing No: REV: A



**CONCOURSE PLAN**  
SCALE 1 : 200

FLOOR FINISHES	
9450.02	VINYL TYPE 2 ANTI STATIC
9450.02	VINYL TYPE 2 ON SCREED
9300.03	CERAMIC TILES ON SCREED
9450.07	TILE - TAFFLE - WARNING - 300X300
2780.08	MASONRY PAVERS TO PTA'S STANDARDS
9650.10	TILE - PLATFORM EDGE
2780.13	MASONRY PAVERS TO PTA'S STANDARDS
9300.01	MASONRY PAVERS TO PTA'S STANDARDS



### DEVELOPMENT APPLICATION

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TCY-CAP-YSA-AR-DRG-07

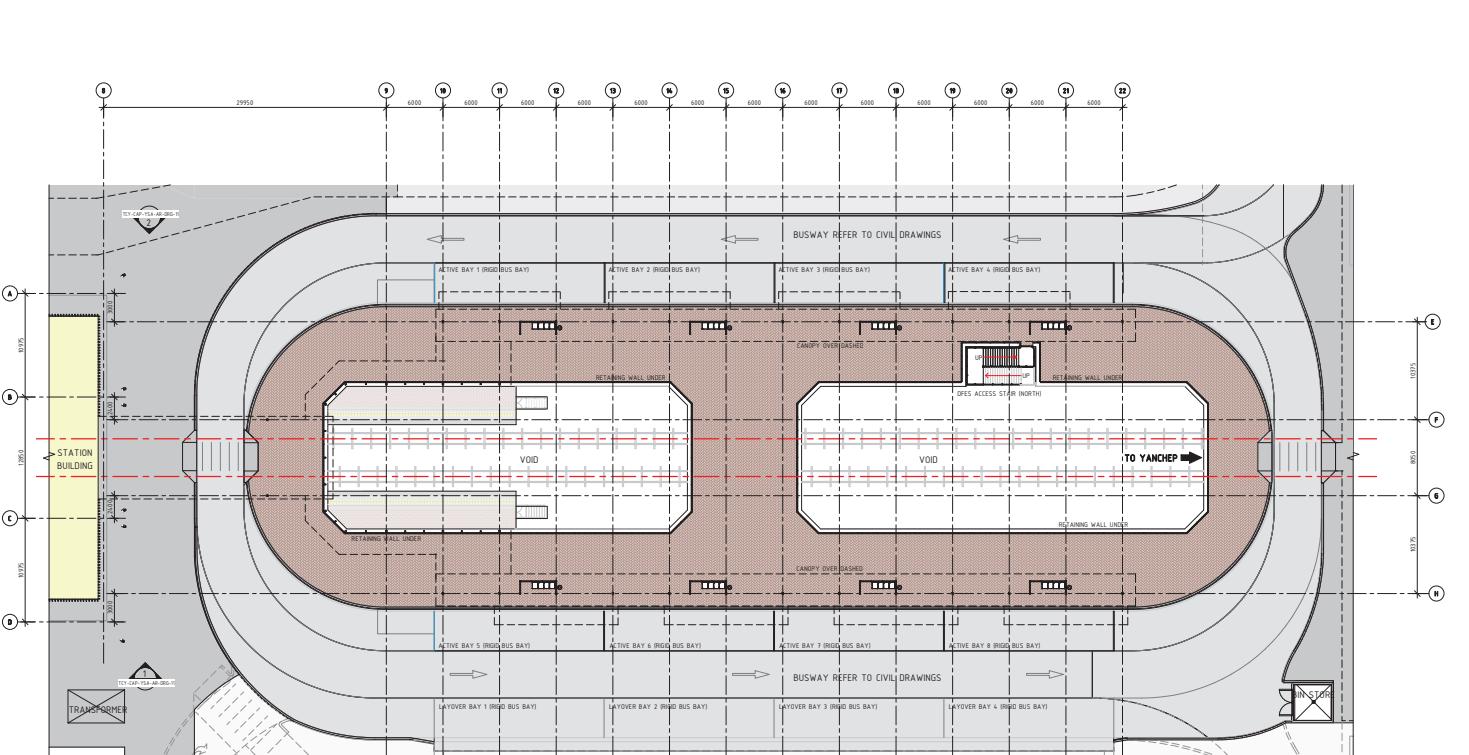
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VERTICAL: AHDT1	
PTA ACCEPTANCE STAMP	EXECUTIVE DIRECTOR PTA Sydney / Extreme Country
=	DATE

Government of Western Australia  
Public Transport Authority  
YANCHEP RAIL EXTENSION  
ALKIMOS STATION  
CONCOURSE LEVEL PLAN  
PTA Drawing No:

REV: A

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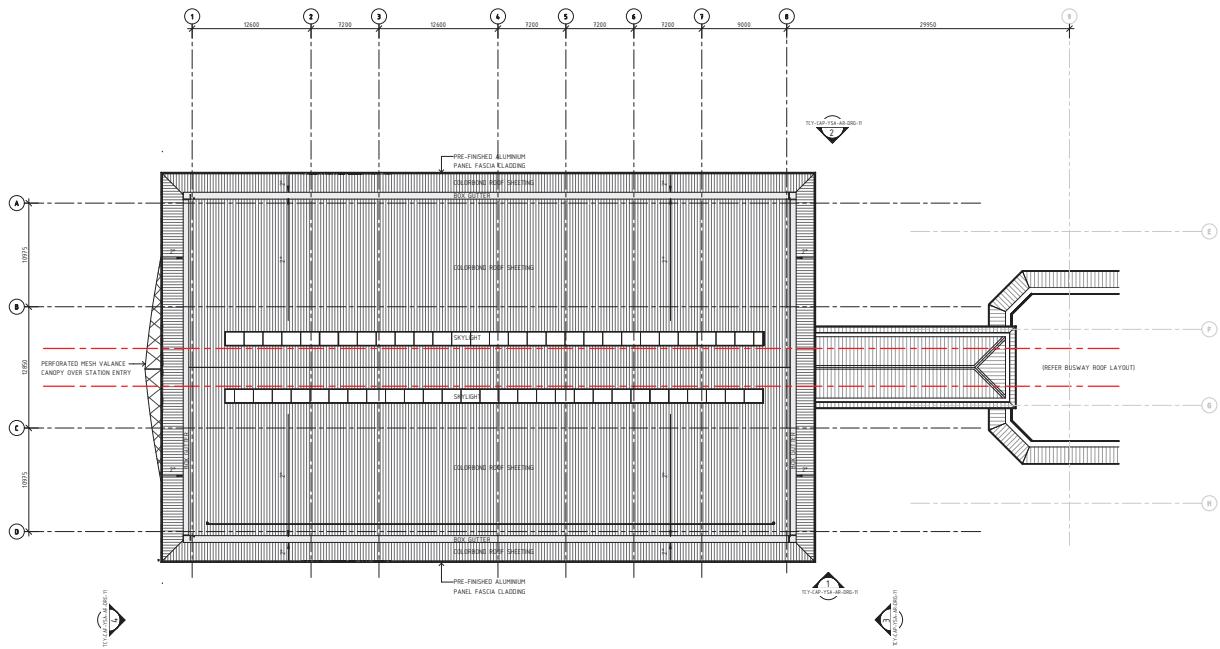


BUS INTERCHANGE OVERALL  
SCALE 1 : 200

SCALE 1 : 200



## **DEVELOPMENT APPLICATION**



CONCOURSE ROOF PLAN  
SCALE 1: 200



### DEVELOPMENT APPLICATION

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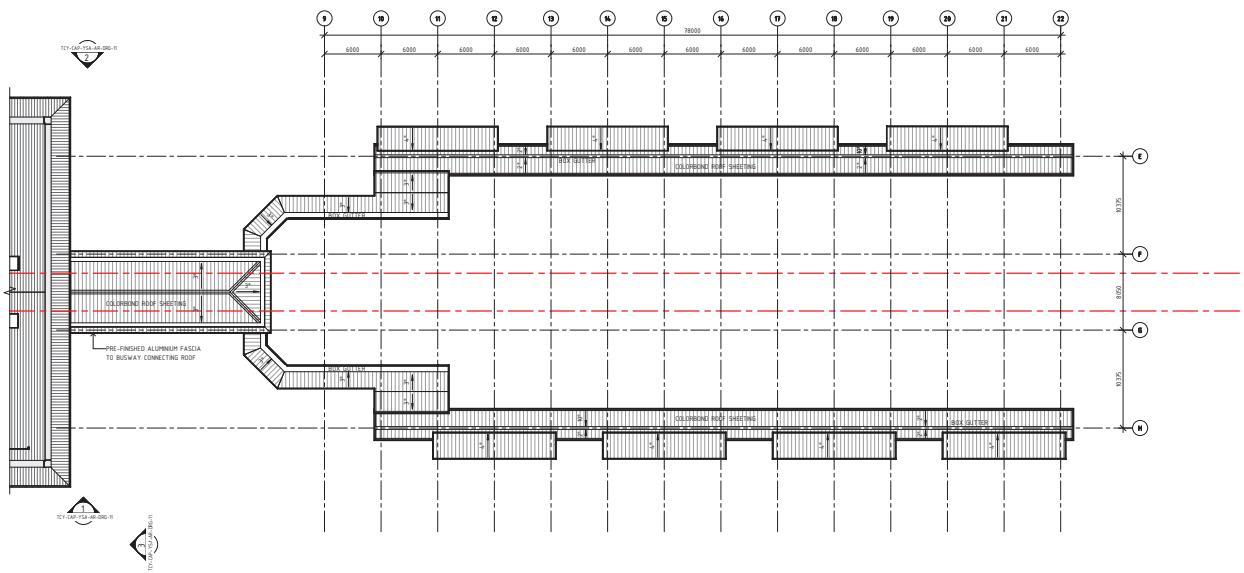
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		=	DATE

Government of Western Australia  
Public Transport Authority  
ALKIMOS STATION  
CONCOURSE ROOF PLAN  
PTA Drawing No: REV: A



BUS INTERCHANGE ROOF PLAN

SCALE 1 - 200



**DEVELOPMENT APPLICATION**



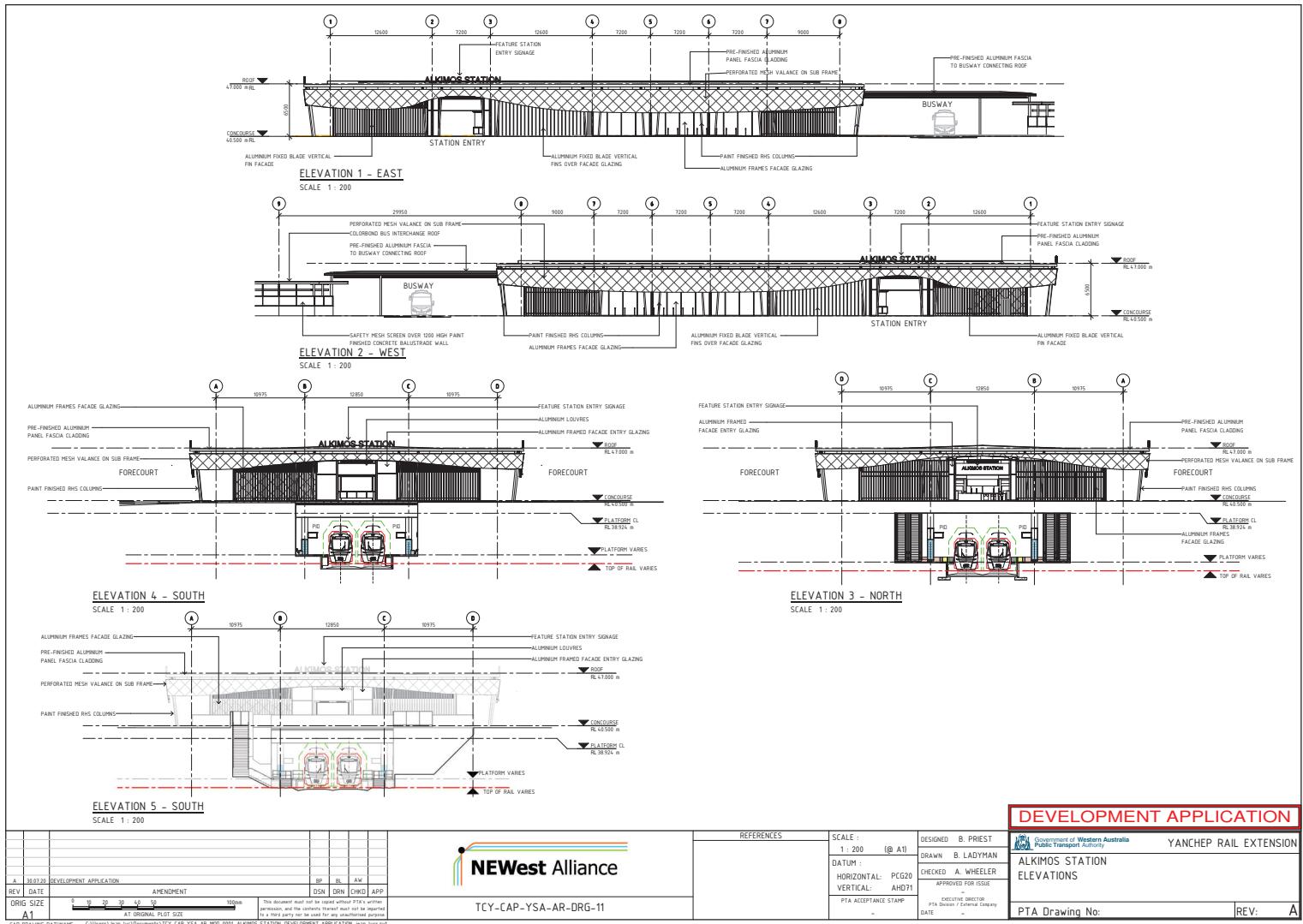
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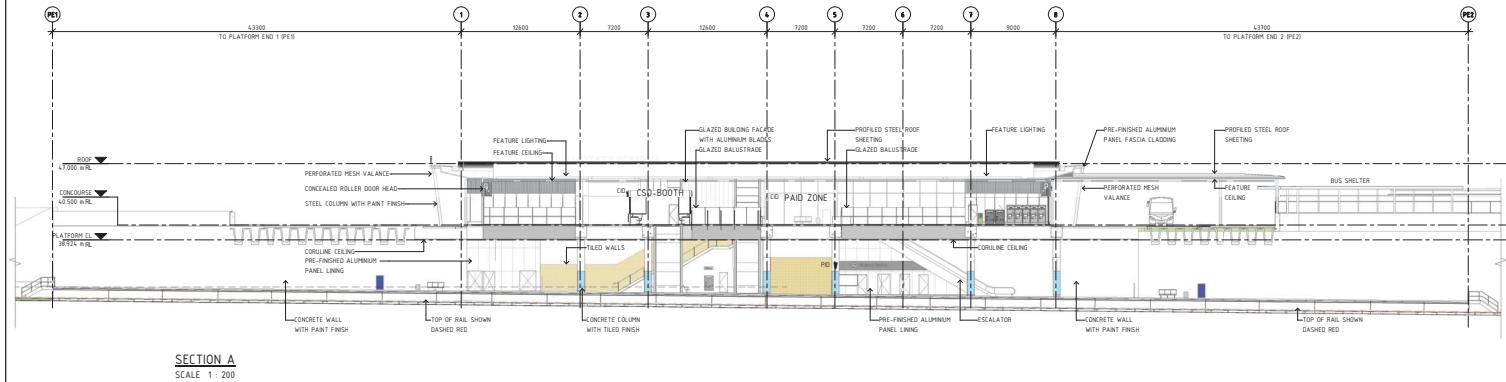
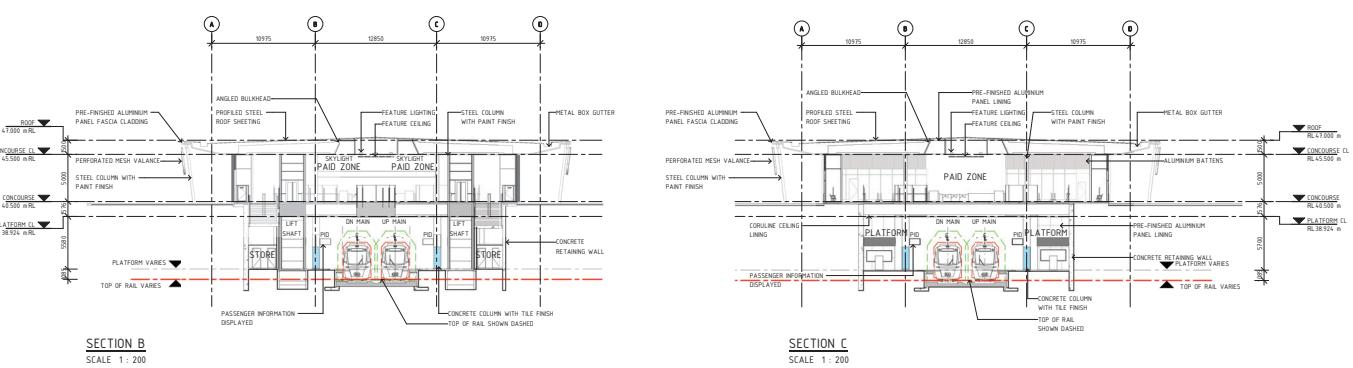
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VERTICAL:	AHD71	APPROVED FOR ISSUE
PTA ACCEPTANCE STAMP	=	PTA DIRECTOR / Executive Director
		DATE

Government of Western Australia	YANCHEP RAIL EXTENSION
Alkimos Station	Bus Interchange Roof Plan
PTA Drawing No:	REV: A



REV.	DATE	DEVELOPMENT APPLICATION			BP	BL	AW
		DSN	DRN	OKD			
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DEVELOPMENT APPLICATION					
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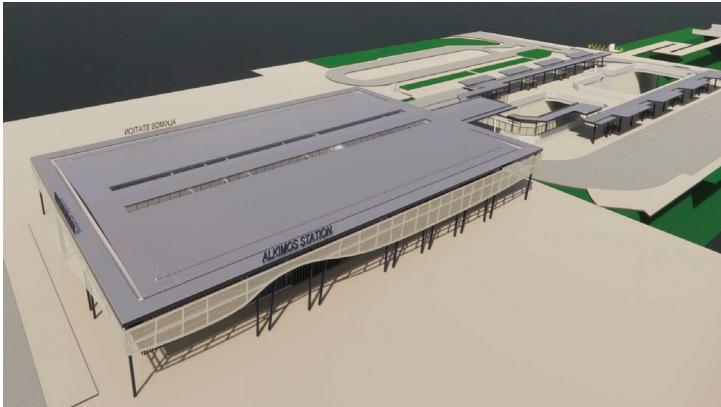
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DEVELOPMENT APPLICATION					
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DATUM :					
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VERTICAL:	AHD71		APPROVED FOR ISSUE		
PTA ACCEPTANCE STAMP	=		PTA DIRECTOR / Executive Director		
			DATE		
PTA Drawing No:					
REV: A					

Government of Western Australia  
Public Transport Authority

YANCHEP RAIL EXTENSION

ALKIMOS STATION  
SECTIONS



EXTERNAL PERSPECTIVE 1 - AERIAL VIEW - SOUTH-EAST



EXTERNAL PERSPECTIVE 2 - NORTH ENTRY VIEW



EXTERNAL PERSPECTIVE - EAST FACING VIEW

DEVELOPMENT APPLICATION											
 <b>ALKIMOS STATION</b> <b>YANCHEP RAIL EXTENSION</b>											
 <b>ALKIMOS STATION INDICATIVE IMAGES</b>											
<b>PTA Drawing No:</b> <span style="float: right;">REV: A</span>											
<b>REFERENCES</b>											
<b>SCALE :</b> NTS (B1) <b>DESIGNED :</b> B. PRIEST <b>DATUM :</b> DRAWN B. LADYMAN <b>HORIZONTAL:</b> PCG20 <b>CHECKED :</b> A. WHEELER <b>VERTICAL:</b> AHDT1 <b>APPROVED FOR ISSUE</b> <b>PTA ACCEPTANCE STAMP</b> = <b>EXECUTIVE DIRECTOR</b> <small>PTA Sydney / Extreme Company DATE</small>											
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## **APPENDIX E**

## **PRELIMINARY PLANS OF SUPPORTING WORKS**

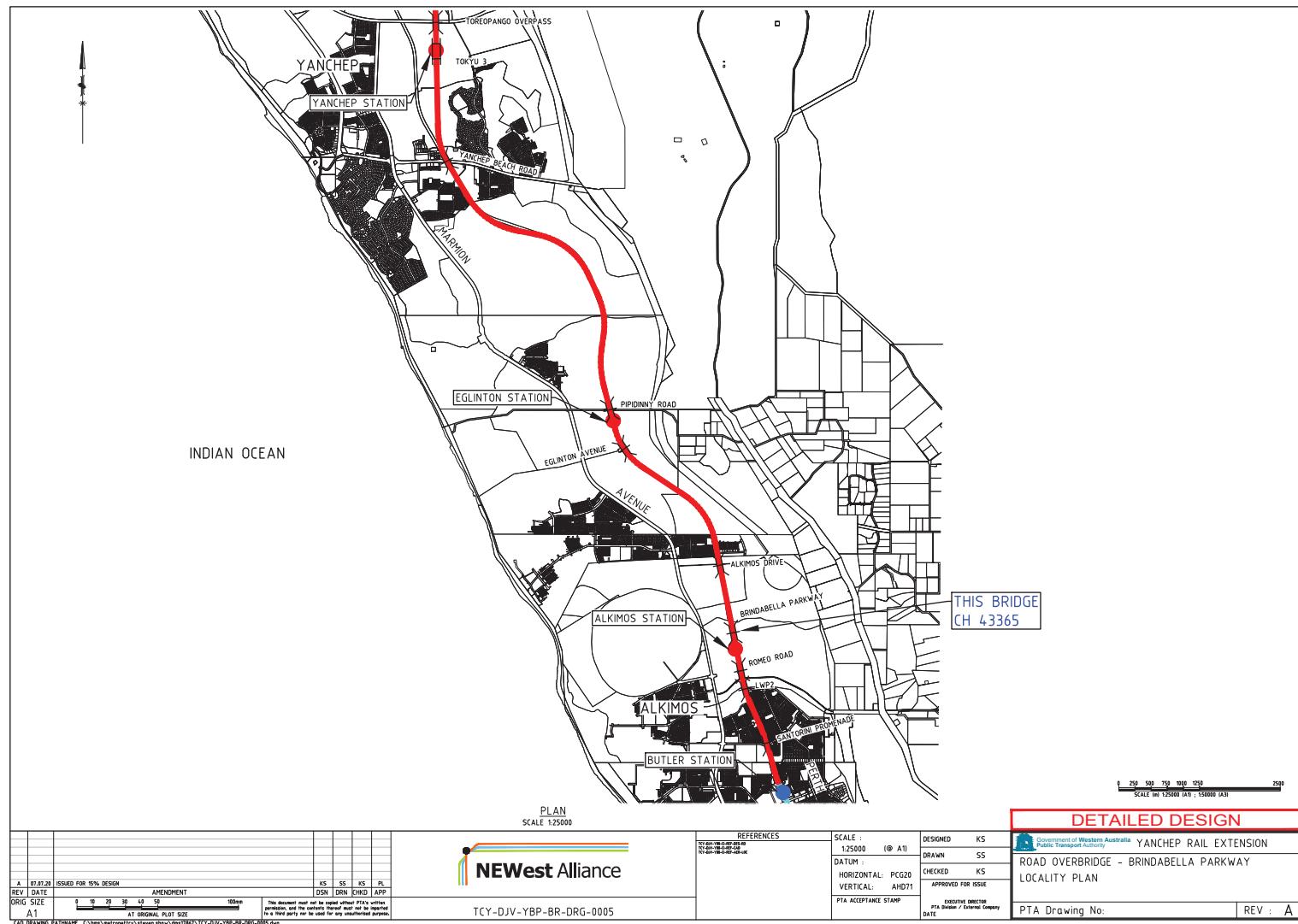
**NEWest ALLIANCE**  
**YANCHEP RAIL EXTENSION**  
**PACKAGE 08 - ROAD OVERBRIDGE**  
**BRINDABELLA PARKWAY (CH 43365)**

REV No.	DRAWING NUMBER		DRAWING TITLE
	NEWest	PTA	
A	TCY-DJV-YBP-BR-DRG-0011		DRAWING INDEX
A	TCY-DJV-YBP-BR-DRG-0005		LOCALITY PLAN
A	TCY-DJV-YBP-BR-DRG-0020		GENERAL ARRANGEMENT - SHEET 1
A	TCY-DJV-YBP-BR-DRG-0021		GENERAL ARRANGEMENT - SHEET 2

**DETAILED DESIGN**

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<small>Government of Western Australia State Transport Authority</small>																																																			
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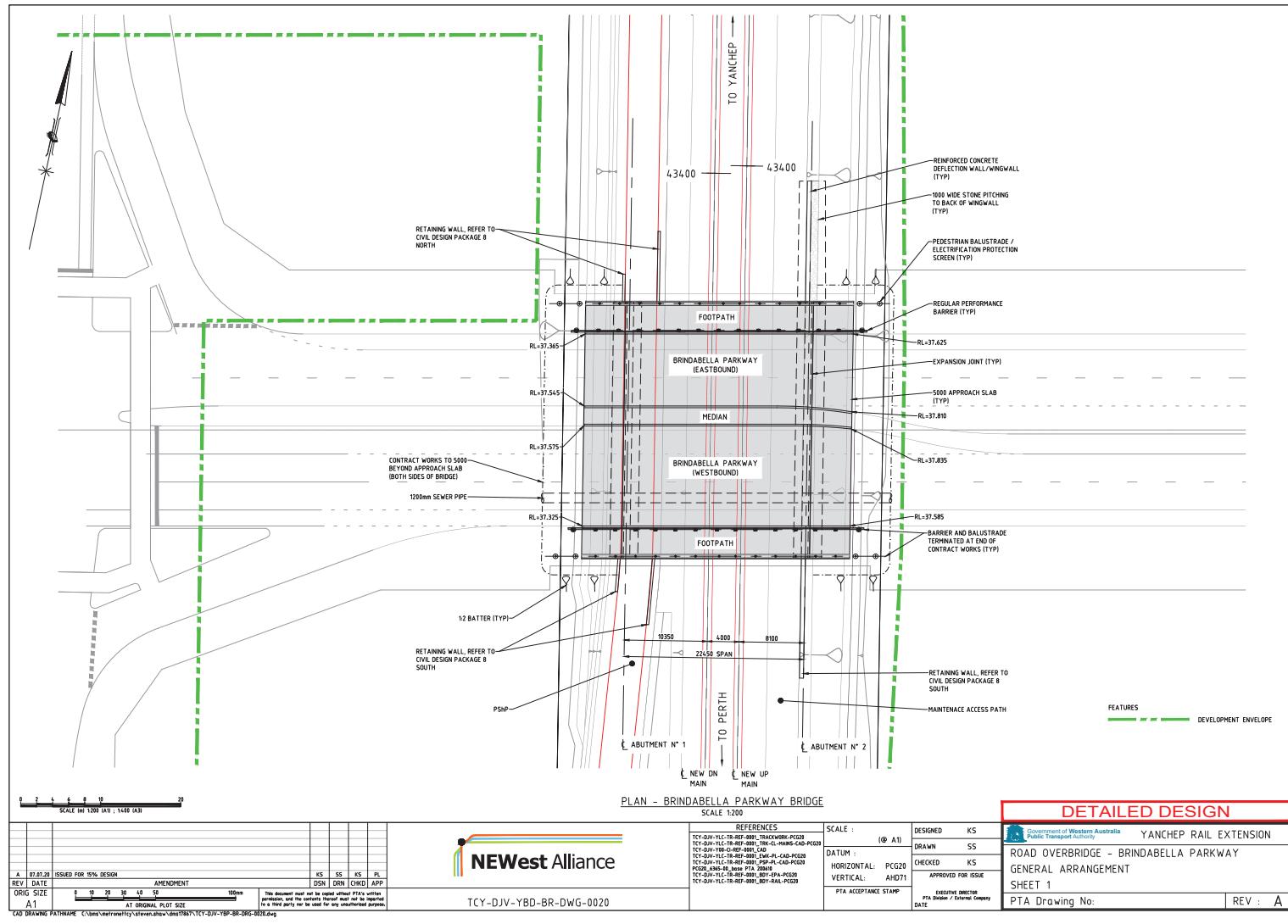
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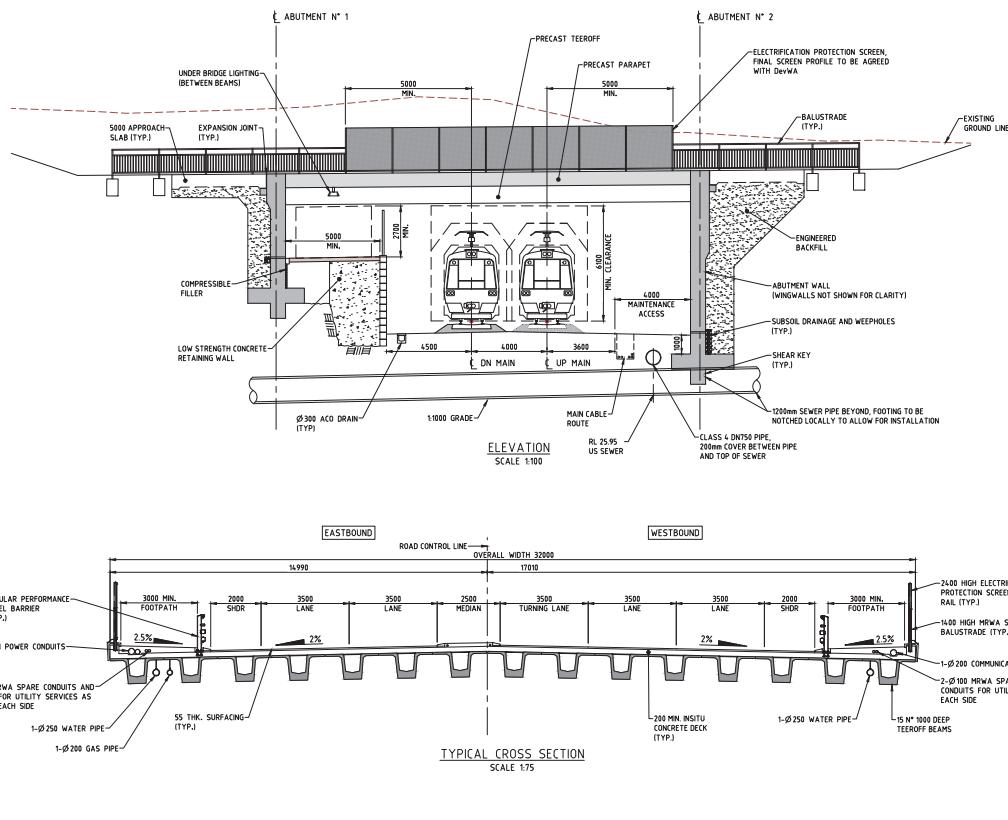


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REV. DATE		AMENDMENT	DSN	DRN	KHO	APP
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**NEWest Alliance**

TCY-DJV-YBP-BR-DRG-0005





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**DETAILED DESIGN**

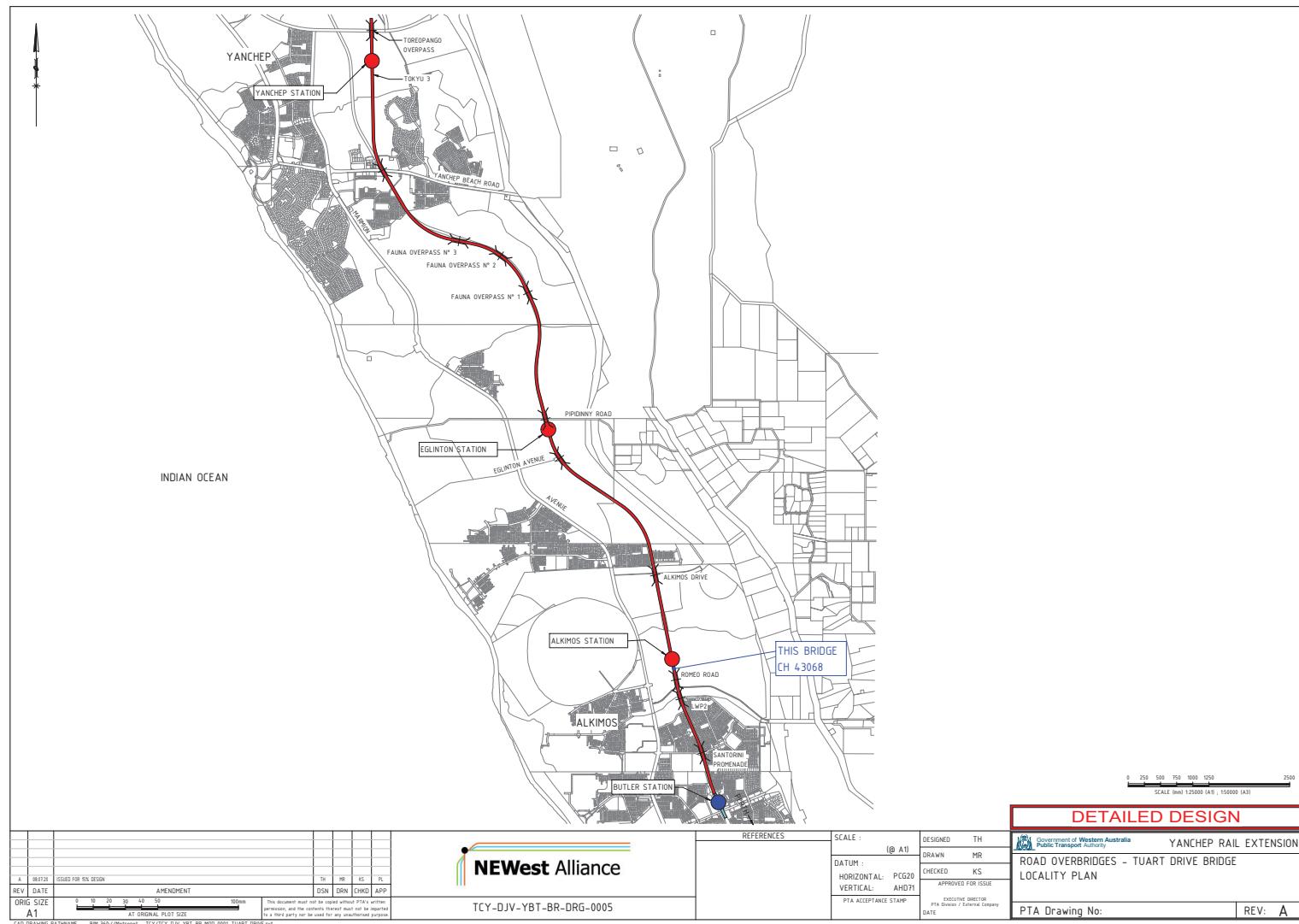
# NEWest ALLIANCE

## YANCHEP RAIL EXTENSION

### PACKAGE 8 - TUART DRIVE BRIDGE

REV No.	DRAWING NUMBER		DRAWING TITLE
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A	TCY-DJV-YBT-BR-DRG-0001		DRAWING INDEX
A	TCY-DJV-YBT-BR-DRG-0005		LOCALITY PLAN
A	TCY-DJV-YBT-BR-DRG-0020		TUART DRIVE BRIDGE - GENERAL ARRANGEMENT SHEET 1
A	TCY-DJV-YBT-BR-DRG-0021		TUART DRIVE BRIDGE - GENERAL ARRANGEMENT SHEET 2

DETAILED DESIGN																																																																																																																																																																																																																																																											
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#### DETAILED DESIGN

ISSUED FOR PTA DESIGN		AMENDMENT				DSN DRW CHDG APP		REFERENCES		SCALE : (B A1)	DESIGNED TH	DRAWN MR	
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												PTA Drawing No:	REV: A

**NEWest Alliance**

TCY-DJV-YBT-BR-DRG-0005

Government of Western Australia

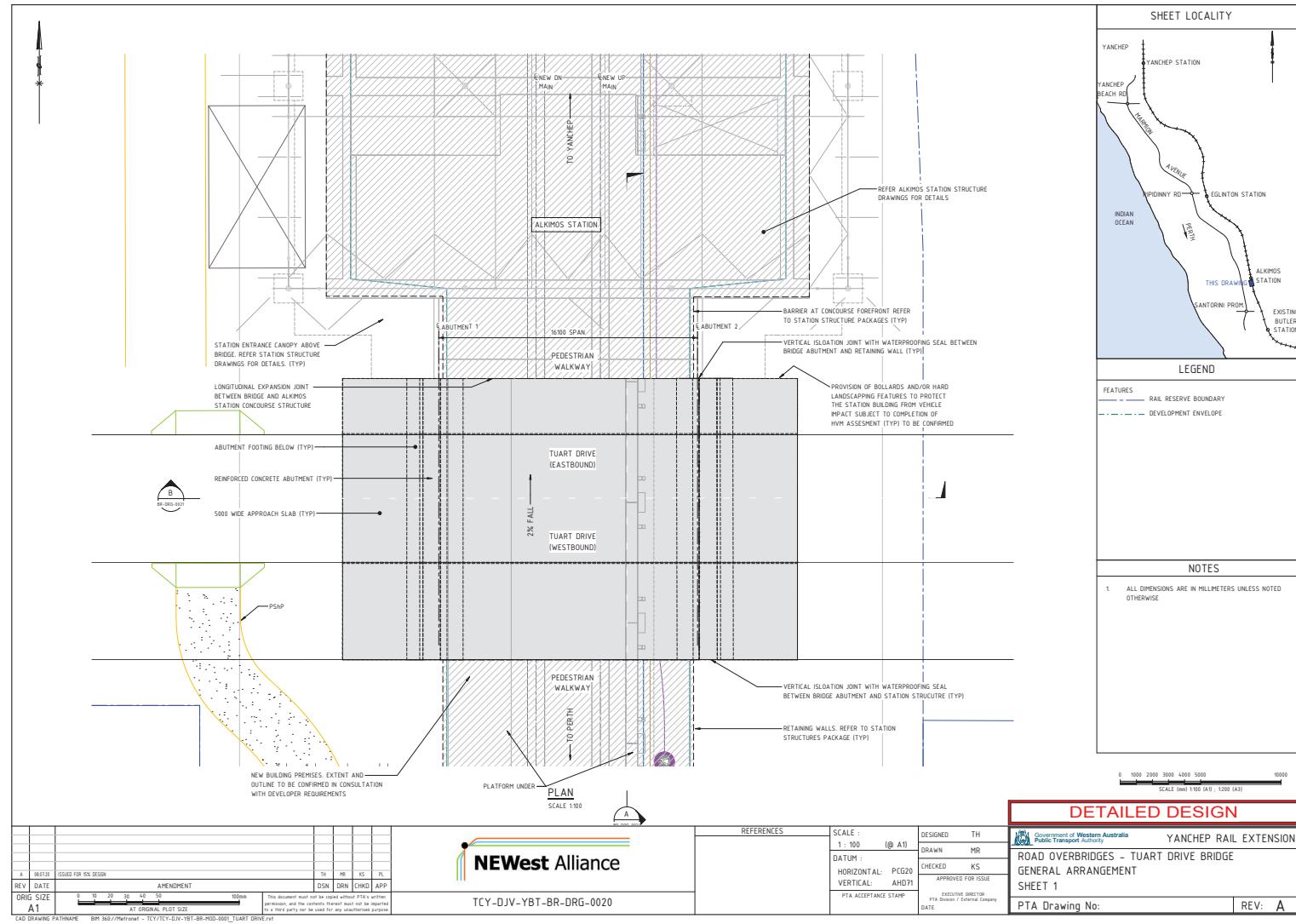
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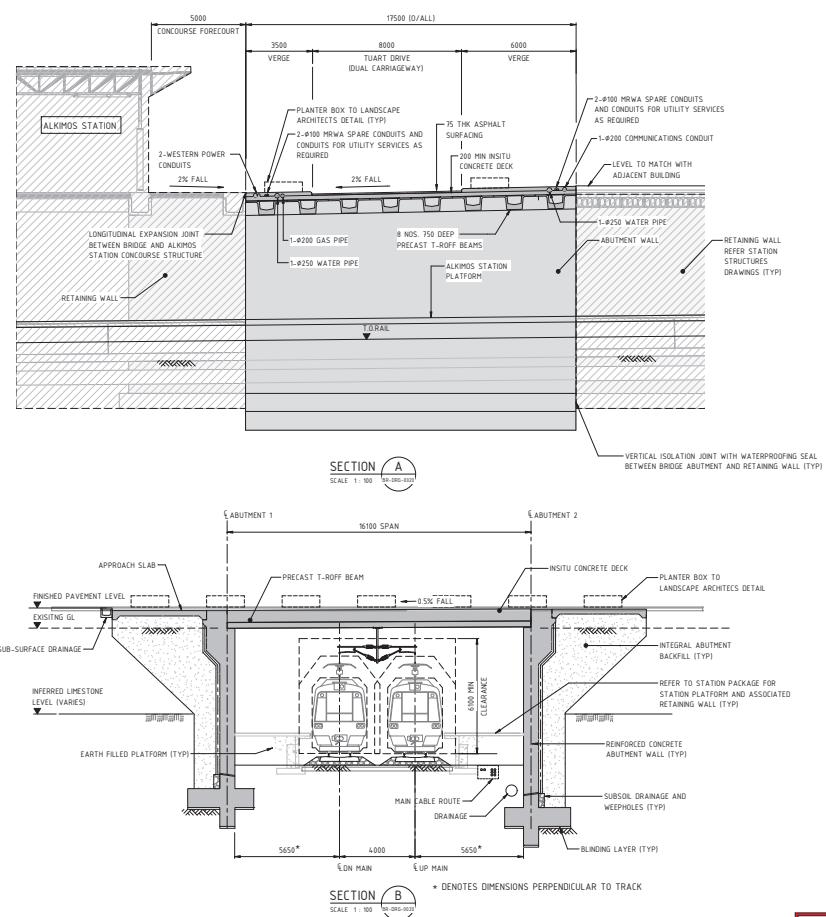
YANCHEP RAIL EXTENSION

ROAD OVERBRIDGES - TUART DRIVE BRIDGE  
LOCALITY PLAN

SCALE (in) 1:25000 (A1), 1:50000 (A3)

2500 250 500 750 1000 1250





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**NEWest Alliance**

TCY-DJV-YBT-BR-DRG-0021

REFERENCES

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VERTICAL:	AHD01	APPROVED FOR ISSUE	
PTA ACCEPTANCE STAMP		EXECUTIVE DIRECTOR PTA Services / Strategic Delivery DATE	

**DETAILED DESIGN**

Government of Western Australia Transport	YANCHEP RAIL EXTENSION
ROAD OVERBRIDGES - TUART DRIVE BRIDGE	
GENERAL ARRANGEMENT	
SHEET 2	

PTA Drawing No:

REV: A

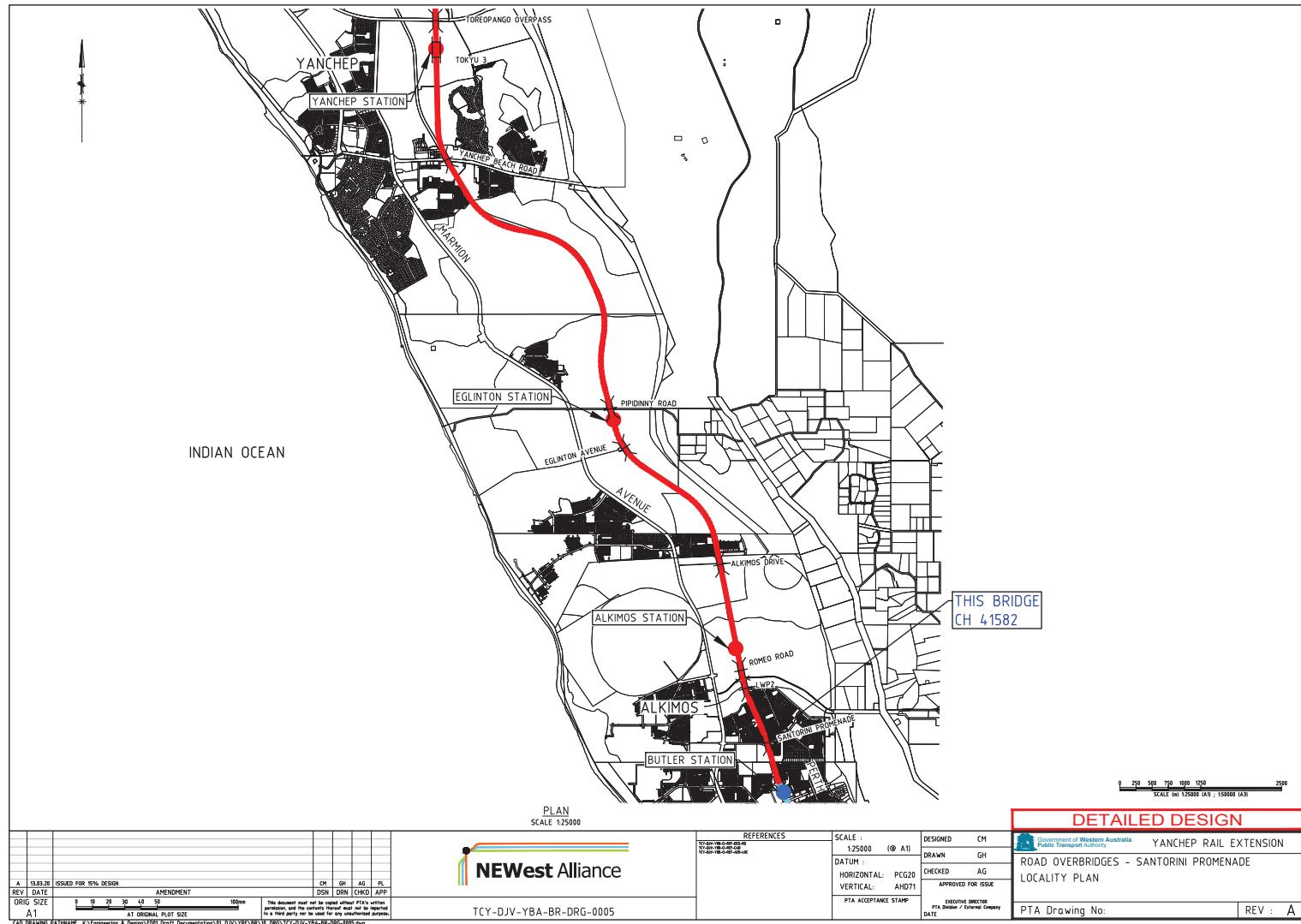
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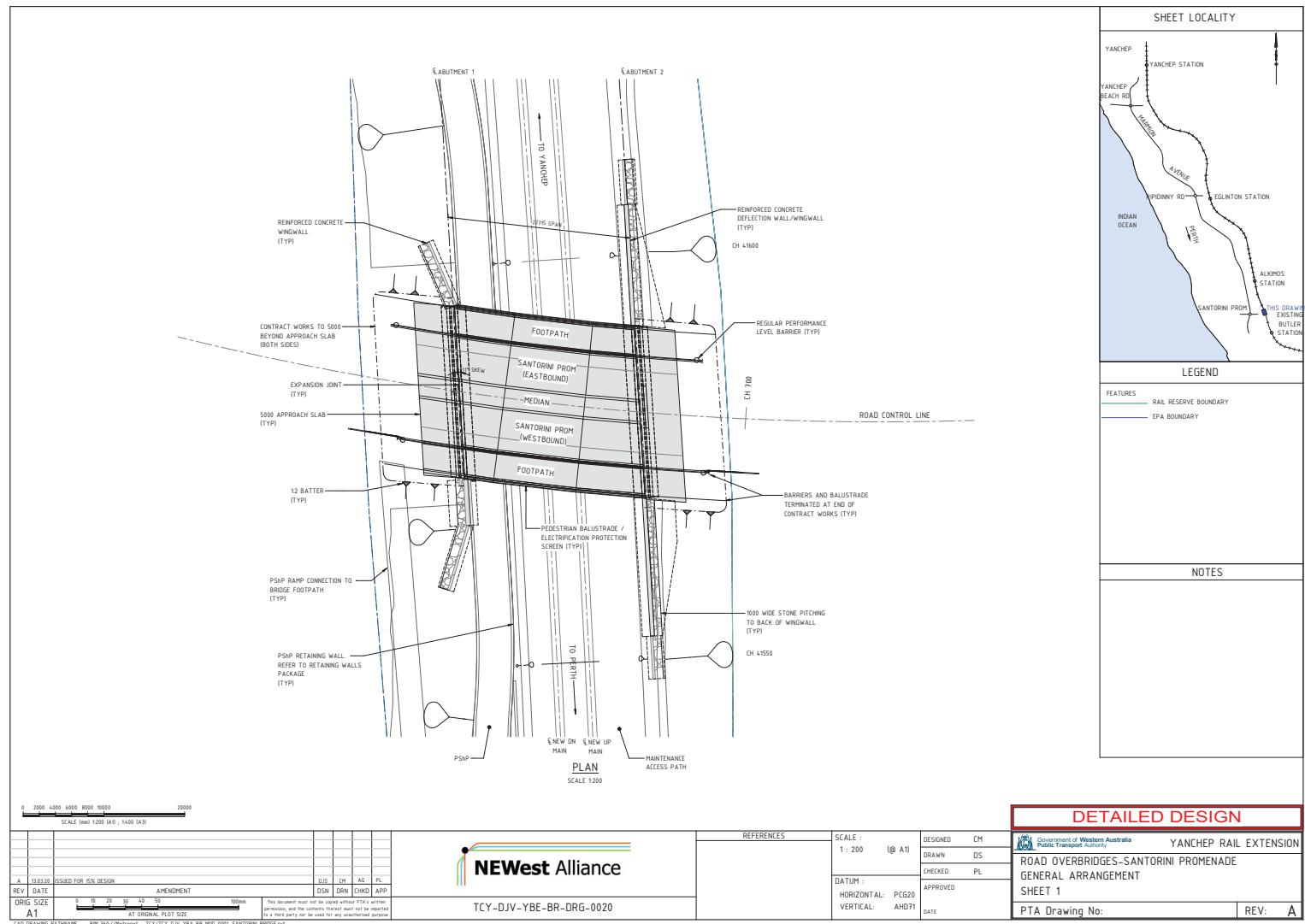
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**YANCHEP RAIL EXTENSION**  
**PACKAGE 04 - ROAD OVERBRIDGES**  
**SANTORINI PROMENADE (CH 41582)**

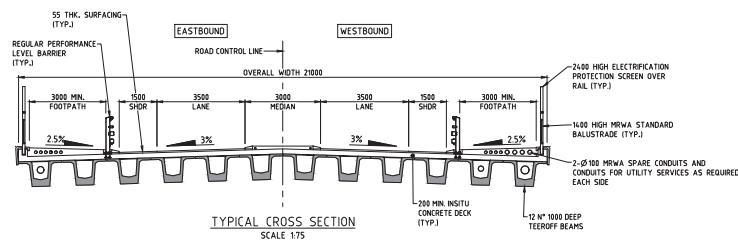
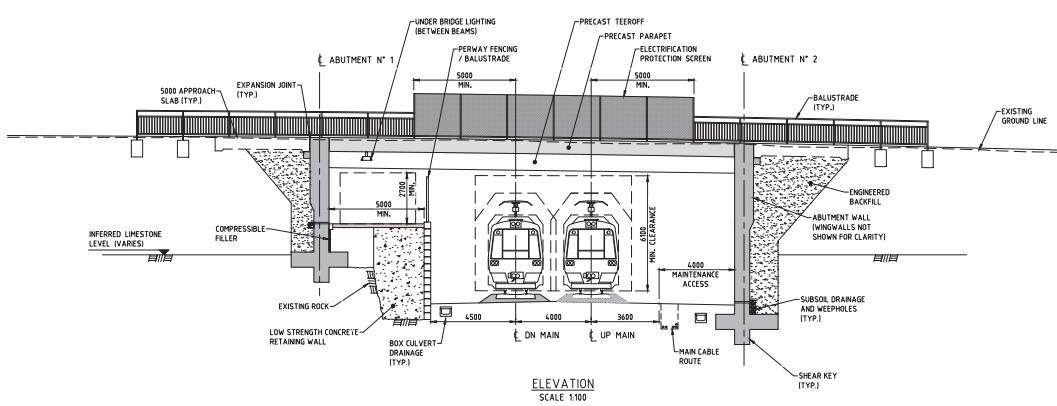
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A	TCY-DJV-YBA-BR-DRG-0005		LOCALITY PLAN
A	TCY-DJV-YBA-BR-DRG-0025		GENERAL ARRANGEMENT - SHEET 1
A	TCY-DJV-YBA-BR-DRG-0021		GENERAL ARRANGEMENT - SHEET 2

**DETAILED DESIGN**

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 <b>NEWest Alliance</b>												
TCY-DJV-YBA-BR-DRG-0001												
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<small>Government of Western Australia          Roads Transport Authority          YANCHEP RAIL EXTENSION          ROAD OVERBRIDGES - SANTORINI PROMENADE          DRAWING INDEX          PTA Drawing No: REV : A</small>												







A	13.01.20	ISSUED FOR 15% DESIGN				CM	GH	AD	PL
REV	DATE	AMENDMENT				DSN	DRN	CWD	APP
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A.1		AT ORIGINAL PLOT SIZE							

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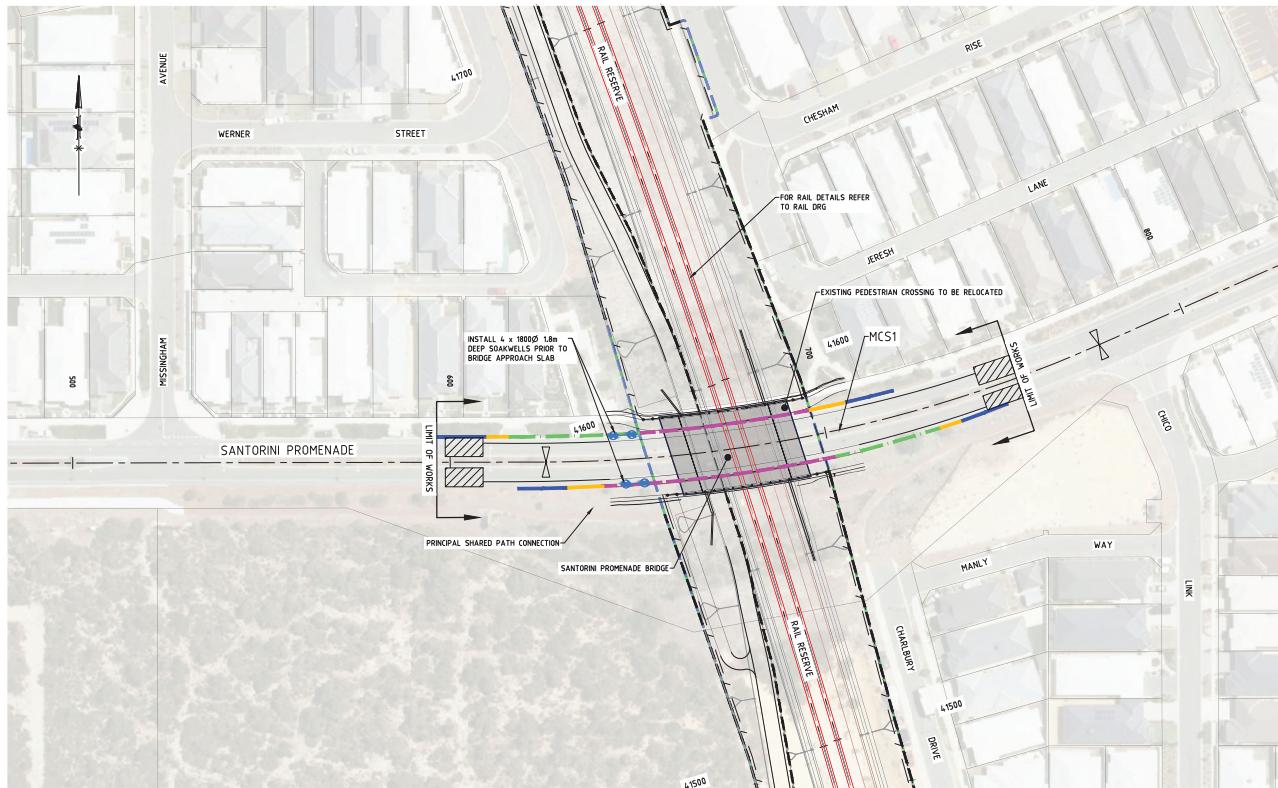
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		YANCHEP RAIL EXTENSION		
		ROAD OVERBRIDGES - SANTORINI PROMENADE		
		GENERAL ARRANGEMENT		
		SHEET 2		
		PTA Drawing No:		REV : A
		EXECUTIVE DIRECTOR PTA Director / Executive Director		
		PTA Acceptance Stamp		

### NOTES

- ALL DIMENSIONS IN METRES UNLESS NOTED
- EXISTING DRAINAGE TO BE SURVEYED AND REVIEWED FOR POTENTIAL MODIFICATIONS.

### LEGEND

	NEW RAIL RESERVE BOUNDARY
	DEVELOPMENT ENVELOPE
	RETAINING WALL
	KERB
	PROPOSED RAIL LINE
	DRAINAGE PIPE
	SOAKWELL
	BLENDED AREA
<b>BARRIERS</b>	
	V-BEAM BARRIER
	L-BEAM BRIDGE BARRIER
	THREE-BEAM BARRIER
	CONCRETE BARRIER
	X-TENSION TERMINAL
	TRAILING TERMINAL
<b>FENCING</b>	
	TYPE 1 - 1.8M GALVANISED CHAINWIRE FENCE WITH THREE BARBED STRANDS (NOT RANKLED)



PLAN  
1:500

SCALE 1:500 1500 (A) / 1000 (A)

### DETAILED DESIGN



TCY-DJV-YBA-CI-DRG-0051

REFERENCES	
TQ-DRG-1-B-0001-002	DR
TQ-DRG-1-B-0001-003	CB
TQ-DRG-1-B-0001-004	TD
TQ-DRG-1-B-0001-005	DSN
TQ-DRG-1-B-0001-006	DRW
TQ-DRG-1-B-0001-007	DRD
TQ-DRG-1-B-0001-008	DRH
TQ-DRG-1-B-0001-009	DRJ
TQ-DRG-1-B-0001-010	DRK
TQ-DRG-1-B-0001-011	APP

SCALE :	DESIGNED DR
1:500 (B A1)	DRAWN GC
DATUM :	CHECKED TB
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VERTICAL: AHD01	PTA Acceptance Stamp
	EXECUTIVE DIRECTOR PTA Design / External Company
	DATE

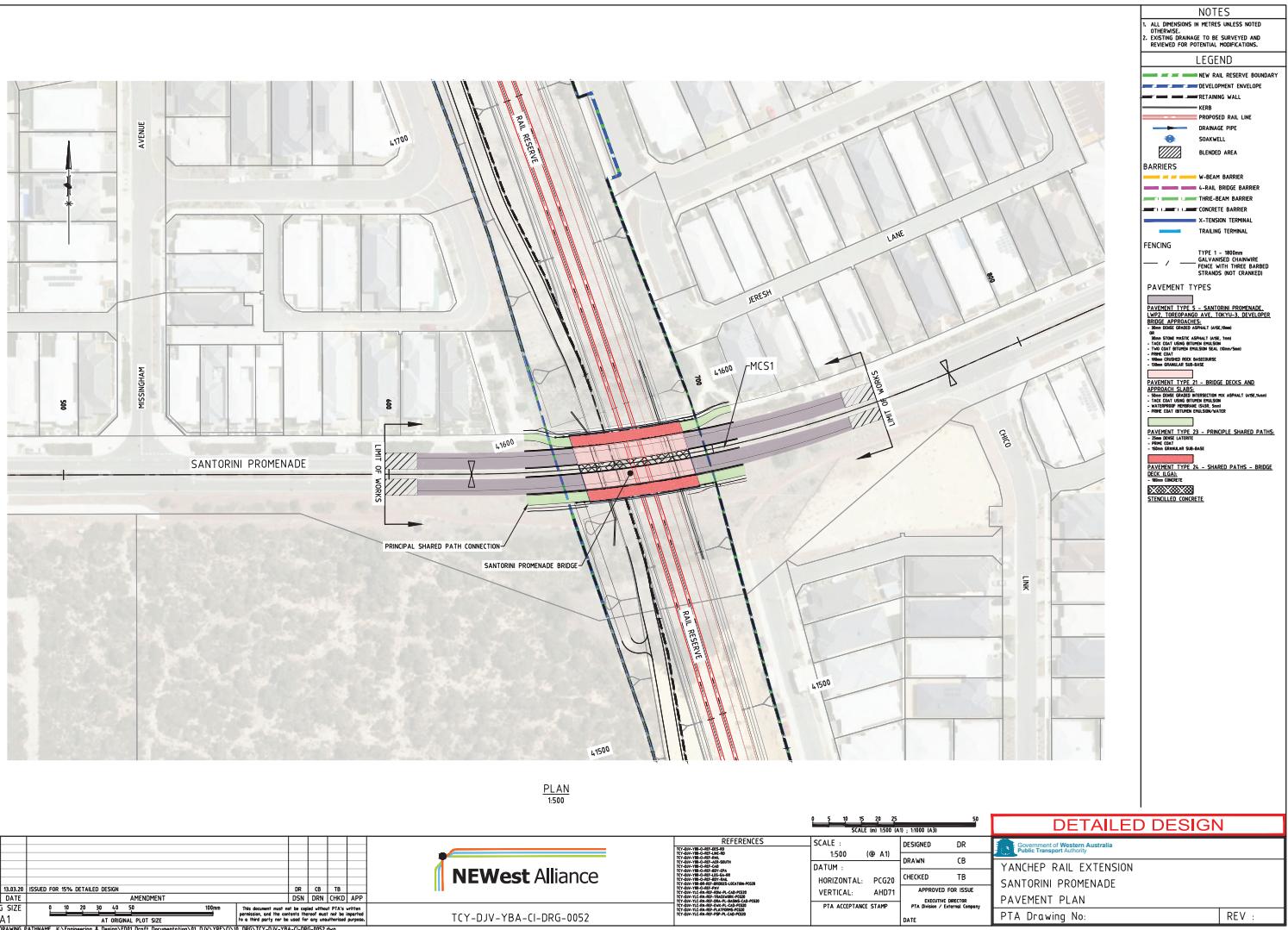
Government of Western Australia  
Metropolitan Transport Authority  
YANCHEP RAIL EXTENSION  
SANTORINI PROMENADE  
GENERAL ARRANGEMENT PLAN  
PTA Drawing No:

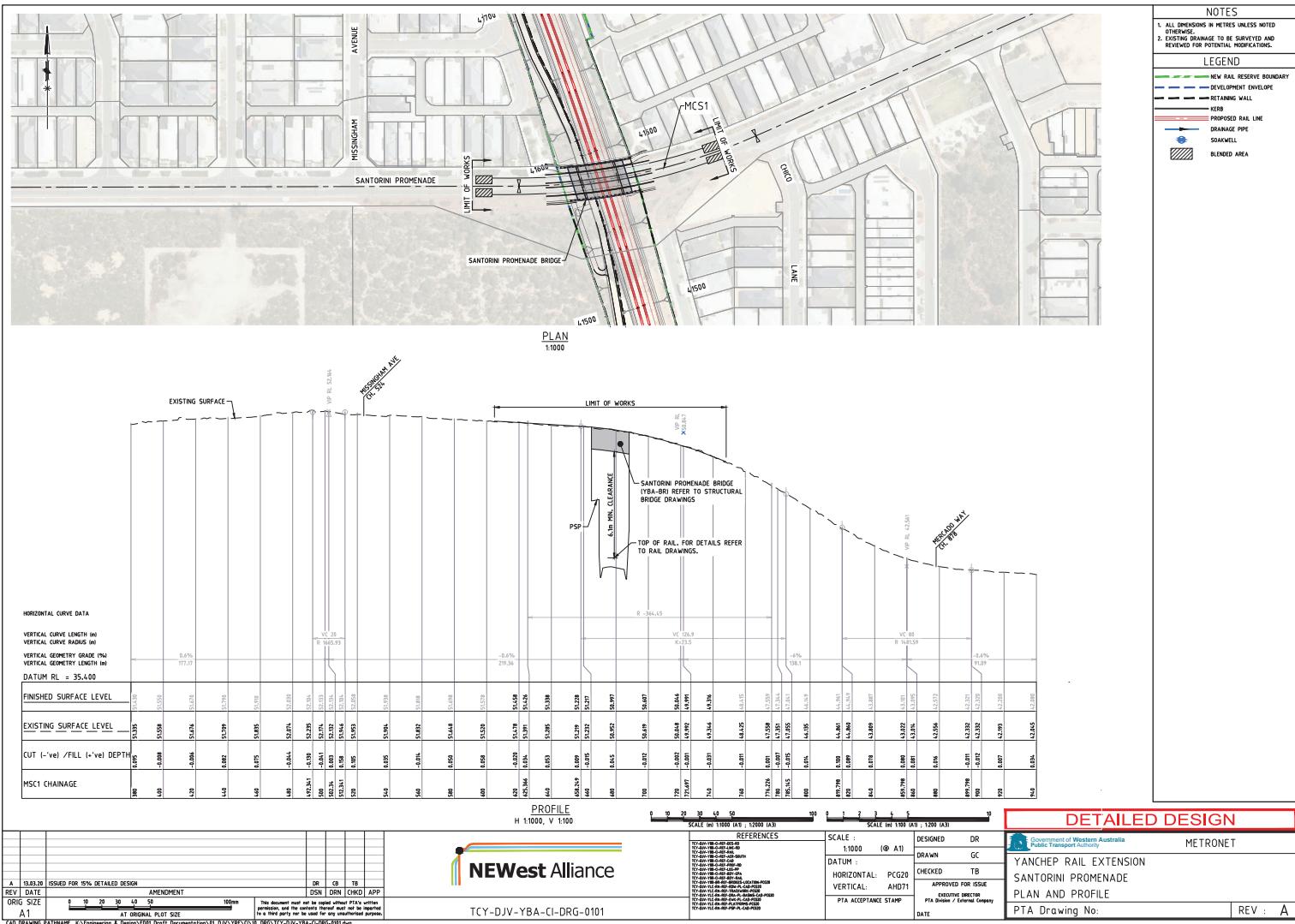
REV : A

A 13.03.20 ISSUED FOR 15% DETAILED DESIGN	DR	CB	TD
REV DATE	DSN	DRW	DRD
ORIG SIZE A1 AT ORIGINAL PLOT SIZE	DRH	DRJ	DRK

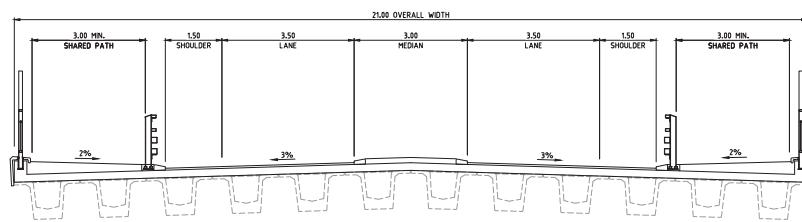
This document must be copied without PTA's written permission if it is to be distributed to a third party or for any unauthorised purpose.

CAD DRAWING PATHNAME: K:\Engineering & Design\DRG Draft Documentation\15% DRAFT\YANCHEP\_RAIL\_EXTENSION\DRG\TCY-DJV-YBA-CI-DRG-0051.dwg





NOTES  
 1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.  
 2. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.



TYPICAL SECTION  
 SANTORINI PROMENADE  
 SCALE 1:50

0 5 10 15 20 25 30  
 SCALE (in 1:50 (A1) : 1:100 (A3))

**DETAILED DESIGN**

A 13.03.20 ISSUED FOR 15% DETAILED DESIGN		DR	CB	TD	REFERENCES	SCALE :	DESIGNED	DR	METRONET						
REV. DATE		DSN	DRW	OKD APP	TCY-DRG-0151	1:50 (B1)	DRAWN	GC	YANCHEP RAIL EXTENSION						
ORIG SIZE	0 10 20 30 40 50 100mm	This document must be copied without PTA's written permission if it is to be given to a third party or used for any unauthorised purpose.			DATUM :	HORIZONTAL: PCG20	CHECKED	TB	SANTORINI PROMENADE						
A1	AT ORIGINAL PLOT SIZE				VERTICAL: AHDT1	APPROVED FOR ISSUE			TYPICAL CROSS SECTION						
PTA ACCEPTANCE STAMP															
PTA Drawing No: REV : A															



TCY-DJV-YBA-CI-DRG-0151

CAD DRAWING PATHNAME K:\Engineering & Design\DRG Draft Documentation\15% DRAFT\15% DRG\TCY-DJV-YBA-CI-DRG-0151.dwg

# NEWest ALLIANCE

## YANCHEP RAIL EXTENSION

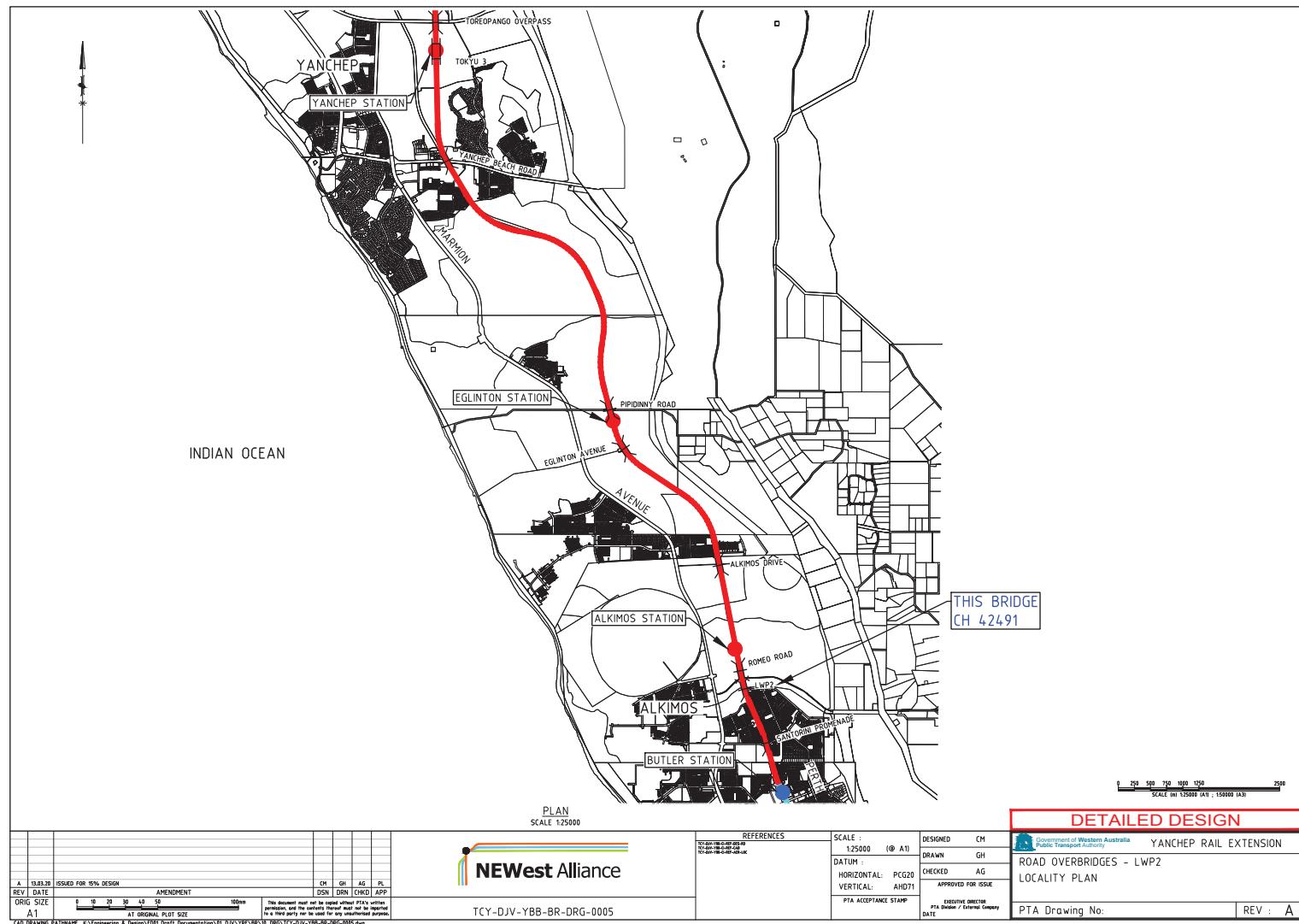
### PACKAGE 04 - ROAD OVERBRIDGES

#### LWP2 (CH 42491)

REV No.	DRAWING NUMBER		DRAWING TITLE
	NEWest	PTA	
A	TCY-DJV-YBB-BR-DRG-0001		DRAWING INDEX
A	TCY-DJV-YBB-BR-DRG-0005		LOCALITY PLAN
A	TCY-DJV-YBB-BR-DRG-0020		GENERAL ARRANGEMENT - SHEET 1
A	TCY-DJV-YBB-BR-DRG-0021		GENERAL ARRANGEMENT - SHEET 2

#### DETAILED DESIGN

A 13.03.20 ISSUED FOR 15% DESIGN		REV. DATE		OY		GH	AG	PL	DSN	DRW	CKD	APP	
ORIG SIZE A1		10 20 30 40 50 100mm AT ORIGINAL PLOT SIZE											
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TCY-DJV-YBB-BR-DRG-0001													
CAD DRAWING PATHNAME K:\Engineering & Design\EDR1 Draft Documentation\01_DJV\YBB\BR\18_DRG\TCY-DJV-YBB-BR-DRG-0001.dwg													
REFERENCES													
SCALE : NA (Ø A1) DESIGNED CM DRAWN GH APPROVED FOR ISSUE													
DATUM : HORIZONTAL: PCG20 VERTICAL: AH071													
CHECKED AG													
PTA ACCEPTANCE STAMP													
EXECUTIVE DIRECTOR PTA Design / External Copy Date													
PTA Drawing No: REV : A													



#### DETAILED DESIGN

 Government of Western Australia Public Transport Authority		YANCHEP RAIL EXTENSION
ROAD OVERBRIDGES - LWP2		LOCALITY PLAN
PTA Drawing No:		REV : A



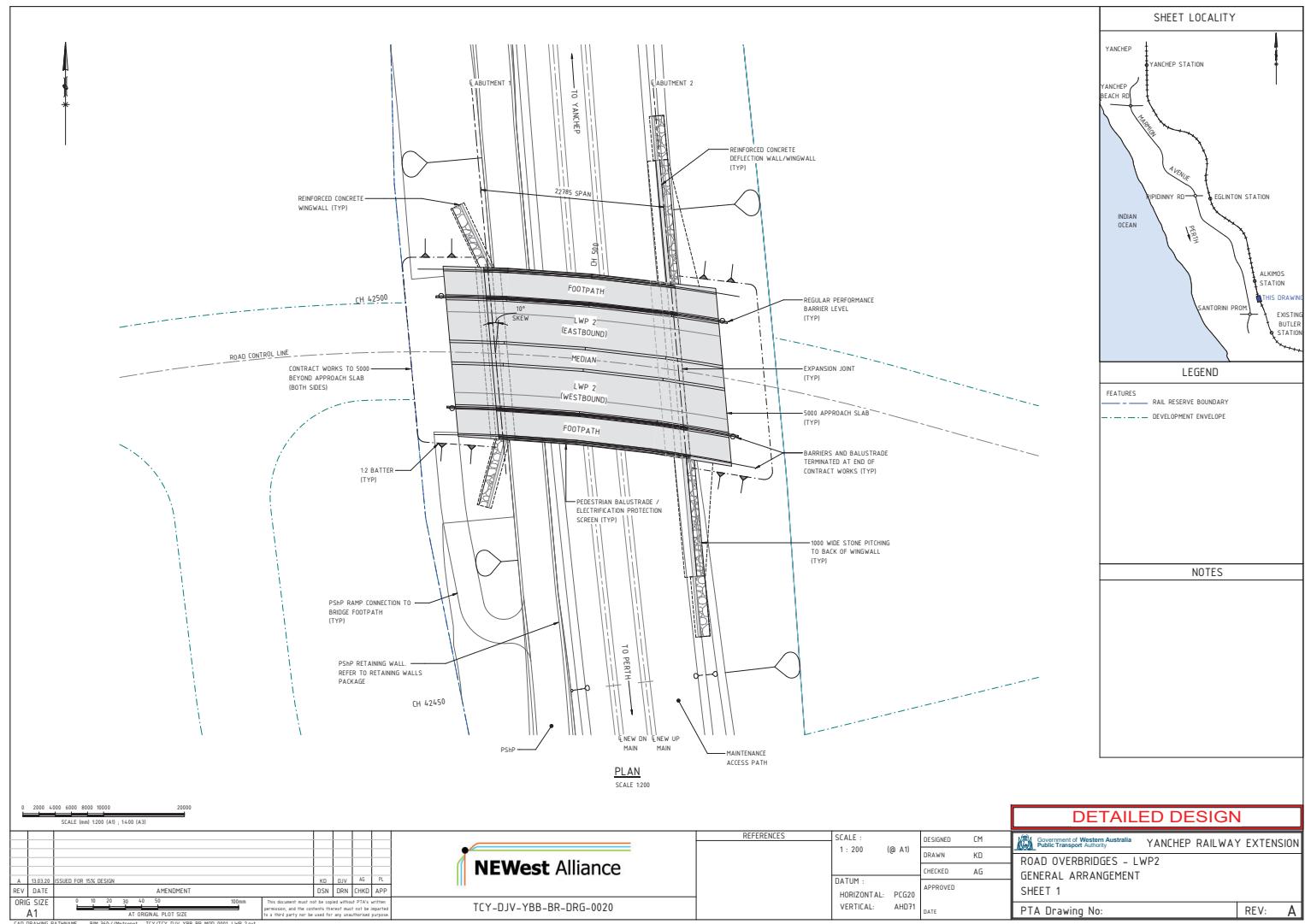
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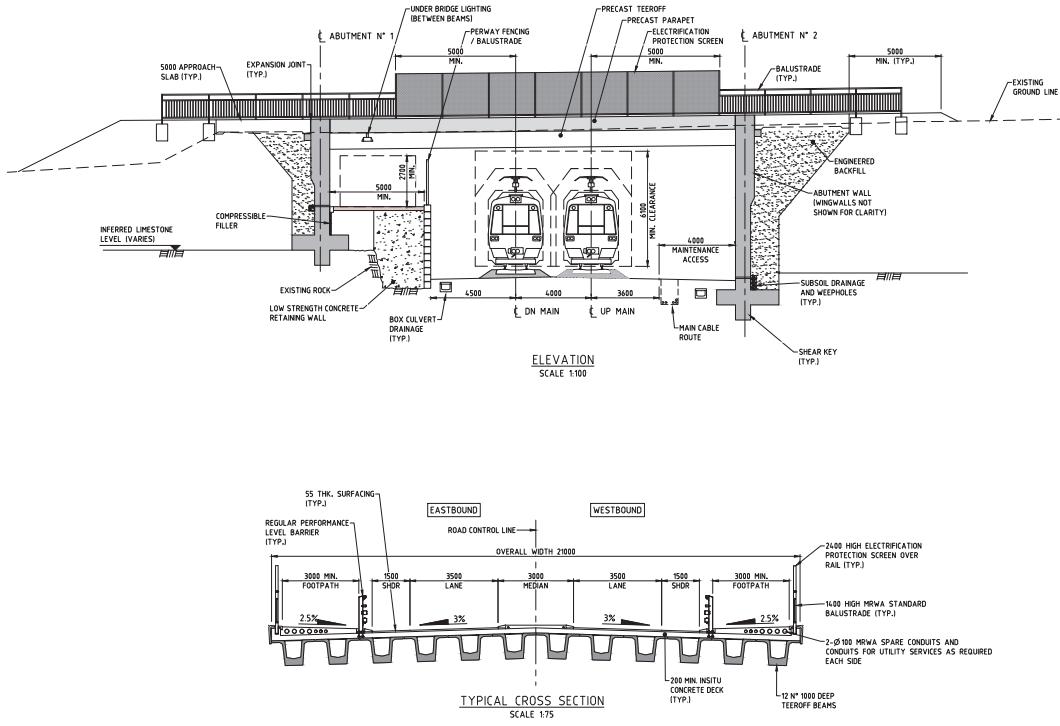
A 13.03.29 ISSUED FOR 15% DESIGN	REV. DATE	OY DSN DRH CHD APP	GH AG PL
A1		AT ORIGINAL PLOT SIZE	150mm

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CAD DRAWING PATHNAME: K:\Engineering & Design\EDR\Draft Documentation\St\_0\YV\YRE\SR1\DRG\TCY-DJV-YBB-BR-DRG-0005.dwg

REFERENCES	SCALE :	DESIGNED	CM
TD-001-B-000-000-00 TD-001-B-000-000-00-UK	1:25000 (B A1)	DRAWN	GH
DATUM :		CHECKED	AG
HORIZONTAL: PCG20		APPROVED FOR ISSUE	
VERTICAL: AH071		EXECUTIVE DIRECTOR	
		PTA Director / Executive Director Copy	
		DATE	



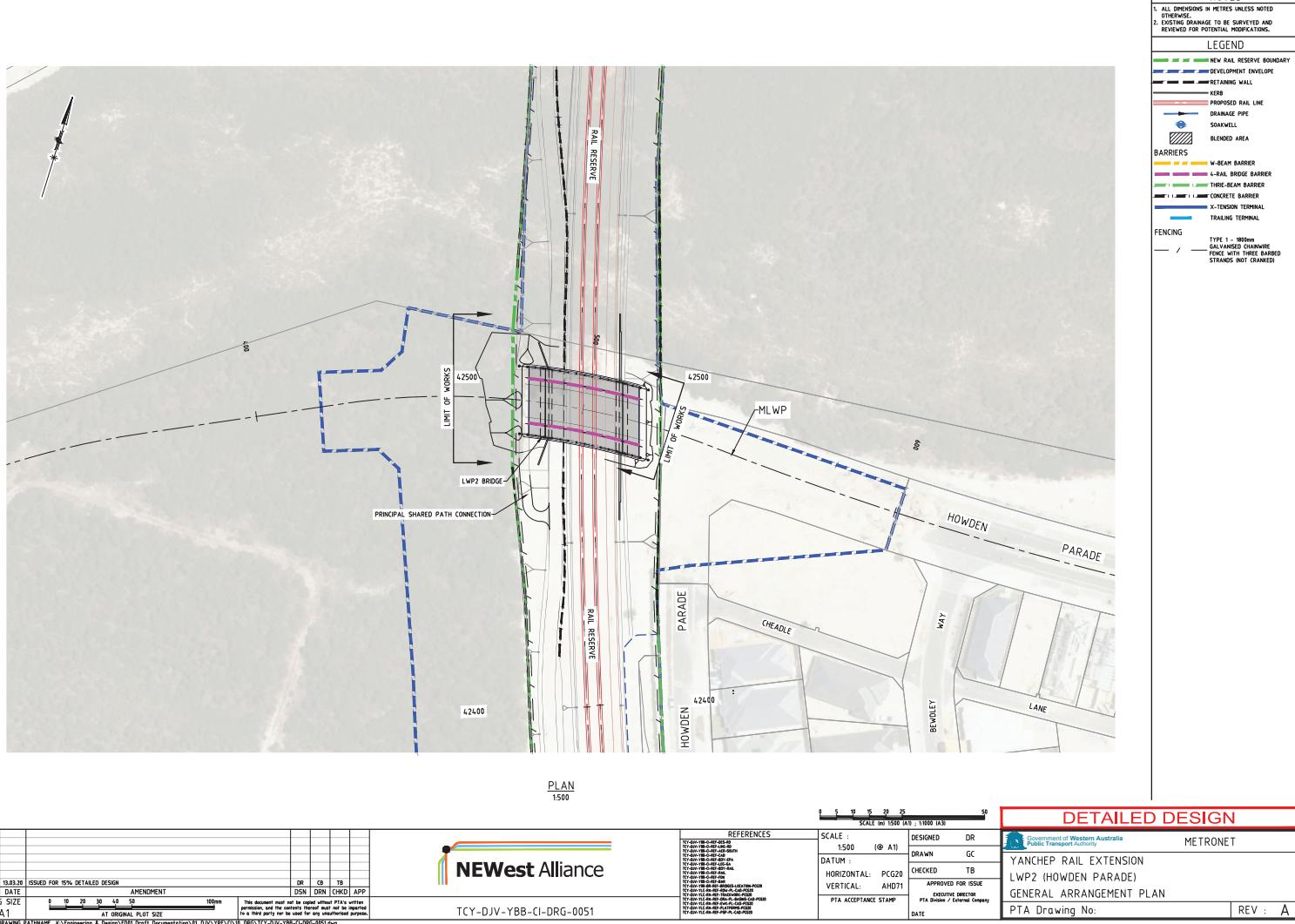


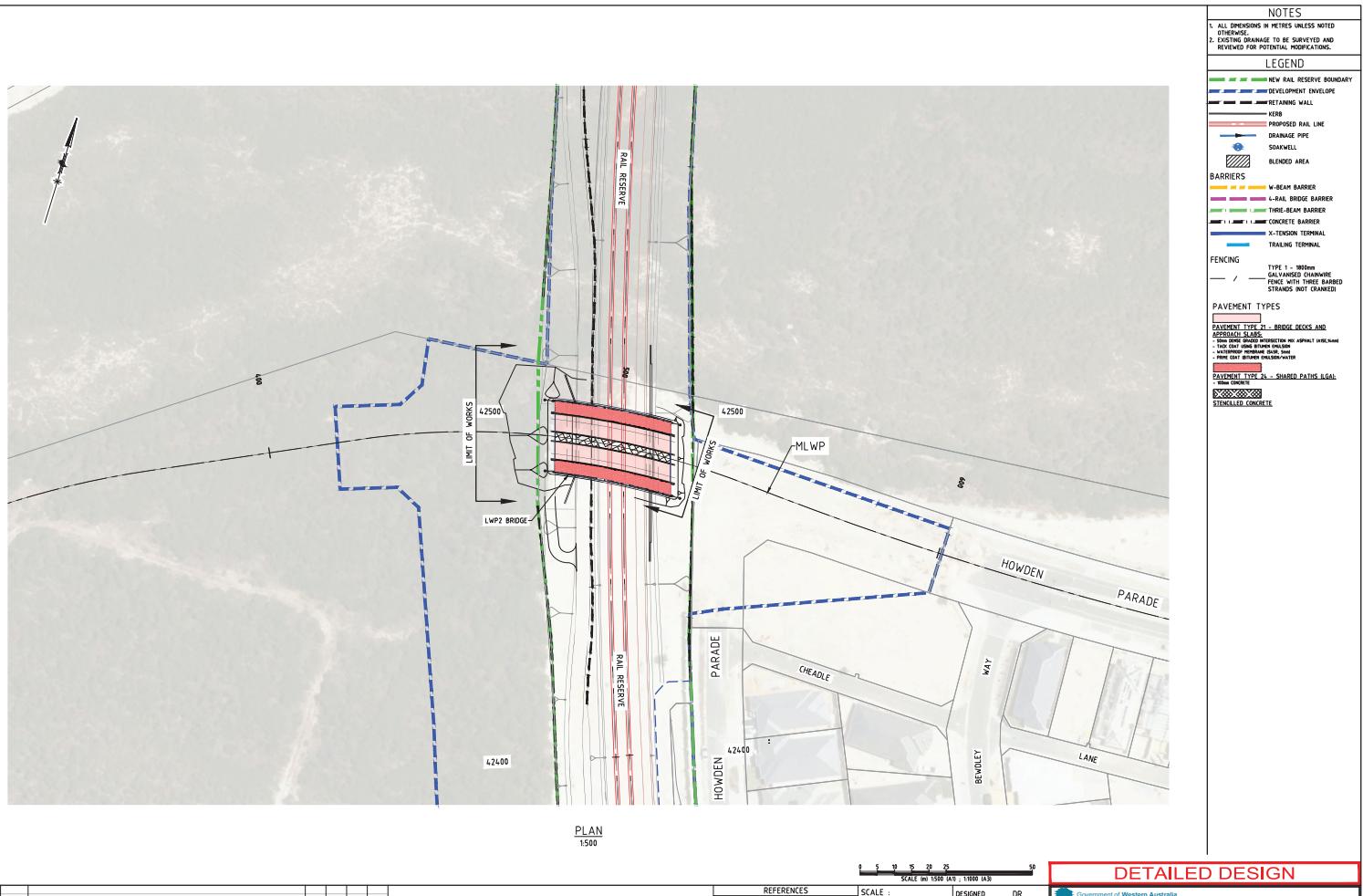
A. 10/13/26	ISSUED FOR 15% DESIGN	CH	GH	AD	P.
REV. SIZE	AMENDMENT	DSN	DSN	DSN	APPROVED
ORIG. SIZE					
A1	100mm				
AT ORIGINAL PLOT SIZE		This document must be retained for at least 15 years from the date of issuance, and the owners thereof must not be represented by anyone other than the original issuer or its authorized representative.			



<b>REFERENCES</b> TCY-DIV-YBB-BB-REF-B8DGE-PDF TCY-DIV-YBB-BB-REF-B8DGE-XS	<b>SCALE :</b> 1:100 ( @ A1 )	<b>DESIGNED :</b> CM	<b>DETAINED DESIGN</b>	
	<b>DATUM :</b>	<b>DRAWN :</b>	Government of Western Australia Public Transport Authority	
	<b>HORIZONTAL :</b> PGCG 20	<b>CHECKED :</b> AG	YANCHEP RAIL EXTENSION	
	<b>VERTICAL :</b> AHD71	<b>APPROVED FOR ISSUE :</b>	ROAD OVERBRIDGES - LWP2	
	<b>PTA ACCEPTANCE STAMP</b>	<b>EXECUTIVE DIRECTOR</b> PTA / External Company DATE:	GENERAL ARRANGEMENT	
			SHEET 2	
		<b>PTA Drawing No:</b>	<b>REV :</b>	A

## DETAILED DESIGN





### DETAILED DESIGN

REFERENCES									
TQ-001-B-000-000-00	SCALE :	1:500	(@ A1)	DESIGNED BY	DR	C8	TB	APPROVED FOR ISSUE	PTA Acceptance Stamp
TQ-001-B-000-000-00	DATUM :			DRAWN BY	CB			YANCHEP RAIL EXTENSION	DATE
TQ-001-B-000-000-00	HORIZONTAL:	PCG20		CHECKED BY				LWP2 (HOWDEN PARADE)	
TQ-001-B-000-000-00	VERTICAL:	AHD01		EXECUTIVE DIRECTOR				PAVEMENT PLAN	
TQ-001-B-000-000-00				PTA Design / External Company				PTA Drawing No:	REV :

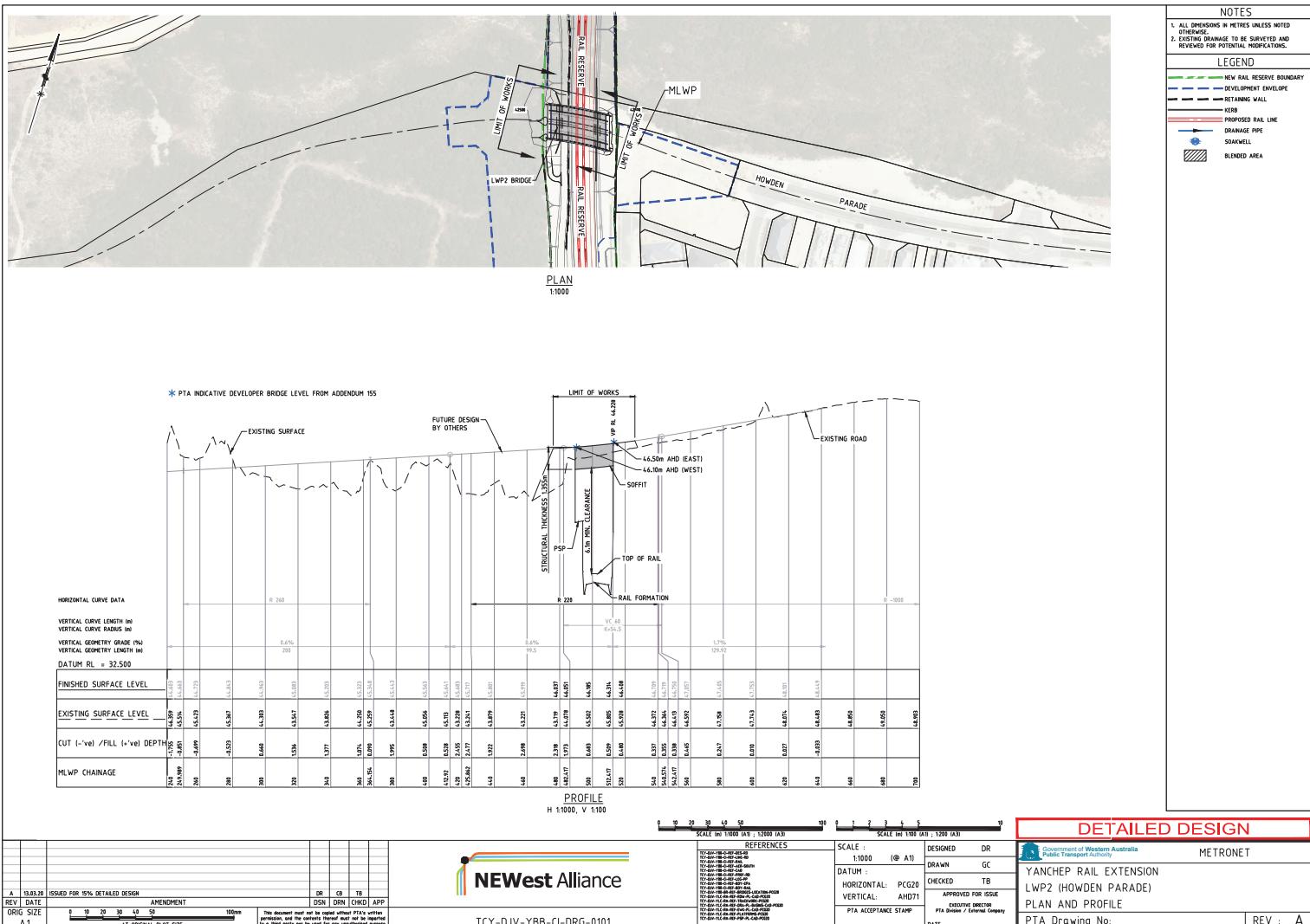
A 13.03.20 ISSUED FOR 15% DETAILED DESIGN  
REV. DATE DR CR TB  
ORIG SIZE 0 10 20 30 40 50 100mm  
A1 AT ORIGINAL PLOT SIZE

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CAD DRAWING PATHNAME K:\Engineering & Design\DRG Draft Documentation\11\_DJV\YBB\YBB-DRG\TCY-DJV-YBB-C-002-002.dwg



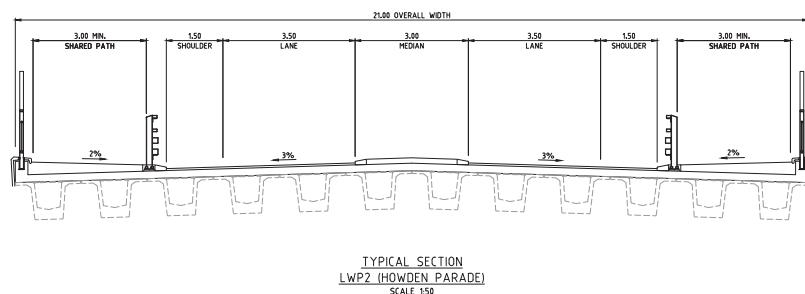
TCY-DJV-YBB-CI-DRG-0052



## NOTES

1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.

2. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.



0 5.5 11.5 22.5 33.5 44.5

SCALE (in 158 (A1) : 118 (A3))

## DETAILED DESIGN

A 13.03.20	ISSUED FOR 15% DETAILED DESIGN	DR	CB	TD
REV. DATE		DSN	DRW	OKD APP
ORIG SIZE A1	0 10 20 30 40 50 150mm	This document must be copied without PTA's written permission if it is to be given to another party or made available to a third party or to be used for any unauthorised purpose.		

AT ORIGINAL PLOT SIZE

CAD DRAWING PATH NAME: K:\Engineering & Design\DRG Draft Documentation\11\_DRAFT\YBB\DRG\TCY-DJV-YBB-C-080-015.dwg



TCY-DJV-YBB-CI-DRG-0151

REFERENCES		SCALE :	DESIGNED	DR
10-04-18-000-010		1:50 (B1)	DRAWN	GC
DATUM :			CHECKED	TB
HORIZONTAL: PCG20			APPROVED FOR ISSUE	
VERTICAL: AH071				
PTA ACCEPTANCE STAMP			EXECUTIVE DIRECTOR	
			PTA Director / External Company	
			DATE	
			PTA Drawing No:	
				REV : A

Government of Western Australia

Public Transport Authority

METRONET

YANCHEP RAIL EXTENSION

LWP2 (HOWDEN PARADE)

TYPICAL CROSS SECTION

PTA Drawing No:

# NEWest ALLIANCE

## YANCHEP RAIL EXTENSION

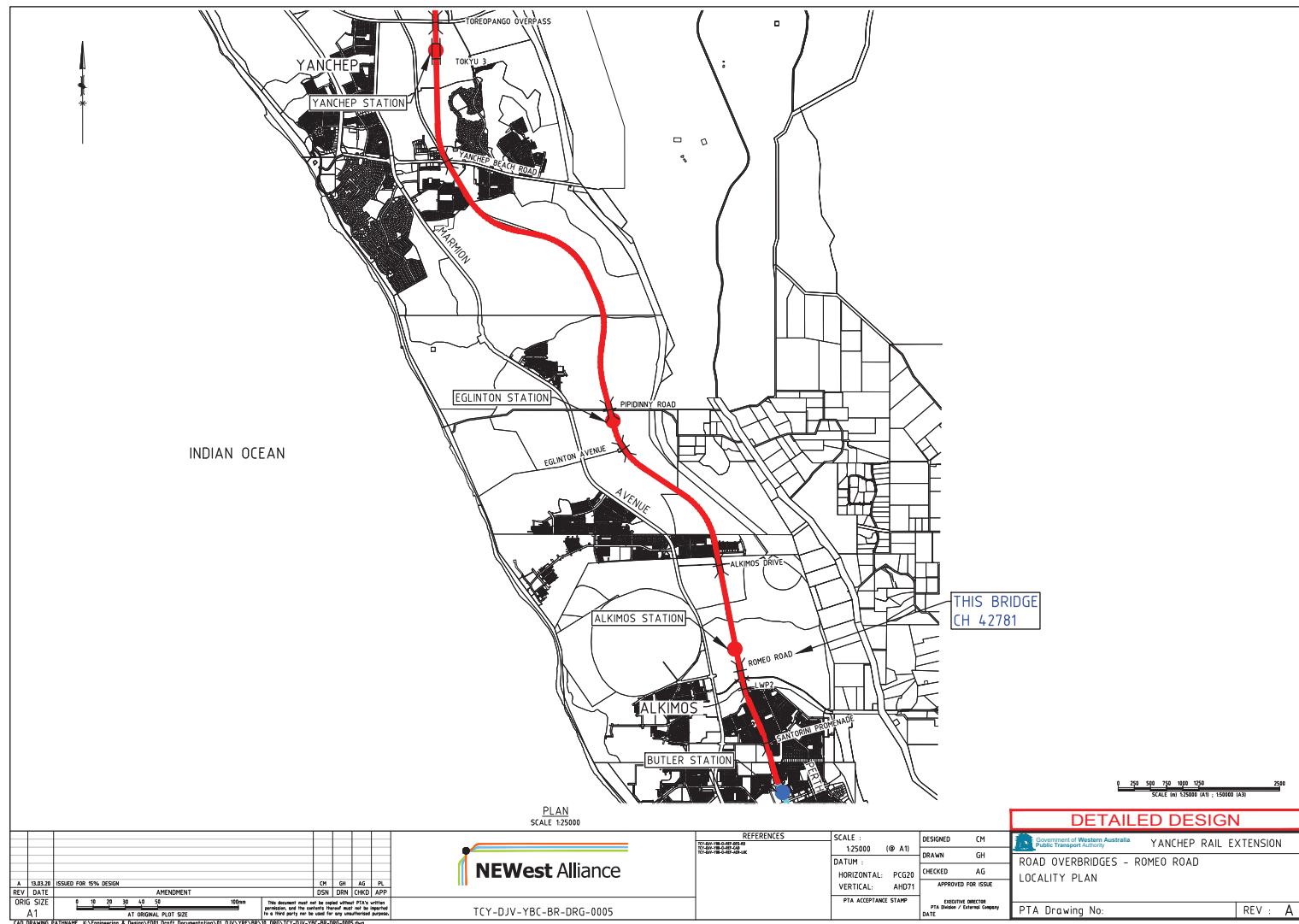
### PACKAGE 04 - ROAD OVERBRIDGES

### ROMEO ROAD (CH 42781)

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	NEWest	PTA	
A	TCY-DJV-YBC-BR-DRG-001		DRAWING INDEX
A	TCY-DJV-YBC-BR-DRG-0105		LOCALITY PLAN
A	TCY-DJV-YBC-BR-DRG-0120		GENERAL ARRANGEMENT - SHEET 1
A	TCY-DJV-YBC-BR-DRG-0021		GENERAL ARRANGEMENT - SHEET 2

#### DETAILED DESIGN

A 13.03.29 ISSUED FOR 15% DESIGN		REV. DATE	AMENDMENT	OR	GH	AG	PL	DSN	DRW	CKD	APP
ORIG SIZE \$ 10 20 30 40 50 150mm AT ORIGINAL PLOT SIZE											
A1 CAD DRAWING PATHNAME K:\Engineering & Design\EDR1 Draft Documentation\11_DJV\YBC\BR\1_DRG\TCY-DJV-YBC-BR-DRG-001.dwg											
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TCY-DJV-YBC-BR-DRG-0001											
REFERENCES											
SCALE : NA (Ø A1) DESIGNED CM DRAWN GH APPROVED FOR ISSUE											
DATUM : HORIZONTAL: PCG20 VERTICAL: AH071											
PTA ACCEPTANCE STAMP EXECUTIVE DIRECTOR PTA Director / External Copyist DATE											
Government of Western Australia Public Transport Authority YANCHEP RAIL EXTENSION ROAD OVERBRIDGES - ROMEO ROAD DRAWING INDEX											
PTA Drawing No: REV : A											

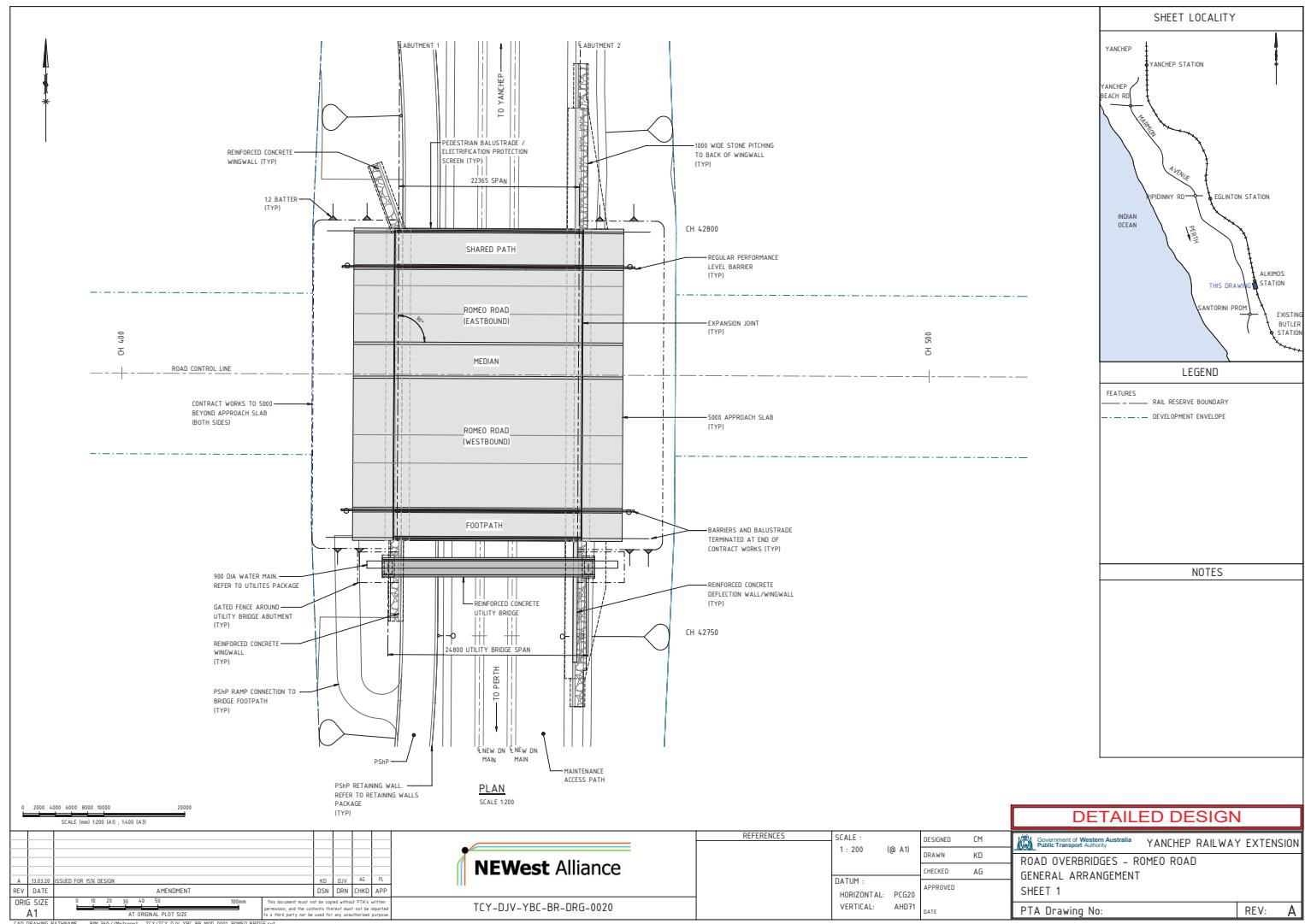


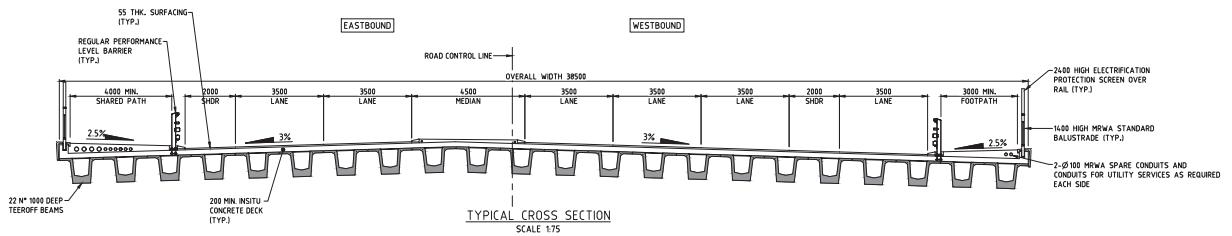
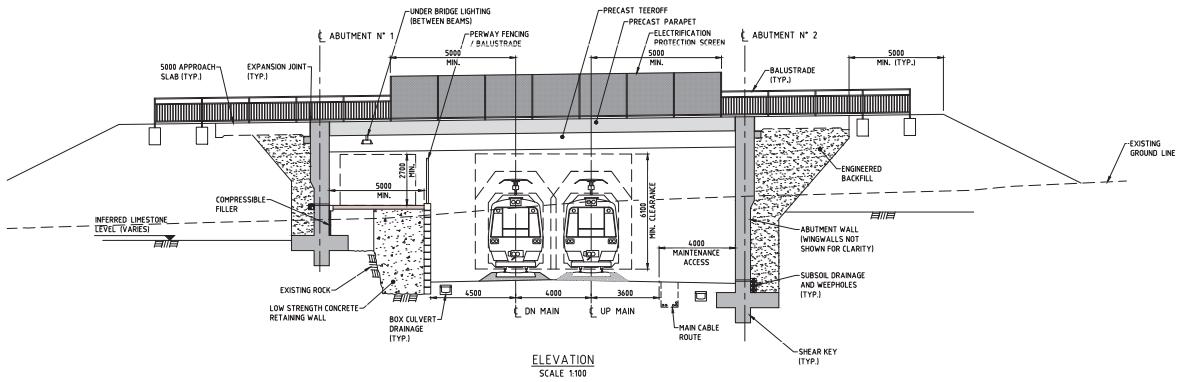
#### DETAILED DESIGN

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A1		AT ORIGINAL PLOT SIZE				TCY-BR-0001-0002 TCY-BR-0001-0003-UK	DRAWN GH	
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<p>PTA ACCEPTANCE STAMP</p> <p>EXECUTIVE DIRECTOR PTA Director / External Copy DATE</p> <p>PTA Drawing No:</p> <p>REV : A</p>								

**NEWest Alliance**

Government of Western Australia  
Public Transport Authority  
YANCHEP RAIL EXTENSION  
ROAD OVERBRIDGES - ROMEO ROAD  
LOCALITY PLAN





A	13.01.20	ISSUED FOR 15% DESIGN				CM	GH	AD	PL
REV	DATE	AMENDMENT				DSN	DRN	CWD	APP
ORIGIN	SIZE	16	20	30	40	50	100m		
A.1	AT ORIGINAL PLOT SIZE								

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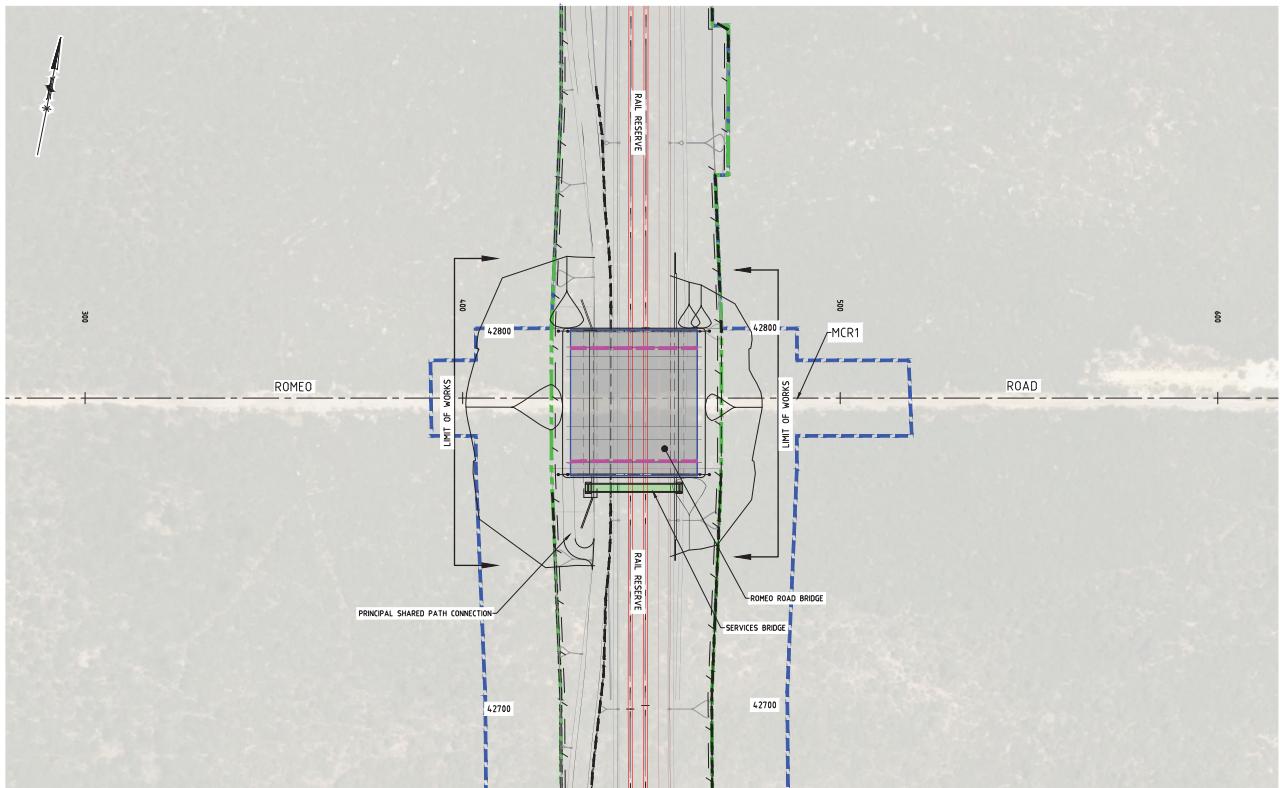
REFERENCES		SCALE : 1:100 (A1)	DESIGNED BY : DRAWN BY : DRAFTED BY :	CM GH AH01	Government of Western Australia Public Transport Authority	YANCHEP RAIL EXTENSION
TCV-03V-Y01-BR-REF-BR002-WH05 TCV-03V-Y01-BR-REF-BR002-AUT-ELEV TCV-03V-YB-C-BR-REF-BR002-X3 TCV-03V-YB-BR-REF-BR002-X3		DATUM :  HORIZONTAL : PCG20 VERTICAL : AH01	APPROVED FOR ISSUE		ROAD OVERBRIDGES – ROMEO ROAD GENERAL ARRANGEMENT SHEET 2	
		PTA ACCEPTANCE STAMP	EXECUTIVE DIRECTOR PTA Director / Executive Company Name / Position		PTA Drawing No: REV: A	

### NOTES

- ALL DIMENSIONS IN METRES UNLESS NOTED
- EXISTING DRAINAGE TO BE SURVEYED AND REVIEWED FOR POTENTIAL MODIFICATIONS.

### LEGEND

	NEW RAIL RESERVE BOUNDARY
	DEVELOPMENT ENVELOPE
	RETAINING WALL
	KERB
	PROPOSED RAIL LINE
	DRAINAGE PIPE
	SOILWELL
	BLENDED AREA
<b>BARRIERS</b>	
	V-BEAM BARRIER
	L-BEAM BRIDGE BARRIER
	THREE-BEAM BARRIER
	CONCRETE BARRIER
	X-TENSION TERMINAL
	TRAILING TERMINAL
<b>FENCING</b>	
	TYPE 1 - 1.8M GALVANISED CHAINWIRE FENCE WITH THREE BARBED STRANDS (NOT RANKLED)



PLAN  
1:500

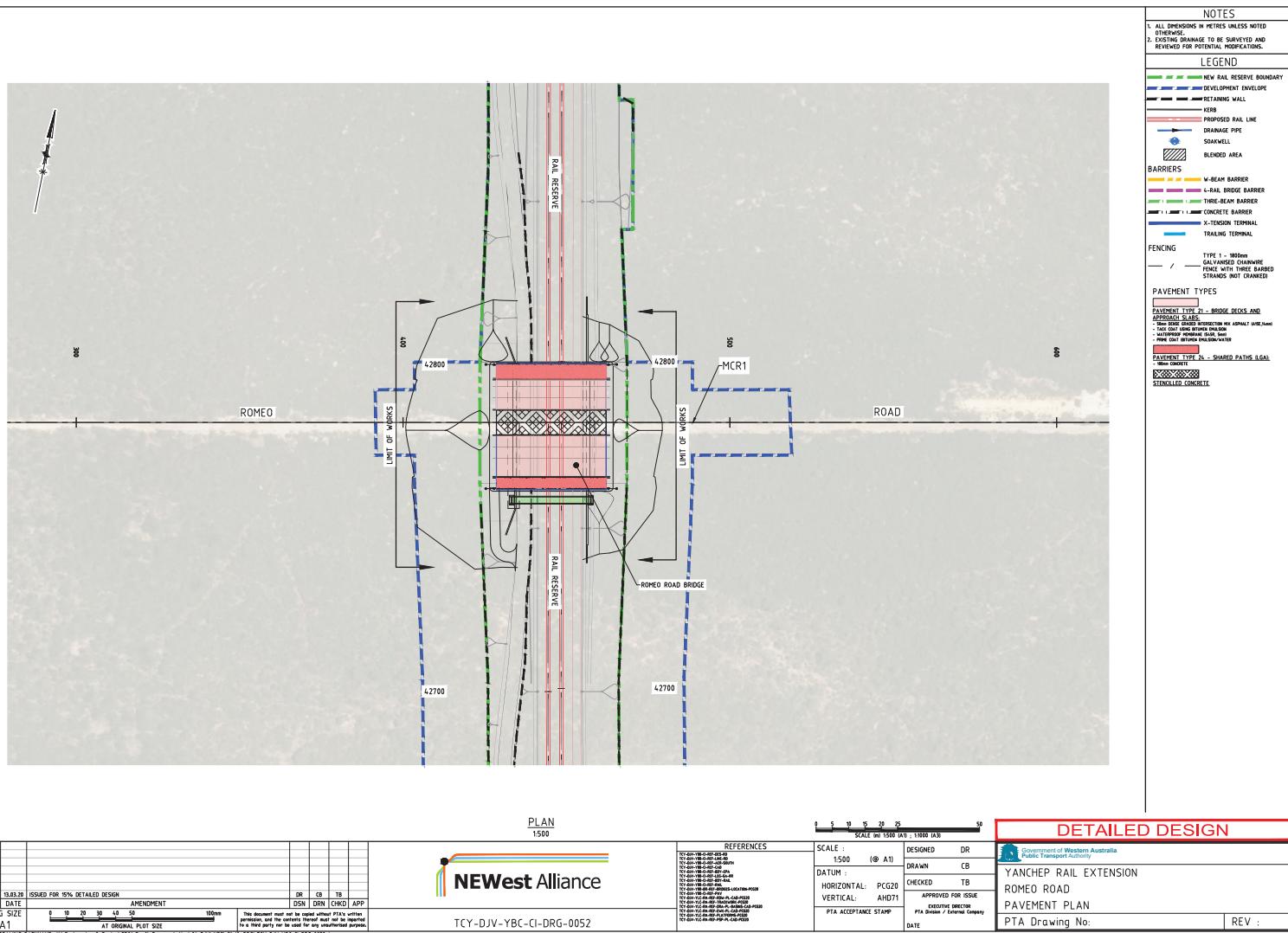
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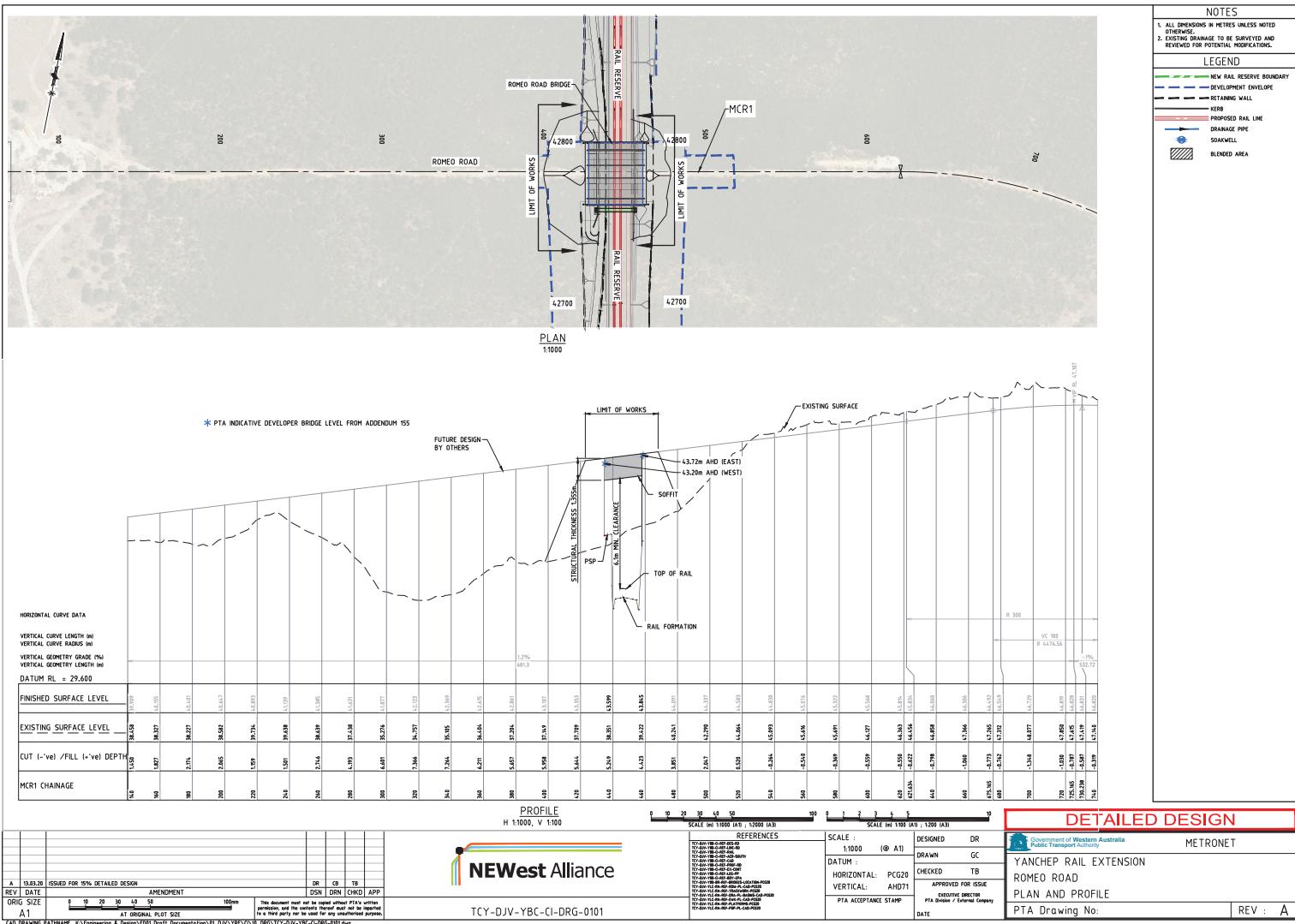
### DETAILED DESIGN



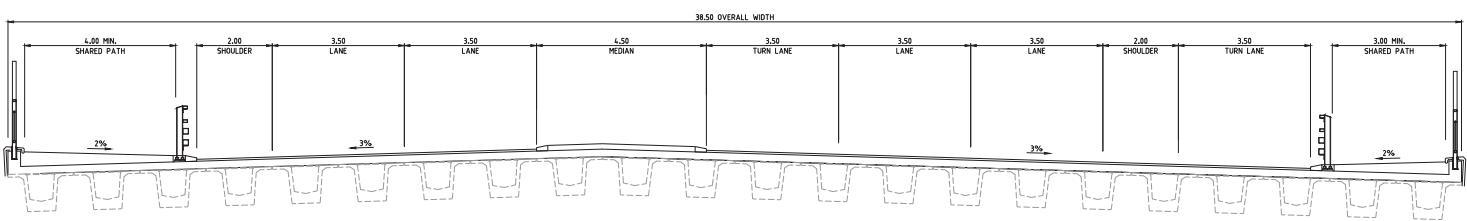
TCY-DJV-YBC-CI-DRG-0051

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NOTES  
 1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.  
 2. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.



TYPICAL SECTION  
ROMEO ROAD  
SCALE 1:50

5 5.5 1 15 2 25 5  
SCALE (m 1:50 (A) : 1:100 (A))

**DETAILED DESIGN**

A 13.03.20 ISSUED FOR 15% DETAILED DESIGN										DR	CB	TD	REFERENCES	SCALE :	DESIGNED	DR	METRONET
REV. DATE	13.03.20	AMENDMENT	DR	CB	TD	DSN	DRW	OKD	APP				TCY-DRG-0151	1:50 (B A)	DRAWN	GC	
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A1							AT ORIGINAL PLOT SIZE							HORIZONTAL: PCG20	CHECKED	TB	YANCHEP RAIL EXTENSION
CAD DRAWING PATH NAME	K:\Engineering & Design\DRG Draft Documentation\15% DRAFT\YANCHEP\15% DRG\TCY-DJV-YBC-CI-DRG-0151.dwg												VERTICAL: AH071	APPROVED FOR ISSUE		ROME ROAD	
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																REV : A	

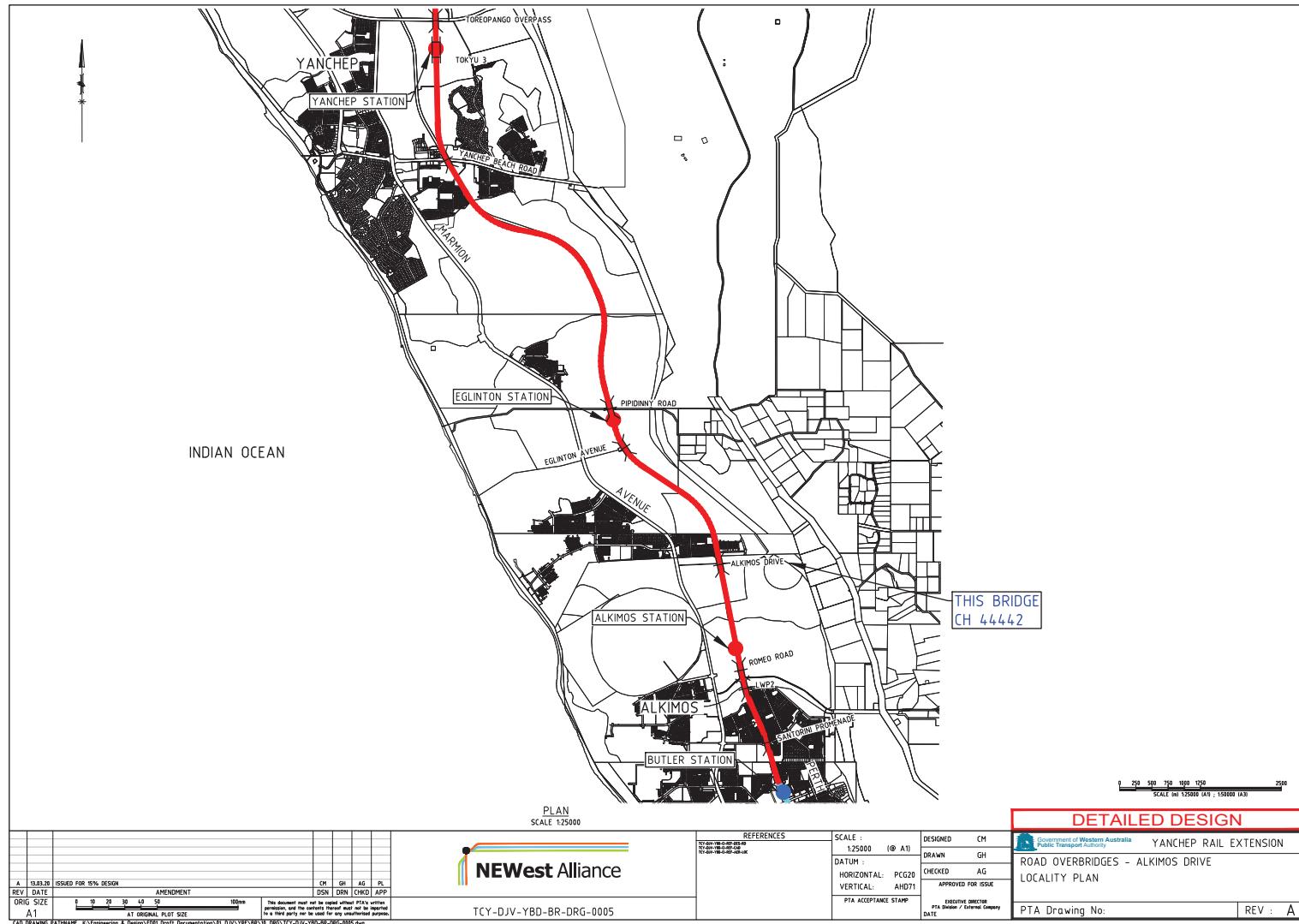


TCY-DJV-YBC-CI-DRG-0151

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**NEWest ALLIANCE  
YANCHEP RAIL EXTENSION  
PACKAGE 04 - ROAD OVERBRIDGES  
ALKIMOS DRIVE (CH 44442)**

REV. No.	DRAWING NUMBER		DRAWING TITLE
	NEW	PTA	
A	TCT-DV-YBD-080-0001		DRAWING INDEX
A	TCT-DV-YBD-080-4005		LOCALITY PLAN
A	TCT-DV-YBD-080-4023		GENERAL ARRANGEMENT - SHEET 1
A	TCT-DV-YBD-080-0021		GENERAL ARRANGEMENT - SHEET 2

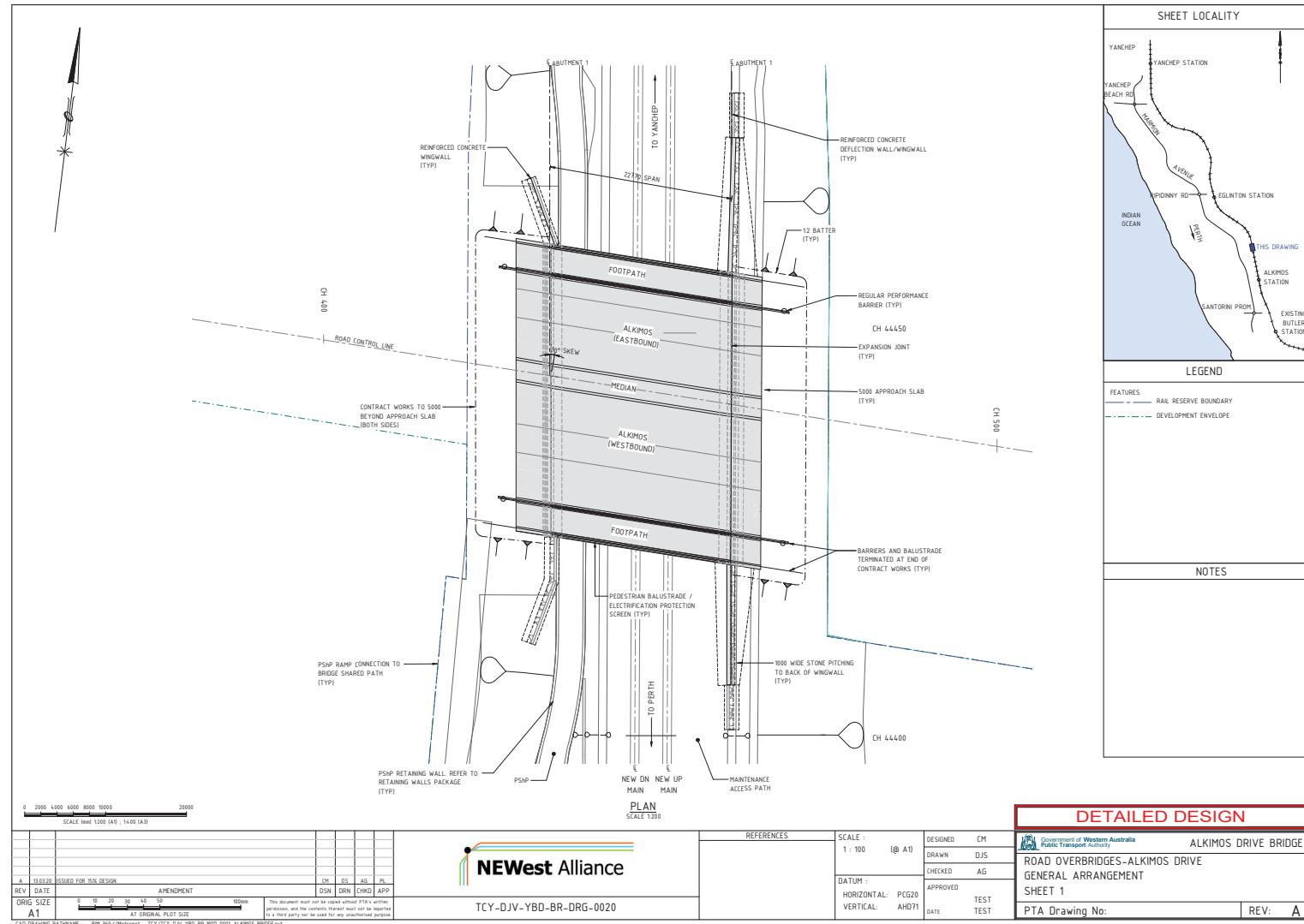


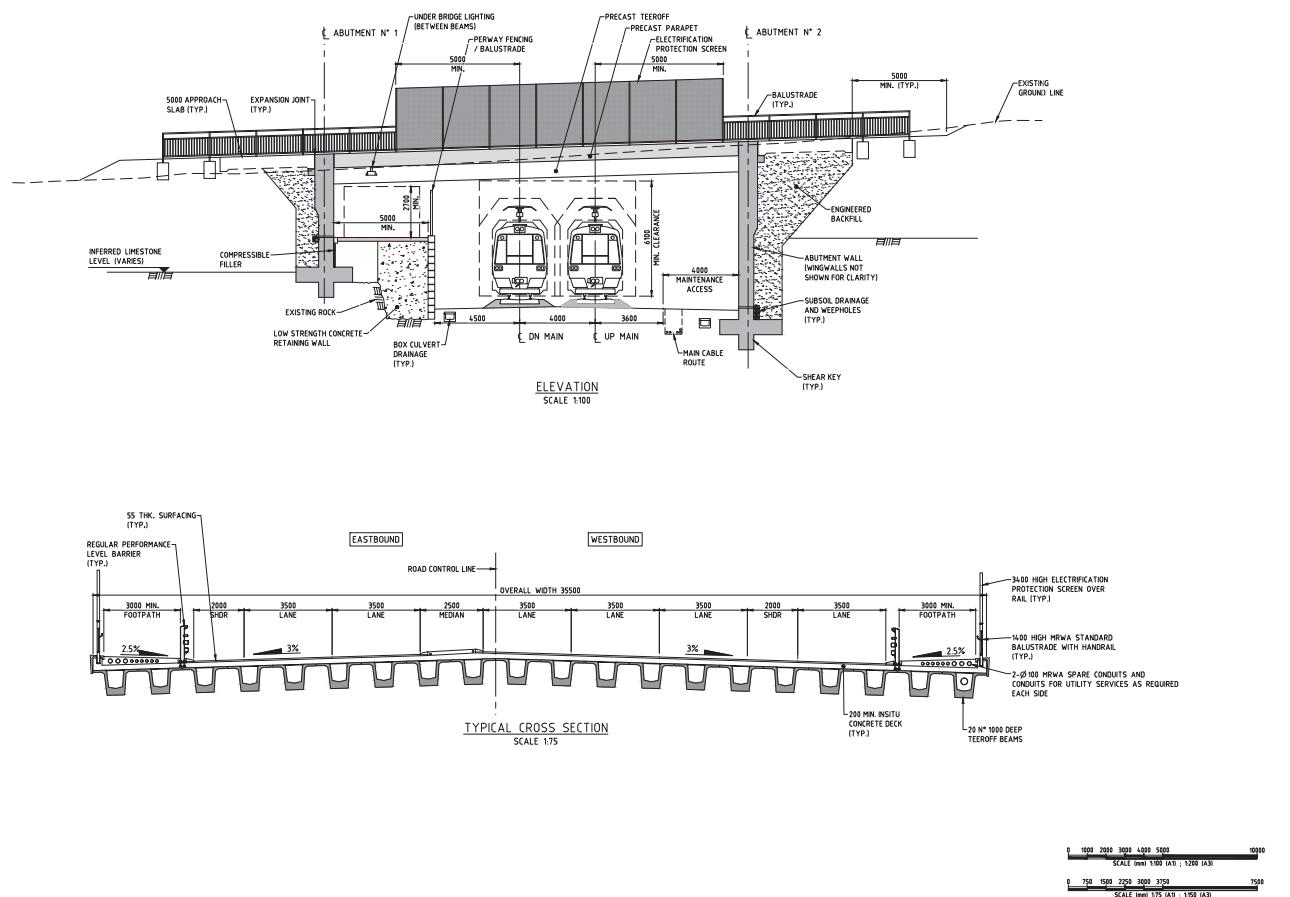
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CAD DRAWING PATHNAME K:\Engineering & Design\EDRI Draft Documentation\11_DRAFT\YANCHEP RAIL EXTENSION\11_YANCHEP RAIL EXTENSION\TCY-DJV-YBD-BR-DRG-0005.dwg							PTA ACCEPTANCE STAMP EXECTIVE DIRECTOR PTA Drawing / External Copy DATE	P T A Drawing No: REV : A

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Government of Western Australia  
Public Transport Authority  
YANCHEP RAIL EXTENSION  
ROAD OVERBRIDGES - ALKIMOS DRIVE  
LOCALITY PLAN





A	13.03.20	ISSUED FOR 15% DESIGN	REV. DATE	OY	GH	AG	PL
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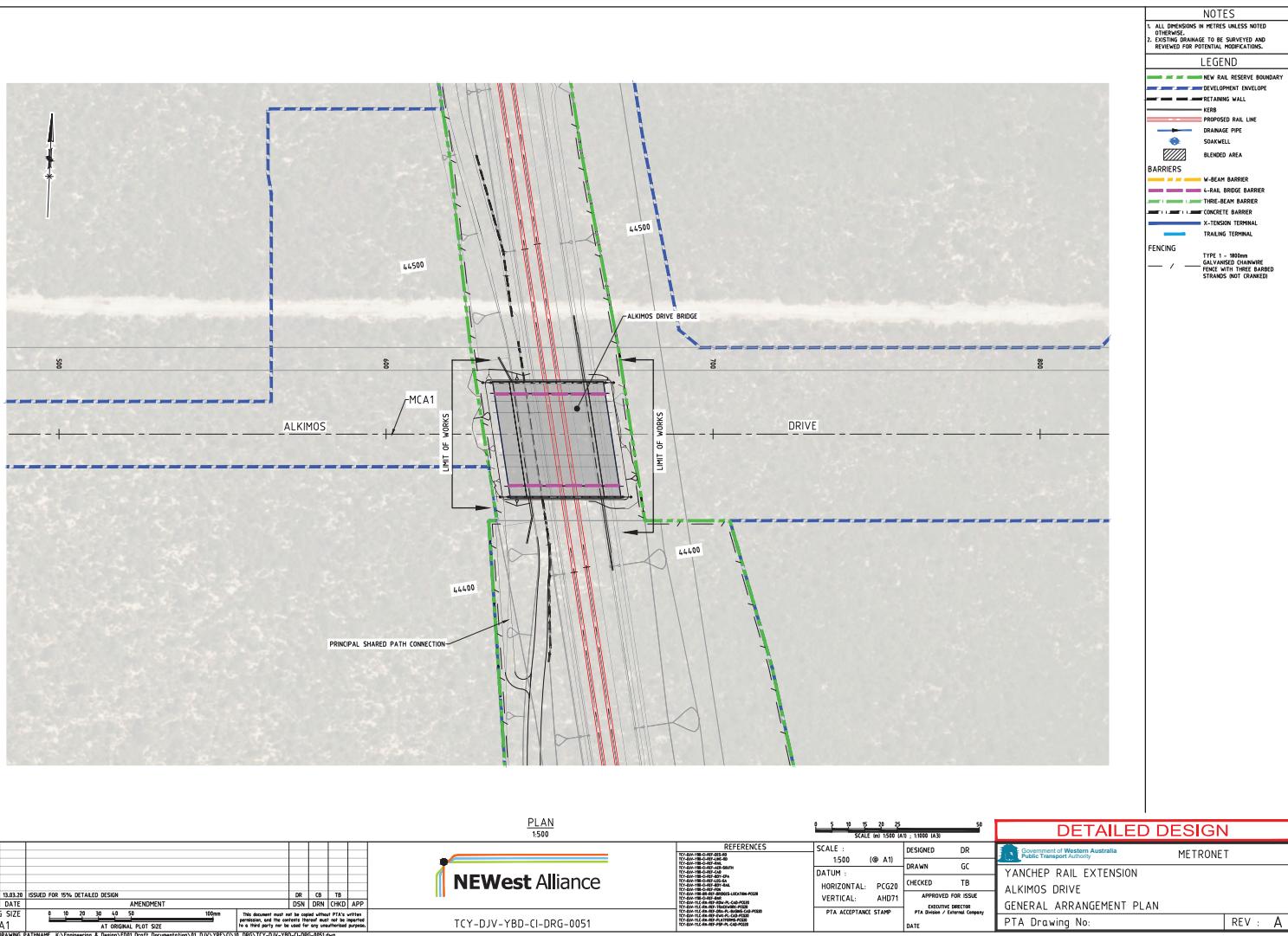
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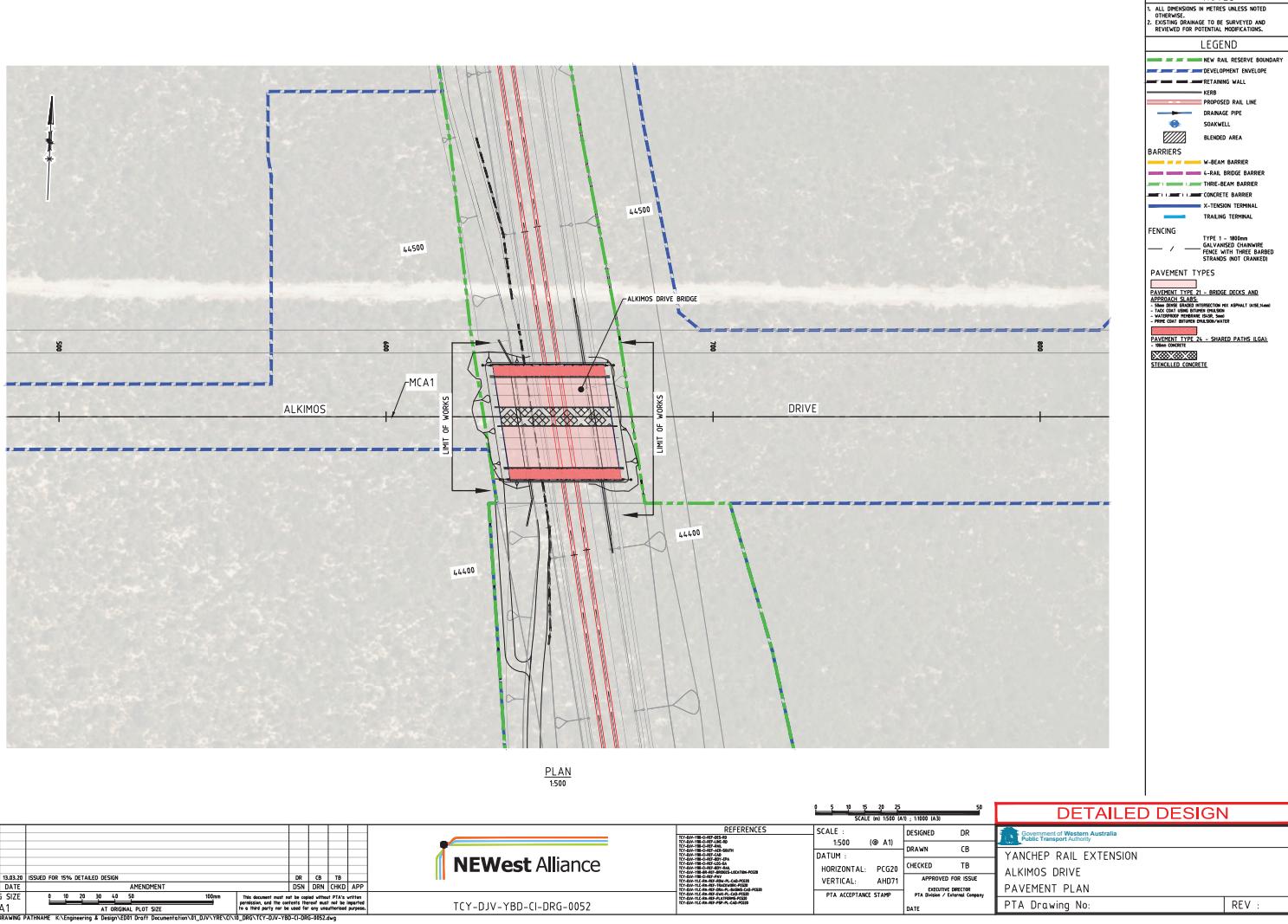


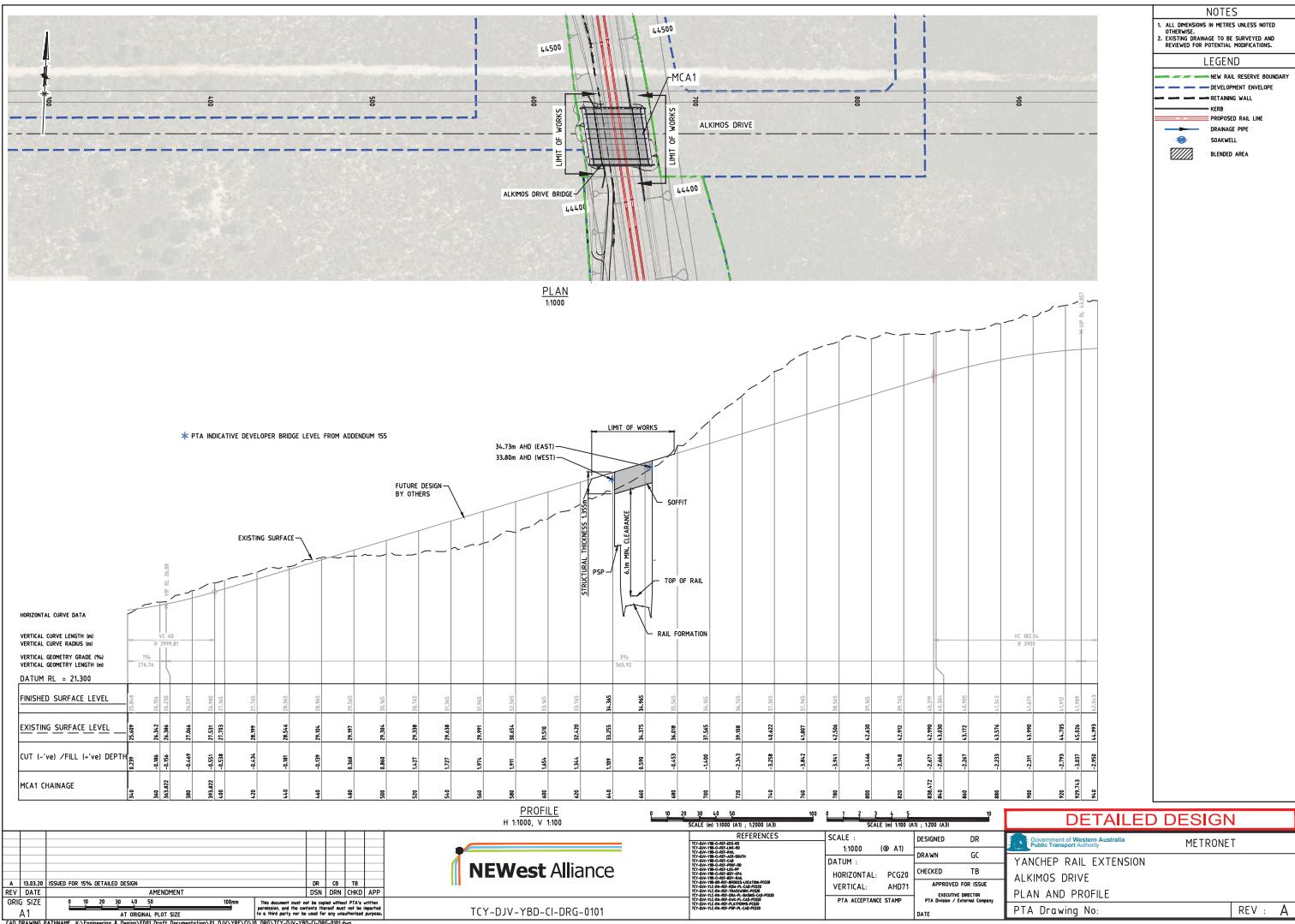
TCY-DJV-YBD-DRG-0021

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			EXECUTIVE DIRECTOR PTA Design / External Copy DATE	

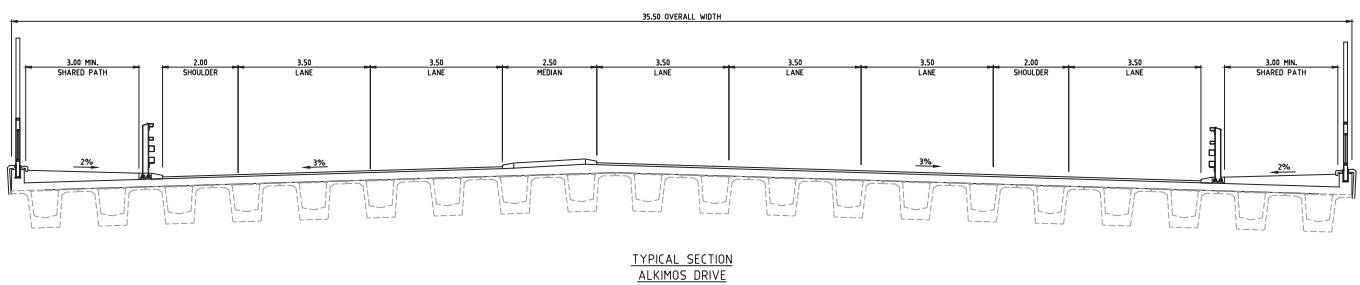
Government of Western Australia  
Transport Department  
YANCHEP RAIL EXTENSION  
ROAD OVERBRIDGES - ALKIMOS DRIVE  
GENERAL ARRANGEMENT  
SHEET 2  
PTA Drawing No: 175 (A1) - 159 (A3)  
REV : A







NOTES  
 1. ALL DIMENSIONS IN METRES UNLESS NOTED OTHERWISE.  
 2. REFER TO STRUCTURAL DRAWINGS FOR DETAILS.



TYPICAL SECTION  
ALKIMOS DRIVE  
SCALE 1:50

5 5.5 1 15 2 25 5  
SCALE (in 150 (A) : 1:50 (A))

**DETAILED DESIGN**

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REV. DATE	0	10	20	30	40	50	100mm									TCY-DRG-0151	DATUM :	1:50 (B A)	DRAWN	GC	YANCHEP RAIL EXTENSION
ORIG SIZE	A1	AT ORIGINAL PLOT SIZE														HORIZONTAL: PCG20	VERTICAL: AHDT1	CHECKED	TB	ALKIMOS DRIVE	
<small>This document must not be copied without PTA's written permission. It is the copyright of the State of Western Australia and is a third party document to be used for any unauthorised purpose.</small>															APPROVED FOR ISSUE	EXECUTIVE DIRECTOR	PTA Director / External Company	PTA Drawing No:	REV : A		
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## **APPENDIX F**

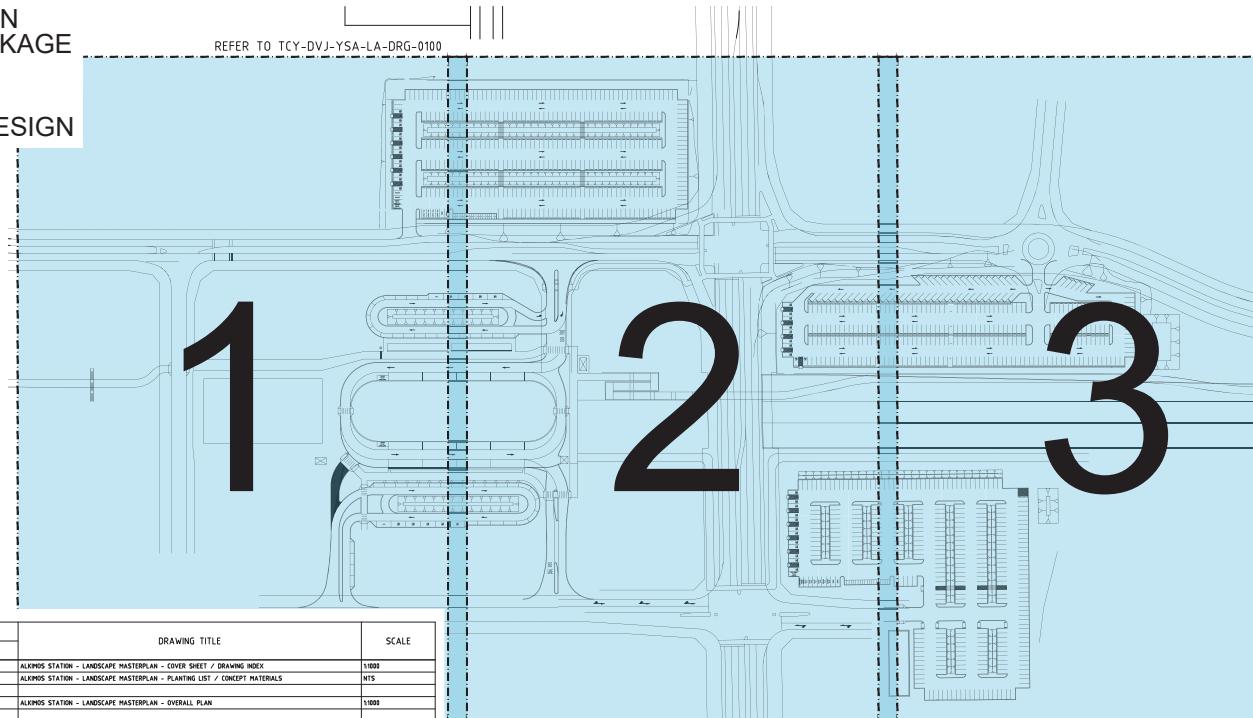
## **LANDSCAPING PLANS**

# NEWest ALLIANCE YANCHEP RAIL EXTENSION

## ALKIMOS STATION LANDSCAPE PACKAGE

YSA LANDSCAPE  
15% DETAILED DESIGN

REFER TO TCY-DVJ-YSA-LA-DRG-0100



REV No.	DRAWING NUMBER		DRAWING TITLE	SCALE
	Newest	PTA		
A	TCY-DIV-YSA-LA-ORG-0001		ALKIMOS STATION - LANDSCAPE MASTERPLAN - COVER SHEET / DRAWING INDEX	1/100
A	TCY-DIV-YSA-LA-ORG-0002		ALKIMOS STATION - LANDSCAPE MASTERPLAN - PLANTING LIST / CONCEPT MATERIALS	NTS
A	TCY-DIV-YSA-LA-ORG-0011		ALKIMOS STATION - LANDSCAPE MASTERPLAN - OVERALL PLAN	1/100
A	TCY-DIV-YSA-LA-ORG-0016		ALKIMOS STATION - LANDSCAPE MASTERPLAN - TYPICAL LANDSCAPE DETAILS - SHEET 1	1/10
A	TCY-DIV-YSA-LA-ORG-0051		ALKIMOS STATION - LANDSCAPE MASTERPLAN - TYPICAL LANDSCAPE DETAILS - SHEET 2	1/10
A	TCY-DIV-YSA-LA-ORG-0052		ALKIMOS STATION - LANDSCAPE MASTERPLAN - TYPICAL LANDSCAPE DETAILS - SHEET 3	1/10 / 120
A	TCY-DIV-YSA-LA-ORG-1001		ALKIMOS STATION - LANDSCAPE MASTERPLAN - SURFACE FINISHES - SHEET 1	1500
A	TCY-DIV-YSA-LA-ORG-0101		ALKIMOS STATION - LANDSCAPE MASTERPLAN - SURFACE FINISHES - SHEET 2	1500
A	TCY-DIV-YSA-LA-ORG-0102		ALKIMOS STATION - LANDSCAPE MASTERPLAN - SURFACE FINISHES - SHEET 3	1500

REFER TO TCY-DVJ-YSA-LA-DRG-010

REF ID: A65432

ALKIMOS STATION - LANDSCAPE COVER SHEET  
SCALE 1:1000



REFERENCES		SCALE : 1:1000 (A1)	DESIGNED BY : DRAWN BY :	APPROVED FOR ISSUE :	YANCHEP RAIL EXTENSION
DATUM :		HORIZONTAL : PG20 VERTICAL : ADH11	CHECKED BY : FM_PF	ALKIMOS STATION LANDSCAPE MASTERPLAN COVER SHEET / DRAWING INDEX	
PTA ACCEPTANCE STAMP		EXECUTIVE DIRECTOR PTA Division / External Category	PTA Drawing No: REV : A		

**ALKIMOS STATION** Landscape Concept (Gnarri Biddi "Our Pathways" - Plains / Sand Dunes / Coast) **FEATURE COLOUR FOR LANDSCAPE - YELLOW**

Category	Plant Name	Type	Description	Soil Type	Flower	Lighting	
Ground Cover	<i>Arenaria sericea</i>	Coastal Soil-cover	Full Sun / Part Shade	All soils including coastal	Spring	(Available Luffitz Nursery)	
	<i>Carpobrotus glaucescens</i>	Coastal Pigface	Full Sun	All soils including coastal	Summer	(Available Luffitz Nursery)	
	<i>Grevillea obtusifolia</i>	Orange Grevillea	Full Sun / Spring	All soils including coastal	Summer	(Available Luffitz Nursery)	
	<i>Malaleuca hispidula prostrata</i>	Ground cover	Full Shade / Full Sun	All soils including coastal	Spring	(Available Benara Nursery)	
	<i>Westringia fruticosa</i>	Westringia	Full Sun	All soils including coastal	Summer	(Available Luffitz Nursery)	
	<i>Anigozanthos hybrid</i>	Amber Velvet PBR Kangaroo Paw	Strappy Leaf	Full Sun	Flower: Spring / Summer	Soil Type: All soils including coastal	(Available Luffitz Nursery)
	<i>Anigozanthos manglesii</i>	Red & Green Kangaroo Paw	Strappy Leaf	Full Sun	Flower: Spring / Winter	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Dianella caerulea 'DCNCO' Breeze</i>	Blue Flax Liliaceae	Strappy Leaf	Full Sun / Partial Shade	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Dianella revoluta DH5000</i>	Blue Flax Liliaceae	Strappy Leaf	Full Sun / Partial Shade	Flower: Spring	Soil Type: All soils	(Available Benara Nursery)
	<i>Lomandra longifolia 'EMX200 Nyala'</i>	Spokey Headed Mat Rush	Strappy Leaf	Full Sun	Flower: Spring	Soil Type: All soils	(Available Benara Nursery)
Grasses	<i>Calostemon viminalis LJT</i>	Better John - Bottletree	Medium Shrub	Full Sun / Partial Shade	Flower: Spring / Summer	Soil Type: All soils including coastal	(Available Luffitz Nursery)
	<i>Calostoma sanguineus</i>	Blood-red Net Bedge	Net Bedge	Full Sun	Flower: Winter to Spring	Soil Type: Coastal	Size: 0.60' x 2m (H x 60/90cm (W)) (Available Luffitz Nursery)
	<i>Melaleuca lanceolata</i>	Chalky Honey-myrtle	Large Shrub	Full Sun / Partial Shade	Flower: Spring / Summer	Soil Type: All soils including coastal	Size: 1 - 2 m (H) x 2m (W) (Available Benara Nursery)
	<i>Olearia axillaris</i>	Coastal Delay Bush	Small Bush	Full Sun / Partial Shade	Flower: Winter/Spring	Soil Type: All soils including coastal	Size: 1 m (H) x 1.5 m (W) (Available Luffitz Nursery)
	<i>Westringia fruticosa IES04</i>	Westringia	Small Shrub	Full Sun	Flower: Winter/Spring	Soil Type: All soils including coastal	Size: 40cm (H x 45cm (W)) (Available Benara Nursery)
	<i>Xanthorrhoea preissii</i>	Grass Tree	Large Tree	Natural Light Shade / Full Sun	Flower: Summer to Winter	Soil Type: All soils including coastal	Size: 2-4 m (H) x 0-4 m (W) (Transplanted)
	<i>Adenanthes sericeos</i>	Woody Bush - Pencil Perfect	Small Shrub	Full Sun / Part Shade	Flower: Spring / Summer	Soil Type: All soils including coastal	Size: 3 m (H) x 1 m (W) (Available Luffitz Nursery)
	<i>Ficinia nodosa</i>	Knotted Club Rush	Clump Shrub	Full Sun	Flower: Summer to Winter	Soil Type: All soils including coastal	Size: 1m (H) x 1m (W) (Available Luffitz Nursery)
	<i>Juncus kraussii</i>	Sea Rush	Rush	Light Shade / Full Sun	Flower: Spring / Summer	Soil Type: All soils including coastal	Size: 1m (H) x 50cm (W) (Available Luffitz Nursery)
	<i>Baumea juncea</i>	Rush Rush	Rush	Light Shade / Full Sun	Flower: Spring / Summer	Soil Type: All soils including coastal	Size: 1m (H) x 1m (W) (Available Luffitz Nursery)
Feature Hedges / Spires	<i>Malaleuca rhaophylla</i>	Freshwater Paperbark	Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Malaleuca prestana</i>	Modong / Stinking Tree	Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Corymbia calophylla</i>	Mari	Large Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Eucalyptus decipiens</i>	Limestone Marlock	Large Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Cupaniopsis anacardioides</i>	Tuckeroo	Large Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Agonis flexuosa</i>	WA Weeping Pepper	Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Acacia koaia</i>	Koa	Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Acacia koa</i>	Koa	Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Acacia koaia</i>	Koa	Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
	<i>Acacia koa</i>	Koa	Tree	Full Sun	Flower: Spring	Soil Type: All soils including coastal	(Available Benara Nursery)
Trees	<i>ALKIMOS STATION BUILDING</i>	Building	Building	Building	Building	Building	
	<b>CONCEPTUAL PAVING MIX</b>	Paving	Paving	Paving	Paving	Paving	
	WAYFINDING THROUGH THE USE OF COLOUR MIXES THAT WILL GUIDE PEDESTRIANS TOWARDS THE MAIN ENTRANCES OF THE STATION	Conceptual Paving Mix					
	<b>THE 'SHED'</b>	The 'Shed'					
	<b>FEATURE SEATING ELEMENTS AND PAVING PATTERNS</b>	Seating Elements					
	OVERALL ELEMENTS OF THE LANDSCAPE DESIGN TO BE BASED ON THE CONCEPTUAL SHAPE OF SAND DUNES.	Seating Elements					
	OVERALL PAVING PATTERNS TO USE SAND DUNE SHAPE AS CONCEPT FOR THE WAYFINDING ELEMENT	Seating Elements					
	Architectural Concept (Melaleucas - Paper Bark - Chenille Honey-myrtle - PURPLE/WHITE/GREY)	Architectural Concept (Melaleucas - Paper Bark - Chenille Honey-myrtle - PURPLE/WHITE/GREY)	Architectural Concept (Melaleucas - Paper Bark - Chenille Honey-myrtle - PURPLE/WHITE/GREY)	Architectural Concept (Melaleucas - Paper Bark - Chenille Honey-myrtle - PURPLE/WHITE/GREY)	Architectural Concept (Melaleucas - Paper Bark - Chenille Honey-myrtle - PURPLE/WHITE/GREY)	Architectural Concept (Melaleucas - Paper Bark - Chenille Honey-myrtle - PURPLE/WHITE/GREY)	
	<b>I Selection of Banksias for Yanchep Station Landscape</b>	<b>I Selection of Banksias for Yanchep Station Landscape</b>	<b>I Selection of Banksias for Yanchep Station Landscape</b>	<b>I Selection of Banksias for Yanchep Station Landscape</b>	<b>I Selection of Banksias for Yanchep Station Landscape</b>	<b>I Selection of Banksias for Yanchep Station Landscape</b>	



TCY-DJV-YSA-LA-DRG-0002

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ORIGINAL PLOT SIZE: 1000m²

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	DRAWN	PB_TL
	DATUM :	
	HORIZONTAL: PCG20	CHECKED
	VERTICAL: AH01	FM_PF
		APPROVED FOR ISSUE
	PTA ACCEPTANCE STAMP	
	EXECUTIVE DIRECTOR	
	PTA Drawing No:	
	DATE	
	REV: A	

## DETAILED DESIGN

Government of Western Australia

YANCHEP RAIL EXTENSION

Alkimos Station

Landscaping

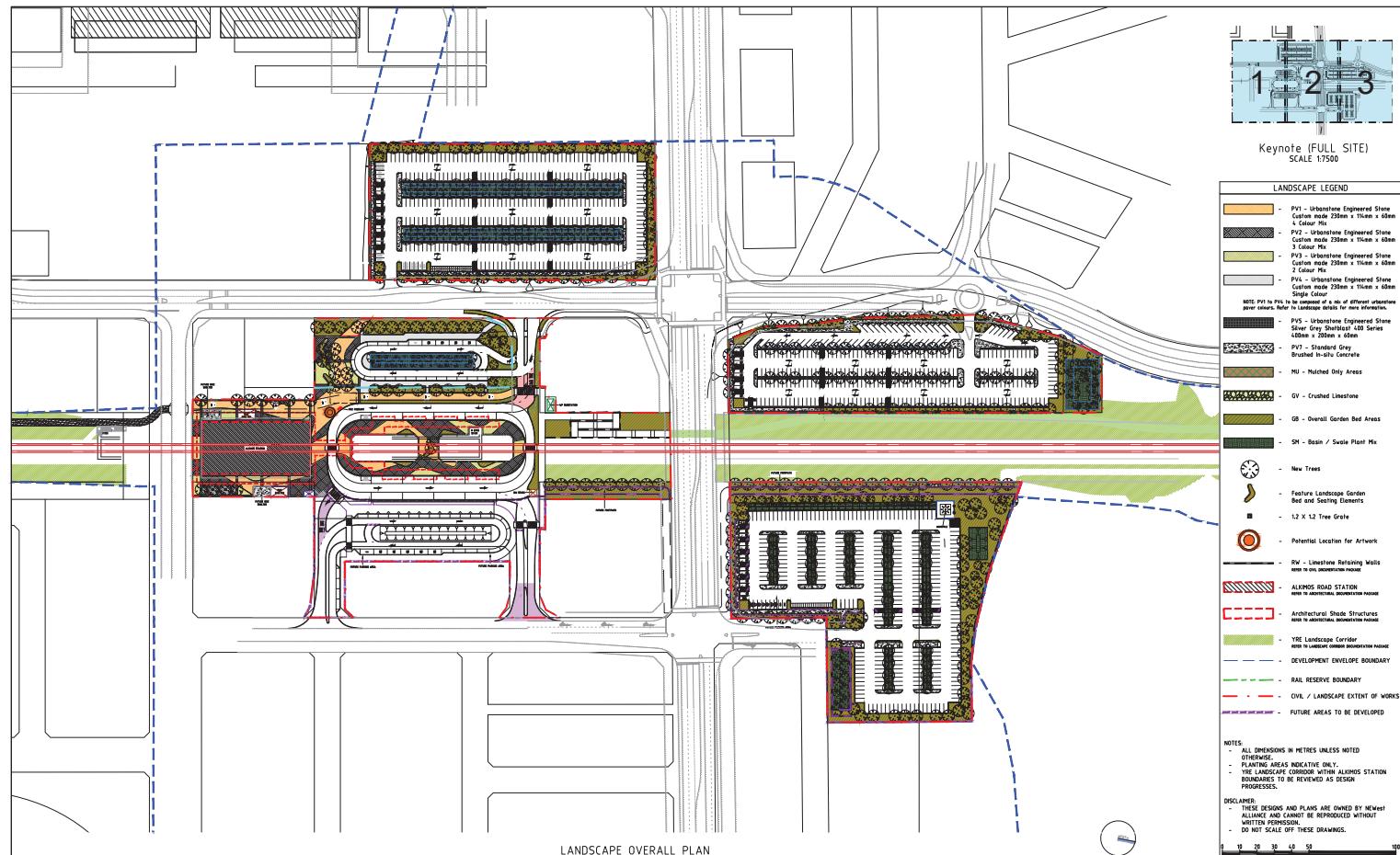
Masterplan

Planting List / Concept Material

Approved for Issue

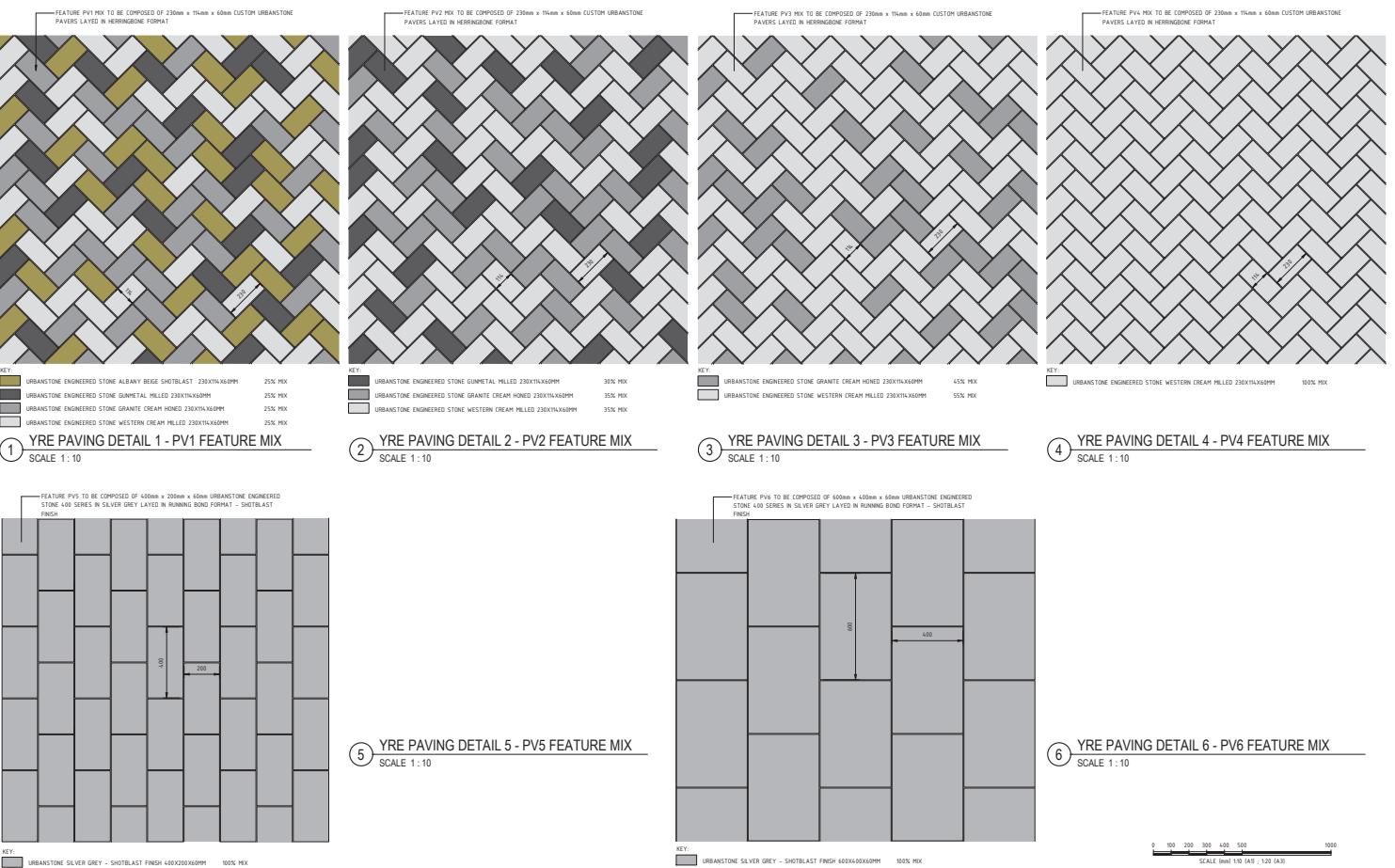
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DATE



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**NEWest Alliance**

TCY-DJV-YSA-LA-DRG-0050

REFERENCES		SCALE :	DESIGNED	PB_TL
DATUM :		1 : 10	(B A1)	PB_TL
HORIZONTAL:	PCG20		DRAWN	PB_TL
VERTICAL:	AHD01		CHECKED	FM_PF
APPROVED FOR ISSUE				
PTA ACCEPTANCE STAMP				
EXECUTIVE DIRECTOR				
PTA Drawing No:				
DATE				

Government of Western Australia  
Transport Department  
YANCHEP RAIL EXTENSION  
ALKIMOS STATION  
LANDSCAPE MASTERPLAN  
TYPICAL LANDSCAPE DETAILS - SHEET 1  
PTA Drawing No:  
REV: A

# **APPENDIX G**

# **SUMMARY OF PUBLIC ART**

## TCY Public Art Summary Statement for DA Planning Reports

DRAFT 1.3, 24 Aug 20

For inclusion into the following applicants:

- Thornlie Station
- Yanchep Station
- Eglinton Station
- Alkimos Station
- Nicholson Road Station
- Ranford Road Station.

### Public Art in new Stations

#### Scope of Work for Public Art

The State Government's Percent for Art Scheme encourages art in the built environment by using a percentage of a development's overall budget to commission art on new public buildings such as schools, hospitals and railway stations. As such, the Percent for Art Scheme requires up to 1% of the construction budget for new works over \$2 million to be spent on artwork.<sup>1</sup>

METRONET Stage 1 program of works is supported by an endorsed Yanchep Rail Extension & Thornlie-Cockburn Link Projects Public Art Guide (April 2020), which is itself informed by the overarching METRONET Public Art Strategy (October 2019). These strategies draw inspiration from and respond to Perth's rich Aboriginal and local culture, history, landscape and place, with a thematic framework built around the Gnarla Biddi story of 'Our Pathways'.

Inclusion of public art in the design phase is essential for successful integration into infrastructure design and for optimal value for money. The purpose of the Public Art Guide for METRONET Stage 1 is to provide the NEWest Alliance with direction regarding the relevant themes to be explored through public art, opportunities for application of public art in the stations' architectural design, procurement, management and funding of public art installations for the Yanchep Rail Extension (YRE) and Thornlie-Cockburn Link (TCL) projects.

Public art plays a key role in enhancing the physical public realm of the new stations and expressing the local community's identity and 'sense of place' by responding to its specific cultural, historical, and environmental narratives.

In approaching the designing and development of the new railway stations, as both important public buildings and major transport hubs, it is acknowledged that public art that responds to the uniqueness of its site and is creatively integrated within the public realm has the ability to celebrate and connect with its local people, as well as attract, inform and educate commuters from the wider community.

The principles and objectives of METRONET'S Public Art Principles and Strategy Framework that will be applied to the public art developed in each new station are as follows:

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<sup>1</sup> Actual budgetary allowance will be reassessed by the PTA upon the engagement of, and with input from, the Public Art Coordinator and pending responses from the artists' concept proposal submissions.

### ***METRONET Public Art Principles***

- Place making: public art is integral to creating vibrant, usable areas, it encourages community use of place, aids understanding of place, history, cultural heritage – Noongar and non-Noongar – and provides new interpretations.
- Site specific: public art created for a specific location celebrates, commemorates and connects what is unique or special about a place, instils a sense of local pride/ collective identity and drives visitation. Site specific artworks encourage exploration through thought, action, a different perspective on the stories of our place and people.
- Scale and fit: the scale of artwork needs to be consistent with the artwork brief/intent - i.e. it could be a landmark piece, a series or pieces, or a small element of surprise. Artwork scale also needs to be responsive to the site context - such as the surrounding landscape and buildings and pedestrian circulation.
- Universal accessibility: public art should be made accessible to all members of the community, irrespective of their age, abilities or cultural background. Consider works that engage multiple senses – sight, sound, touch, smell and/or taste.
- Attractor: public art can be used as an ‘attractor’ for visitors and tourists – particularly places with landmark artworks or seasonal art programmes. Such cultural tourism can provide a significant economic return to places/ cities with visitor-attracting iconic artworks.
- Sustainable: art is designed considering key environmental, social and economic opportunities for both procurement/delivery and ongoing function and use.
- Well considered and managed: artworks must be designed and constructed with best practice risk and asset management, being mindful of public safety, straightforward and low cost maintenance, resistance to vandalism, and constructed with robustness appropriate for the lifespan of the artwork.

### ***METRONET Public Art Strategy Objectives***

- Drive the delivery of a diverse program of high quality progressive, bold, meaningful and inspiring public art that is valued by the community.
- Support the appeal and legibility of public spaces connected to stations and other transport infrastructure by creating points of interest, supporting walkability and building a sense of adventure.
- Showcase local culture, build place identity and animate public spaces to make them a more enjoyable.
- Celebrate, respect and acknowledge Australia’s First People by promoting, engaging and responding to local Aboriginal culture, community, heritage and history.
- Encourage creativity and innovation and support the development of creative capital and sustainability of the local arts sector.
- Leave a positive project legacy to acknowledge the significance of METRONET.

In addition, the Gnarla Bidji METRONET Aboriginal Engagement Strategy also critically informs landscaping and architectural design elements including the creation of public art at each new station, as guided by the following interrelated context setting documents:

- METRONET Noongar Cultural Context – Wadjup Thornlie-Cockburn Link Project; and
- METRONET Noongar Cultural Context – Yanchep (Mooroo) Rail Extension Project.

## Public art for Placemaking

The brief for the development of public art in any station is that it must be integral to vibrant, usable and activated spaces, that aids understanding of place, history, cultural heritage (Noongar and non-Noongar) and provides new interpretations. As such, the design of public artworks is to fulfil the following objectives and guiding principles of:

- To promote community engagement
- To enable community capacity building
- To ensure safety
- To support wayfinding.



**METRONET public art guiding principles**

## Delivery Program for Public Art

The Public Art Plan for TCL and YRE is to guide the engagement of the Public Art Coordinator, who will have responsibility for implementing the strategy and Public Art Guide into the development of each new station project. The scope of the Public Art Coordinator's role in implementing the strategy includes:

- Coordination and management of all aspects of the artist procurement, design, development, installation and commissioning of all station artwork projects.
- Producing a Public Art Plan each for the YRE and TCL that are in line with the METRONET Public Art Strategy and Gnarla Biddi METRONET Aboriginal Engagement Strategy and approved by the strategys' respective coordinators.

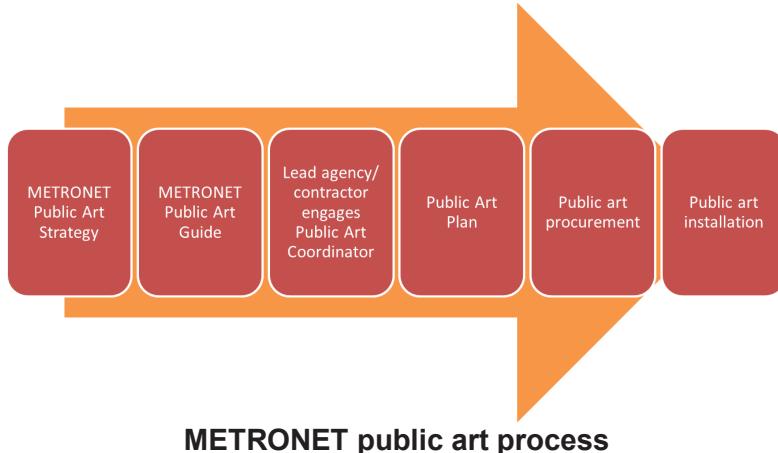
Public Art Plans are to include a Sense of Place Statement (n.b. may be a separate document) for each station that draws on the different cultural, geographical, sociological, environmental and historical narratives from the surrounding local area. The Sense of Place Statement sets the curatorial vision for each station's artwork, parameters for its integration, a delivery guide, fabrication details and budget for the artwork at each station.

- Preparation of a procurement plan and relevant documentation, which will include Artwork Brief requesting demonstrated adherence to the objectives of the METRONET Public Art Strategy and Request for Quotation (RfQ) documents; and coordination of artists during the design and development process, to ensure that the public art produced for the project satisfies the requirements as described in the RfQ and briefing documents.
- Collaboration and liaison with relevant internal and external stakeholders, the design and construction project teams, and public consultation if required. Key stakeholders that have been identified include, but are not limited to, the following:
  - PTA,
  - METRONET Office,
  - METRONET Noongar Reference Group, and
  - the Local Government specific to each station's locality.

- Assisting the artist with preparing any documentation for building certification and permits, if required.

For artwork to be successfully integrated within the station's landscaping, infrastructure and building design - the Public Art Coordinator will liaise closely with METRONET's Program Strategy Coordinator and artist(s) during the project's detailed design phase. The proposed timeframe for delivery is as follows:

- engagement of Public Art Coordinator
- production and approval of Public Art Plans, EOI and Artwork Brief documents
- advertising of EOI and shortlisting of artist's concept proposal submissions for selection
- commissioning of artists
- 50% design assessment
- fabrication completion
- installation of artwork.



## Timing of Implementation for Planning and Building Development Approvals

Given the robustness and timeframe of the public art delivery program, it is recommended that the public art component of the project be delivered prior to the commissioning and opening of the new station, as this enables synchronisation with other nontangible community development actions associated with leading up to and on Day One Operations.

As such, details of the ultimate public art installations proposed will be documented for the purposes of satisfying the condition in plan and elevation drawings, along with an associated artist design report. Together, the drawings and report materials will need to demonstrate that the proposed public art installations can be properly integrated with the approved architecture and landscaping of the station precinct.

Consequently, the following draft condition is provided for consideration in any resulting development approval:

*Public art is to be provided in accordance with the State Government's Percent for Art Scheme, details of which are to be submitted prior to occupation, to the satisfaction of the WAPC in consultation with the Local Government.*

## **APPENDIX H**

## **SUMMARY OF CONSULTATION OUTCOMES**

## YRE Community and Stakeholder Consultation Summary Statement for DA Planning Reports

DRAFT 1.2, 21 Aug 20

### Overview

The NEWest Alliance strategic approach to engagement is based on the International Association of Public Participation (IAP2) Consultation Spectrum. Stakeholders are profiled and the engagement methodology tailored to provide the appropriate level of involvement in the project's designing and decision-making processes.

Since the 2017-18 State Budget announcement confirming funding for the Thornlie-Cockburn Link (TCL) and Yanchep Rail Extension (YRE), engagement with stakeholders has been undertaken by the Public Transport Authority (PTA) and the METRONET Office of the Department of Planning, Lands and Heritage (DPLH).

Since the awarding of the contract in November 2019, NEWest Alliance has further developed the reference designs for each station in consultation with the community and key stakeholders through a series of briefings, technical workshops, reference groups and responses to enquiries.

### Key Statistics

Between 1 November 2019 to 31 July 2020, the NEWest Alliance had 174 interactions with 171 distinct stakeholders.

The greatest proportion of stakeholders consulted were community members (25%), local government (19%), community interest groups (12%), community reference group (9%) and general public (9%).

The main mechanisms for engagement were meetings with key stakeholders (22%), email enquiries (21%), email responses (16%), targeted mail (9%) and briefings and presentations (8%).

### Consultation Program Summary

Level	Engagement	Stakeholders	Topic/Discussion	Timing
Strategic	METRONET Local Government Reference Group – executive level	City of Wanneroo, METRONET Office, NEWest Alliance	Introduction to the NEWest Alliance Environment and Construction, Stations and Precincts, Interface and Engagement	Quarterly
	METRONET Noongar Reference Group	Whadjuk Noongar community representatives, METRONET Office, NEWest Alliance	Introduction to the NEWest Alliance Yanchep Rail Extension design workshop	Quarterly and as required
	METRONET Access and Inclusion	METRONET Office, Department of	Introduction to the NEWest Alliance	Quarterly and as required

Level	Engagement	Stakeholders	Topic/Discussion	Timing
	Reference Group	Communities, Housing Advisory Unit, PTA, AIRG representatives	Lifts, respite seating, accessibility of car bays, drop off areas	
Operational	City of Wanneroo Briefings – officer level	City of Wanneroo, NEWest Alliance	Construction, Design, Environment, Community, Approvals	Quarterly
	Technical / targeted workshops	Water Corporation Telstra Western Power ATCO Gas Environmental Protection Agency DevelopmentWA Transperth DFES	Design, Construction Staging, Approvals	Fortnightly, Monthly or as required
Tactical	Yançep Rail Extension Community Reference Group	City of Wanneroo, local residents, environmental groups	Construction, Design, Communications	Quarterly
	Yançep Rail Extension Communications Coordination Meeting	City of Wanneroo, Main Roads WA, Development WA, Water Corporation, METRONET Office	Communications / cross promotional opportunities	Quarterly
	Trinity at Alkimos Residents Association	City of Wanneroo (mayor and elected member), local residents, NEWest Alliance	Project scope, stations, forward works, introduction to NEWest Alliance.	March 2020

Face to face engagement has been supported by communication campaigns and response to enquiries. Approximately 380 notifications have been distributed to local residents and business to inform them of early works, geotechnical investigation, and temporary traffic changes with a further 80 properties directly engaged via doorknocks.

### Pre-Lodgement Meetings for Station Planning and Development Approval

Station	Responsible Authority	Date
Alkimos*	City of Wanneroo / DPLH for WAPC	17 August 20
Eglinton*	City of Wanneroo / DPLH for WAPC	14 July 20

Station	Responsible Authority	Date
Yançep*	City of Wanneroo / DPLH for WAPC	14 July 20

Note: \* Project development site is located within a Planning Control Area (PCA).

### Upcoming Communication and Engagement

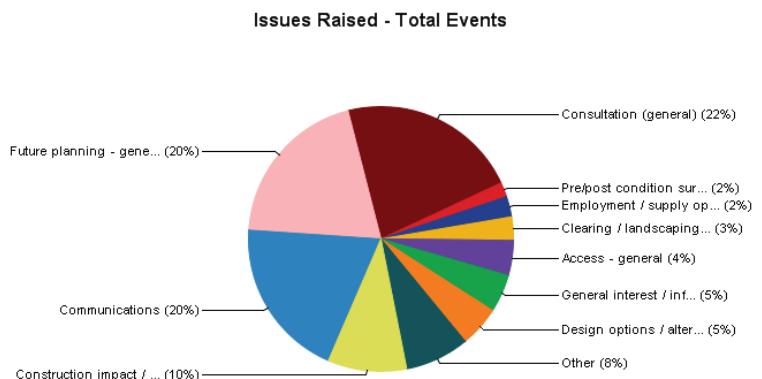
- Community Drop-In sessions planned to be held locally over two Saturdays, 5 September 2020 (venue Butler Community Centre, Butler) and 12 September 2020 (venue Oldham Park Clubrooms, Yançep)

The drop-in sessions will give the community an opportunity to find out more about the project's progress and plans, ask specific questions and raise concerns as well as understand how the project will help enhance Perth's growing northern suburbs.

- Business readiness workshops – partnership with Small Business Development Corporation
- Fact sheets/construction updates (by zone) / release of renders and Augmented reality
- Property precondition surveys to 50 metres
- Site mobilisation engagement including doorknocks
- Quarterly briefings October 2020
- Postcode wide distribution of Project Updates planned for September 2020, to the following suburbs: Eglinton, Yançep, Butler, Alkimos, Jindalee.

**Yançep Rail Extension (YRE) Consultation Outcomes Statistics**
*Date Range 1 November 2019 to 31 July 2020*
**Key Issues Raised**

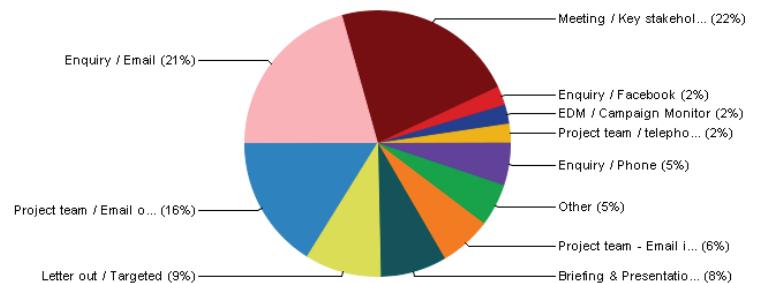
Issues	Events	Stakeholders	
		Distinct	Total
Consultation (general)	62	104	224
Future planning - general	56	50	67
Communications	55	55	165
Construction impact / notices	27	46	51
Design options / alternatives	14	13	13
General interest / information	13	47	50
Access - general	12	12	12
Clearing / landscaping / revegetation	8	54	54
Employment / supply opportunities	7	6	7
Pre/post condition survey	5	4	5
Other	22	97	98
[No issues]	4	13	13
<b>Total Events</b>	<b>174</b>	<b>171</b>	<b>358</b>



## Event Types

Event Types	Events	Stakeholders	
		Distinct	Total
Meeting / key stakeholder	39	27	44
Enquiry / email	36	36	43
Project team / email out	28	28	128
Letter out / targeted	16	1	1
Briefing / presentation	14	36	59
Project team - email in	11	10	10
Enquiry / phone	9	8	9
Enquiry / Facebook	4	3	3
Project team / telephone out	4	4	4
EDM / Campaign Monitor	4	0	0
Other	9	57	57
<b>Total Events</b>	<b>174</b>	<b>171</b>	<b>358</b>

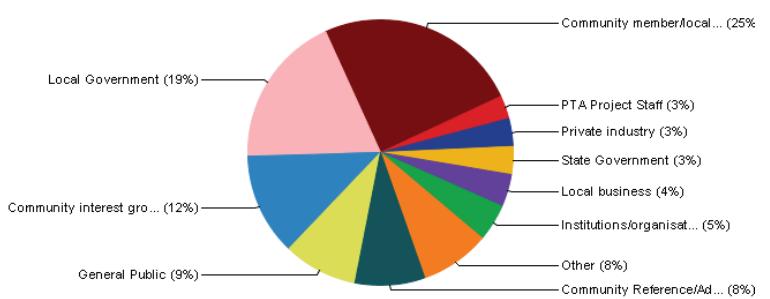
Event Types - Total Events



## Stakeholders Consulted

Stakeholder Groups	Events	Stakeholders	
		Distinct	Total
Community member / local resident	44	32	147
Local Government	33	27	69
Community interest group	22	7	23
General public	16	17	20
Community Reference / Advisory Group member	15	7	80
Institutions / organisations	8	6	9
Local business	7	5	9
Private industry	6	5	6
State Government	6	7	9
PTA project staff	5	3	5
Other	15	13	15
[No Stakeholder Groups]	66	90	211
<b>Total Events</b>	<b>174</b>	<b>171</b>	<b>358</b>

## Stakeholders Consulted - Total Events



## **APPENDIX I**

# **PEDESTRIAN CATCHMENT ANALYSIS AND MODE SHARE REVIEW MEMORANDUM**

# Memorandum

<b>Date</b>	09/07/2020
<b>To</b>	Willem du Toit, Rob Forbes Marco Bense
<b>From</b>	Hugo Nilsson Teressa Matassa
<b>CC</b>	Thor Farnworth, John Caveill, Chris Deshon, Brad Sherlock, Param Lobana, Patrick Thompson, Gary Jones, Guy Smith, Martijn Van Het Kaar, Andy Godden Mason Bao, Thomas Beaver
<b>Subject</b>	<b>ALKIMOS STATION CATCHMENT AND MODE SHARE REVIEW</b>
<b>Doc No.</b>	<b>TCY-DJV-YSA-TM-MMO-0002</b>
<b>Revision</b>	<b>A</b>

## 1.0 Introduction

NEWest Alliance has been commissioned by METRONET to undertake a review of the catchment analysis for the Yanchep Rail Extension (YRE), based on the most recent land use, infrastructure and station design assumptions. This note summarises the data used and the methodology along with the findings in relation to mode specific patronage and associated parking requirements.

This note first considers the existing and forecast land use data and transport network to assess the potential catchments and associated potential patronage for each mode (car, bus, cycle and walk). This is followed by a review of the likely effective mode shares, which, along with the forecast overall patronage volumes, will inform parking requirements.

The analysis in this note builds on previous catchment analysis and transport assessment work carried out for the METRONET YRE project. This work is presented in the below documents, which will be referenced through this note:

- *Yanchep Rail Extension Strategic Access Planning* (Arup, 2018)
- *Yanchep Rail Extension Transport Assessment* (WSP, 2019)

Information relating to the assumed future infrastructure network and land use informing the catchment analysis has been gathered from the following City of Wanneroo structure plans:

- *Agora Village Agreed Structure Plan* (2010)
- *Alkimos City Centre Structure Plan* (2018)
- *Central Alkimos Local Structure Plan* (2018)
- *Lots 1001 & 1002 Marmion Ave, Alkimos* (2017)
- *South Alkimos Local Structure Plan* (2019)
- *Western Precinct Local Structure Plan, Lot 6 Taronga Place, Eglinton* (2018)

## Memorandum

*Overviews of the structure plans are provided Figure 1 to Figure 6.*

The exact layout of local roads and walking / cycling routes within these structure plan areas are still under development and therefore the catchment analysis has only been based on mapping of following future key movement corridors:

- Walking and Cycling network:
  - All existing local roads – assuming all local roads have a path on at least one side.
  - Existing Primary Distributor, Integrator A and B Roads, Neighbourhood Connector roads – matching the existing path provision along these corridors.
  - Future Primary Distributor, Integrator A and B Roads and Neighbourhood Connector roads only – assuming these roads will be constructed with walking and cycling facilities as outlined in the Structure Plans.
  - Future Draft Long Term Local Cycle Network primary, secondary and local routes for the City of Wanneroo region.
- Car and Bus network:
  - All existing roads.

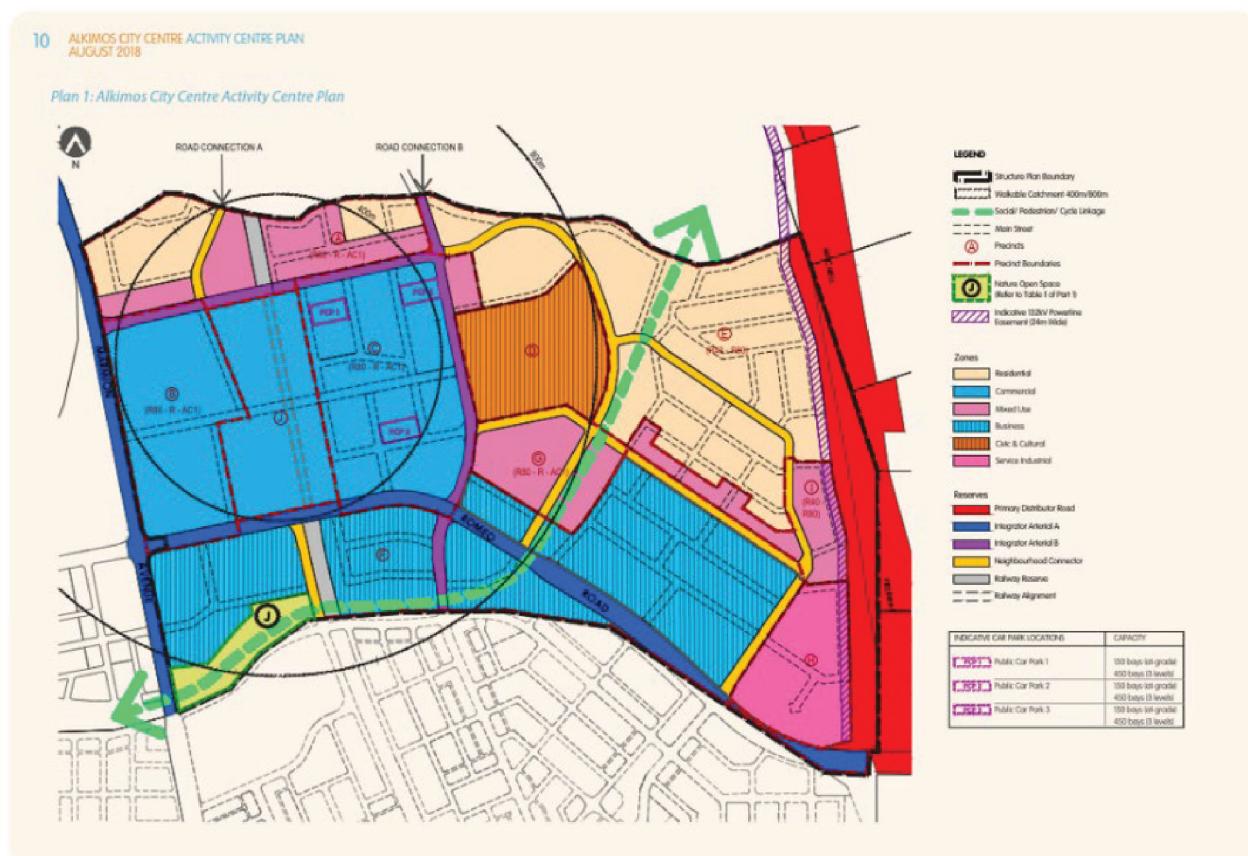
Future Primary Distributor, Integrator A and B Roads and Neighbourhood Connector roads only

*Figure 1: Agora Village Structure Plan*



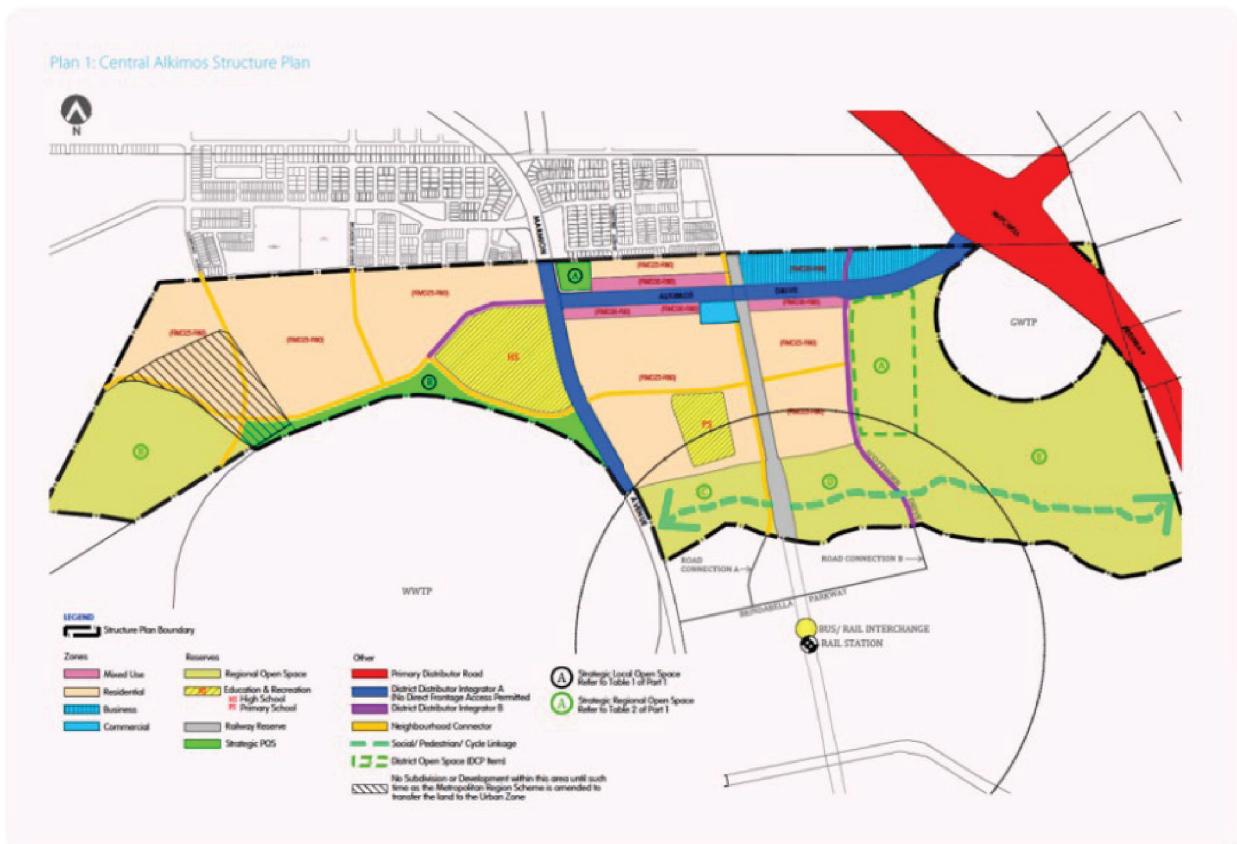
## Memorandum

Figure 2: Alkimos City Centre Structure Plan



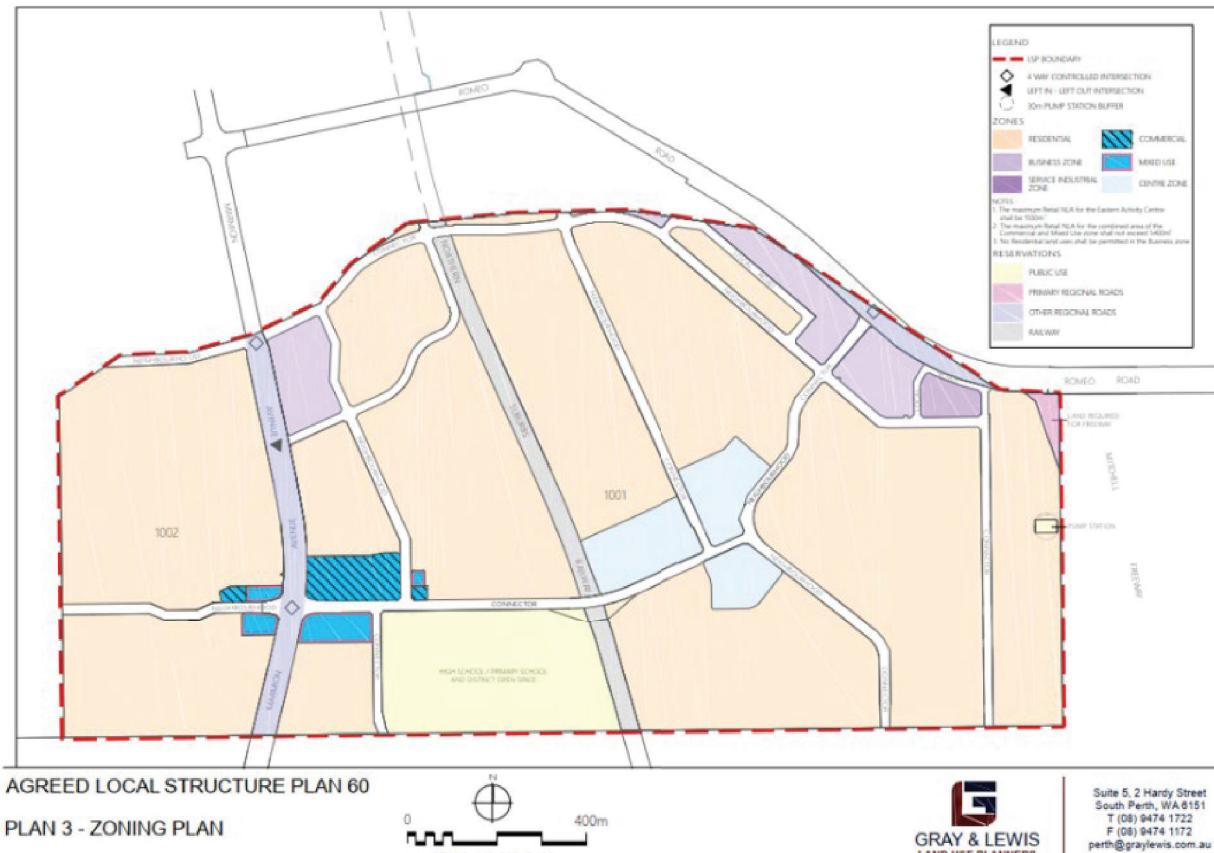
# Memorandum

Figure 3: Central Alkimos Structure Plan



## Memorandum

Figure 4: Lots 1001 & 1002 Marmion Ave



# Memorandum

Figure 5: South Alkimos Structure Plan



# Memorandum

Figure 6: Lot 6 Western Precinct Structure Plan



## 2.0 Geographical Catchment

This section describes the methodology of determining the geographical catchments for each mode. The extent of the geographical catchments will subsequently inform the potential patronage capture in Section 4.0.

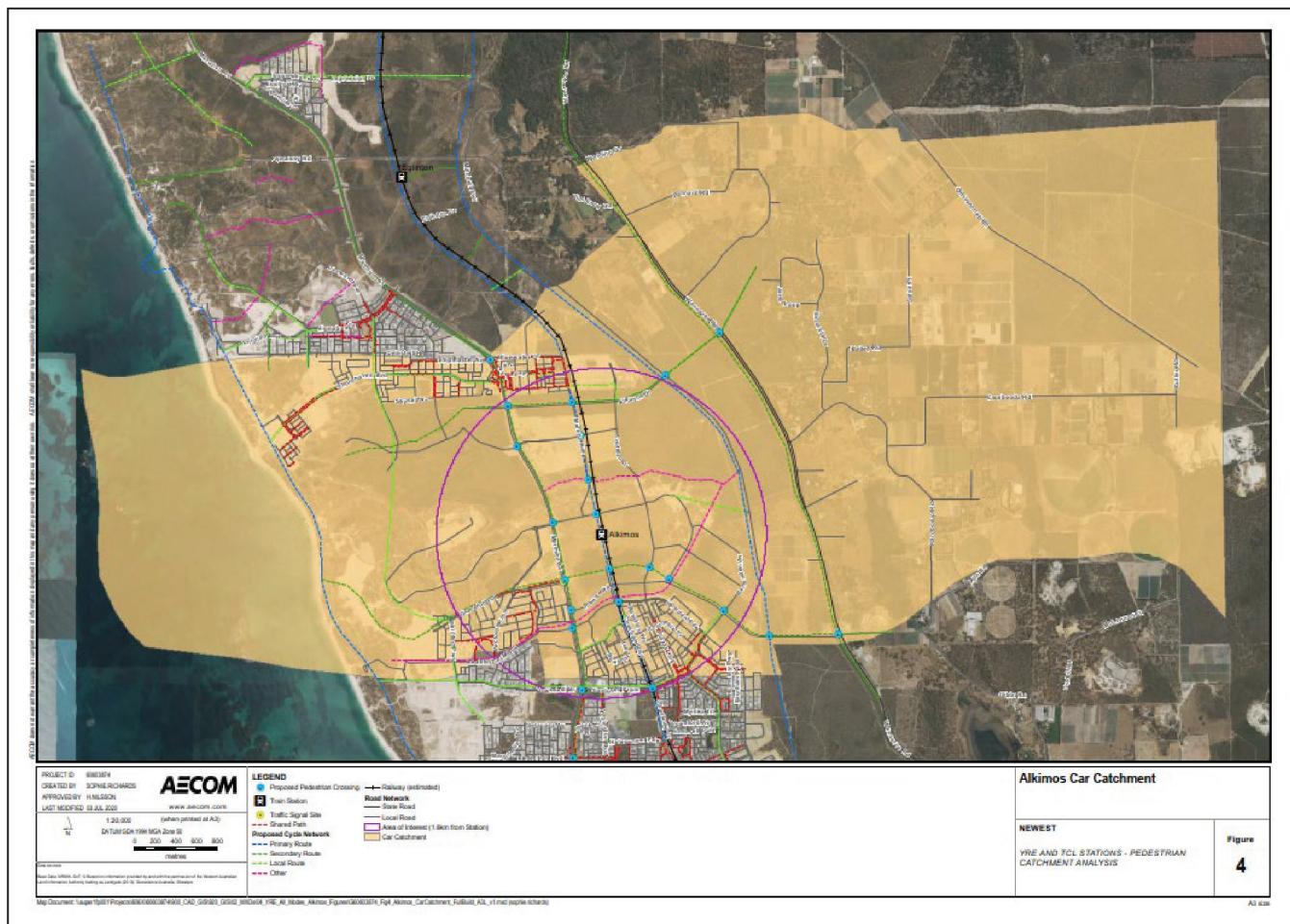
Land use data from the Metropolitan Land Use Forecasting System (MLUFS) (version 1.6), has been used to estimate the potential population within the future Alkimos Station catchment. MLUFS does not cover areas north of Two Rocks, but this is not considered to be an issue as Two Rocks effectively forms the northern edge of the Perth metropolitan area, with population being very scarce beyond this limit. Therefore, for the purpose of this analysis, Two Rocks will form the northern limit of the whole YRE catchment. Similarly, areas to the east of State Route 60 (Indian Ocean Drive) along most of the YRE is very scarcely populated, although this area is covered in MLUFS and will be included in the assumed catchments.

# Memorandum

## 2.1 General Catchment

The general (car) catchments for all new stations along the YRE was considered within the same analysis using the same assumptions adopted in the *YRE Strategic Access Planning* (Arup, 2018). This assumes a tendency that drivers will avoid ‘back-tracking’ and are likely to prefer driving downstream (towards Perth CBD) rather than upstream the railway line. The assumed general catchment for Alkimos Station is presented in Figure 7.

*Figure 7: General Catchment*

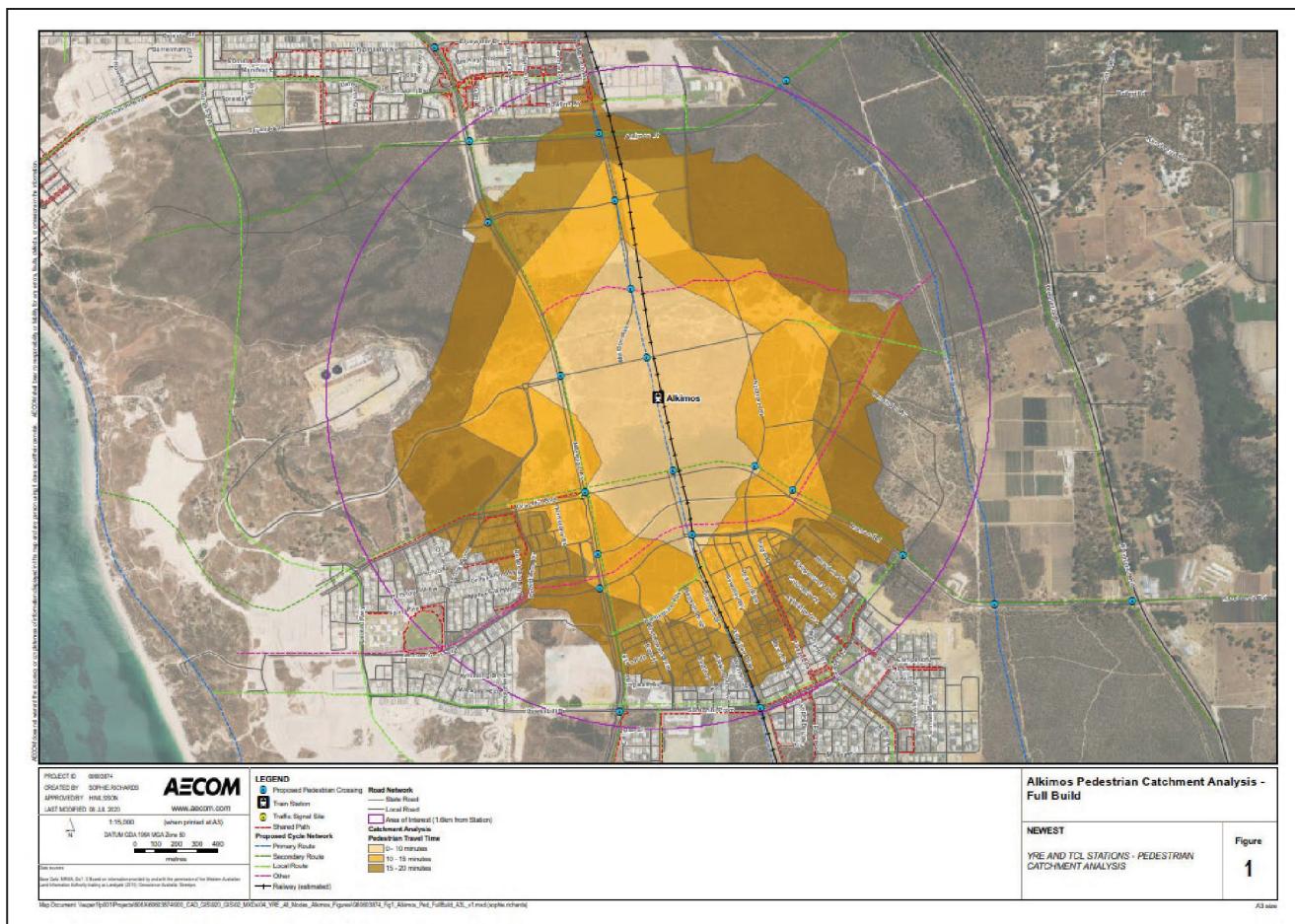


## Memorandum

### 2.2 Future (2031) Walkable Catchment

Figure 8 presents the future (2031) walkable catchment around Alkimos Station, segmented into 800m, 1200m and 1600m network distances. This is equivalent to a 10-, 15- and 20-minute walk at 4.8km/h, respectively. The potential walking catchment is set to fall within the 20-minute zone.

Figure 8: Future (2031) 10/15/ 20-minute Walkable Catchment

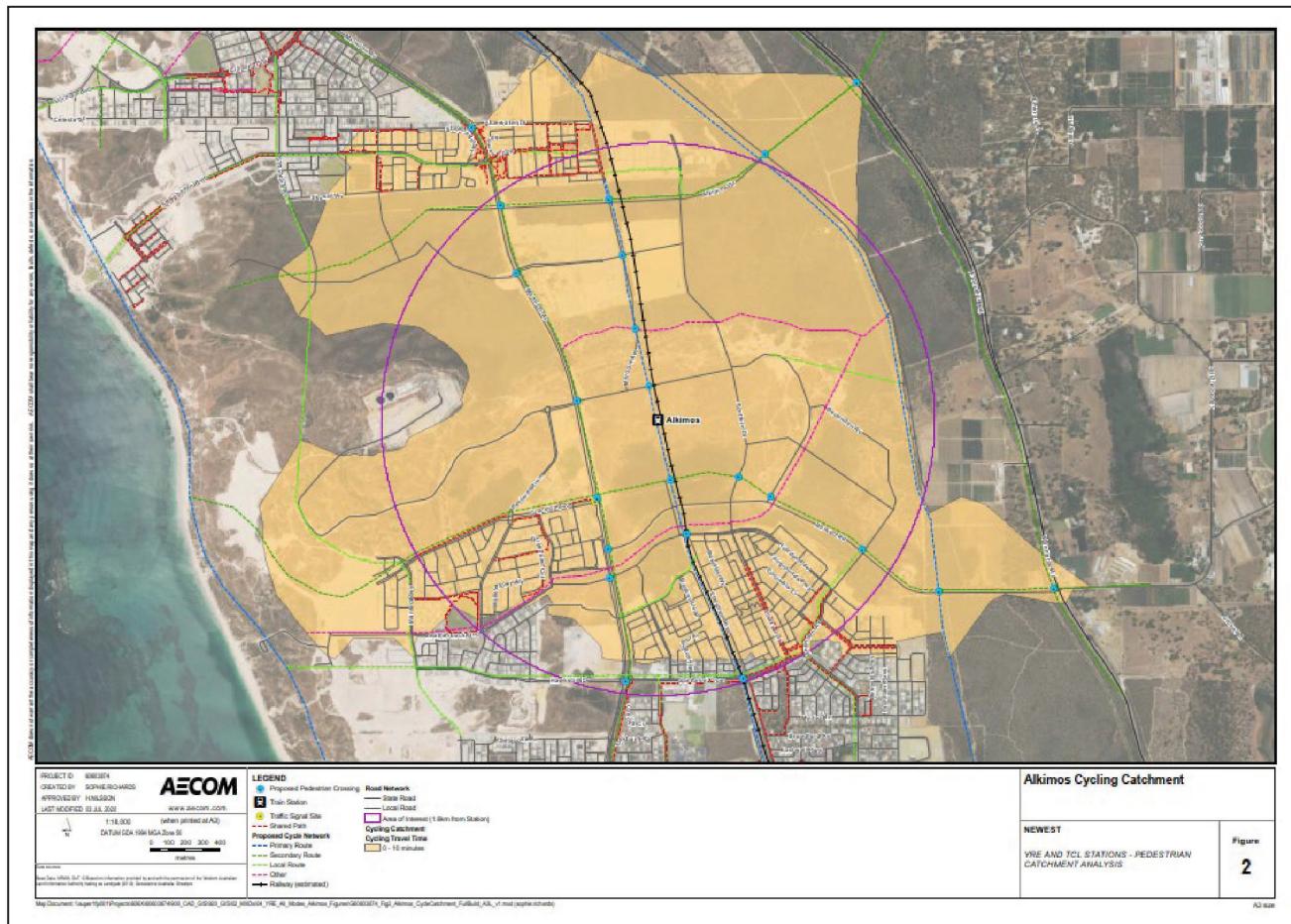


# Memorandum

### **2.3 Future (2031) Cyclable Catchment**

Figure 9 presents the future cyclable catchment around Alkimos Station, within an 3km network distance. This is equivalent to a 10-minute cycle<sup>1</sup> and is the assumed potential cycling catchment. It further considers the assumed extent of the future cycling catchments of the neighbouring Eglinton and Butler stations, using the same principle to avoid ‘back-tracking’ used to define the general catchment for each individual station.

*Figure 9: Future (2031) 10-minute Cyclable Catchment*



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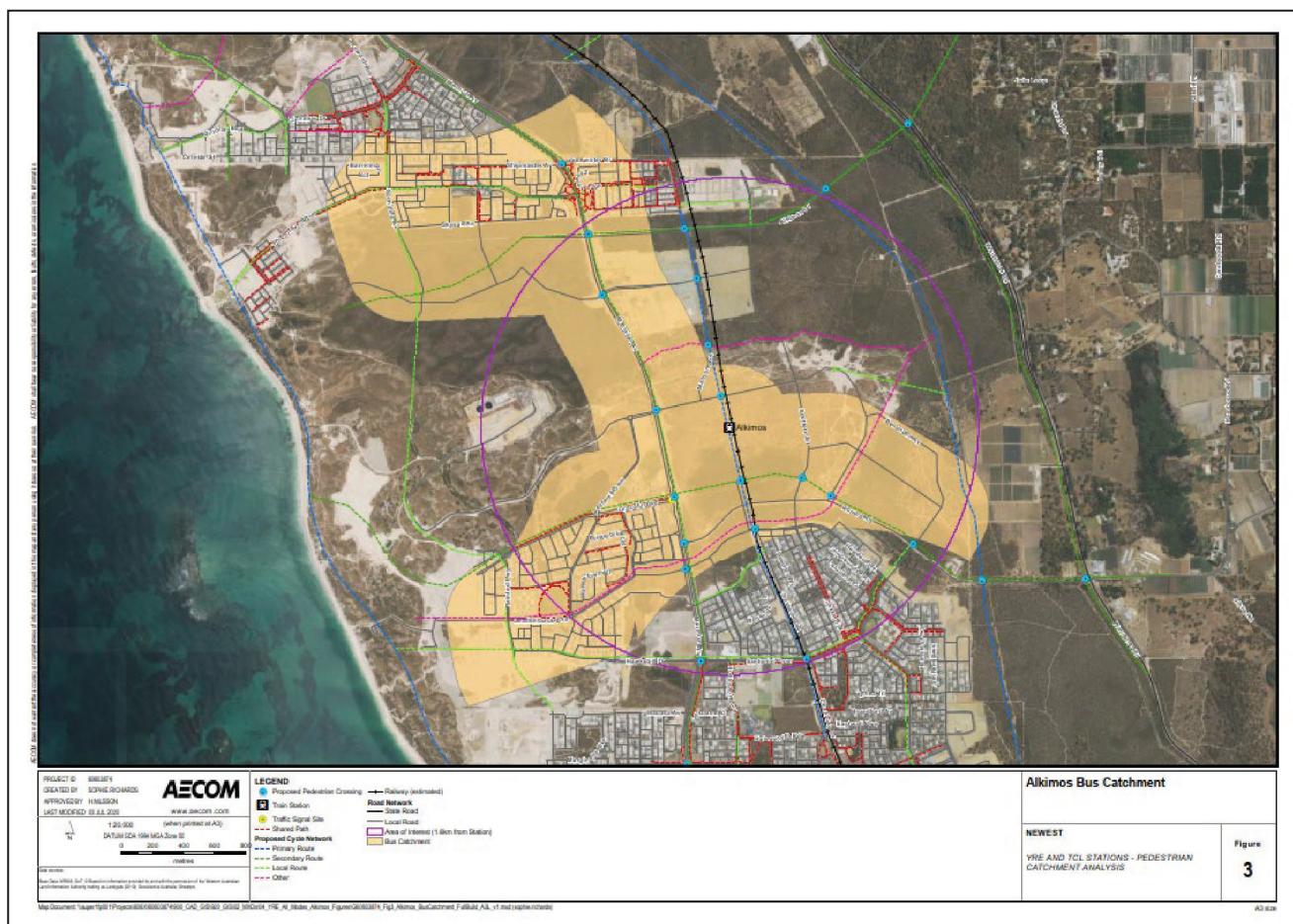
<sup>1</sup> Based on an average of 18/km cycle speed

# Memorandum

## 2.4 Future (2031) Bus Catchment

A preferred future bus network option has been supplied to the NEWest team by PTA. Figure 10 highlights the resulting associated bus catchment. As route alignment and bus stop locations are yet to be confirmed the catchments are indicative only and formed by a 400m bus route buffer. It further considers the assumed extent of the bus catchments of the neighbouring Eglinton and Butler stations, using the same principle to avoid 'back-tracking' used to define the general catchments.

*Figure 10: Bus Catchment*



# Memorandum

## 3.0 STATION TYPOLOGIES AND PATRONAGE

### 3.1 Alkimos Station Typology

The future Alkimos Station Access Typology and Precinct Typology are identified below in Table 1. The Station Access Typology reflects the anticipated catchment conditions and priority access modes, noting that a Bus n Ride Station suggests a large (typically more than 30 percent) mode share for bus transfers at the station but also allows for similar Park n Ride and walking/cycling mode shares depending on the Precinct typology and surrounding land uses. Alkimos Station is identified as an SP4 'Town' Precinct Typology, which supports a mixed-use town centre including a mixture of residential densities, and has a moderate catchment extending to nearby suburbs (generally smaller than a 'City' Precinct). As a 'Town' Precinct, Alkimos Station is anticipated to generate a reasonable proportion of rail passengers from the immediate walking and cycling catchment once the Town Centre and surrounding land area has been developed.

*Table 1: Station Typologies*

Access Typology	Precinct Typology	Comparable Stations
<b>Bus n Ride</b>	SP 4 Town	<ul style="list-style-type: none"> <li>• Wellard (Bus n Ride / Suburban)</li> <li>• Butler (End of Line / Suburban)</li> <li>• Warnbro (Park n Ride)</li> </ul>

### 3.2 Forecast Patronage

The NEWest adopted patronage forecast for Eglington station is presented in Table 1<sup>2</sup>. The forecasts are derived from the STEM multi-modal transport model and are compared below to previous patronage forecasts used in the previous METRONET studies by Arup (2018) and WSP (2019).

*Table 2: Forecast Patronage*

Year	YRE 2018 <sup>3</sup>	YRE 2019 <sup>4</sup>	YRE Adopted <sup>2</sup>
2021	2,167	336	2,167
2031	5,922	1,896	2,700

## 4.0 Potential Patronage Capture

MLUFS land use data has been used to estimate the potential patronage that can access Alkimos Station by each mode. The analysis for each mode has been carried out to determine the percentage of the MLUFS zones which are within the mode-specific geographical catchment. Detailed information on future land use development gathered from the Structure Plans has been used to further adjust the percentage of the MLUFS zone within a catchment, to more realistically reflect the potential patronage. This adjusts for land uses areas identified within the Structure Plans which are likely to have low residential, employment or education activities such as conservation areas or large sections of public open space.

<sup>2</sup> Patronage forecasts specified in the YRE SWTC

<sup>3</sup> YRE 2018 - *Yanchep Rail Extension Strategic Access Planning* (Arup, 2018)

<sup>4</sup> YRE 2019 - *Yanchep Rail Extension Transport Assessment* (WSP, 2019)

## Memorandum

### 4.1 MLUFS Data

MLUFS data describe forecasted population and employment figures for the Perth metropolitan region and forms the basis for the catchment analysis. The zones falling within the station catchments are highlighted in Figure 11.

Figure 11: MLUFS Zones

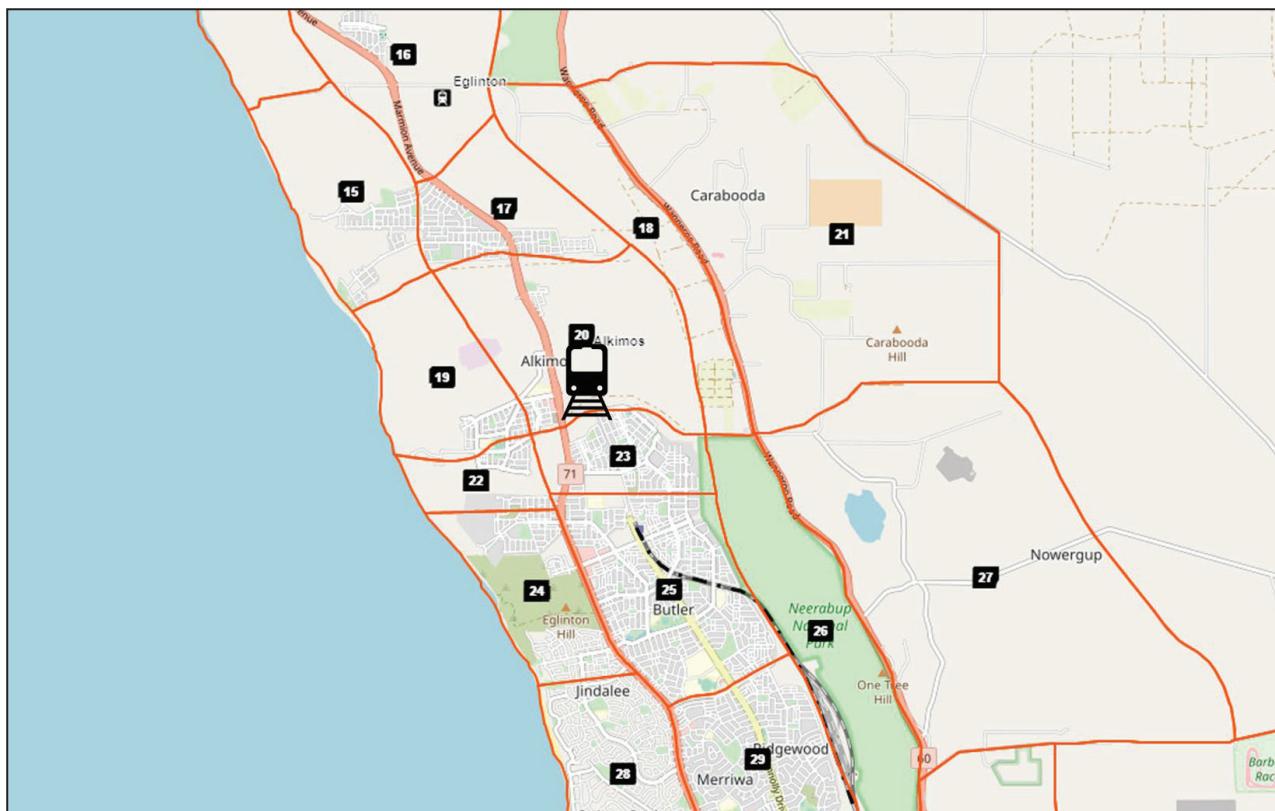


Table 2 provides a break-down of the residential and employment data for each zone for the year 2021 and 2031, along with the resulting growth between the two years. The zones with the higher proportion of existing or future population are highlighted in shades of green, illustrating the zones which have the potential to generate the most trips for Alkimos Station in 2021 and 2031. These zones should therefore be a key focus for delivery of the interim (2021) and future transport routes to the station.

# Memorandum

Table 3: MLUFS Land Use Data

MLUFS Zone	2021			2031			2021 to 2031	
	Residents	Employment	Total	Residents	Employment	Total	Growth	
15	3,085	897	3,982	9,999	1,323	11,322	184%	
17	4,874	478	5,352	6,579	891	7,470	40%	
18	34	21	55	41	34	75	36%	
19	1,995	630	2,625	5,091	779	5,870	124%	
20	1,479	783	2,262	9,194	984	10,178	350%	
21	309	78	387	309	80	389	1%	
22	1,502	1,132	2,634	2,810	1,214	4,024	53%	
23	2,957	792	3,749	5,574	884	6,458	72%	
26	2,957	792	3,749	5,574	884	6,458	72%	
27	2,957	792	3,749	5,574	884	6,458	72%	
713	868	426	1,294	869	445	1,314	2%	

## 4.2 Overall Catchment Potential

Figure 12 provides an overview of the area overlap between the general catchment and the MLUFS zones, along with detailed land use data. The overlap serves as an indication of the proportion of population and employment within each MLUFS zone that will form part of the potential car patronage for Alkimos Station.

## Memorandum

Figure 12: Future (2031) Overall Catchment, Land Use and MLUFS Zone Overlap

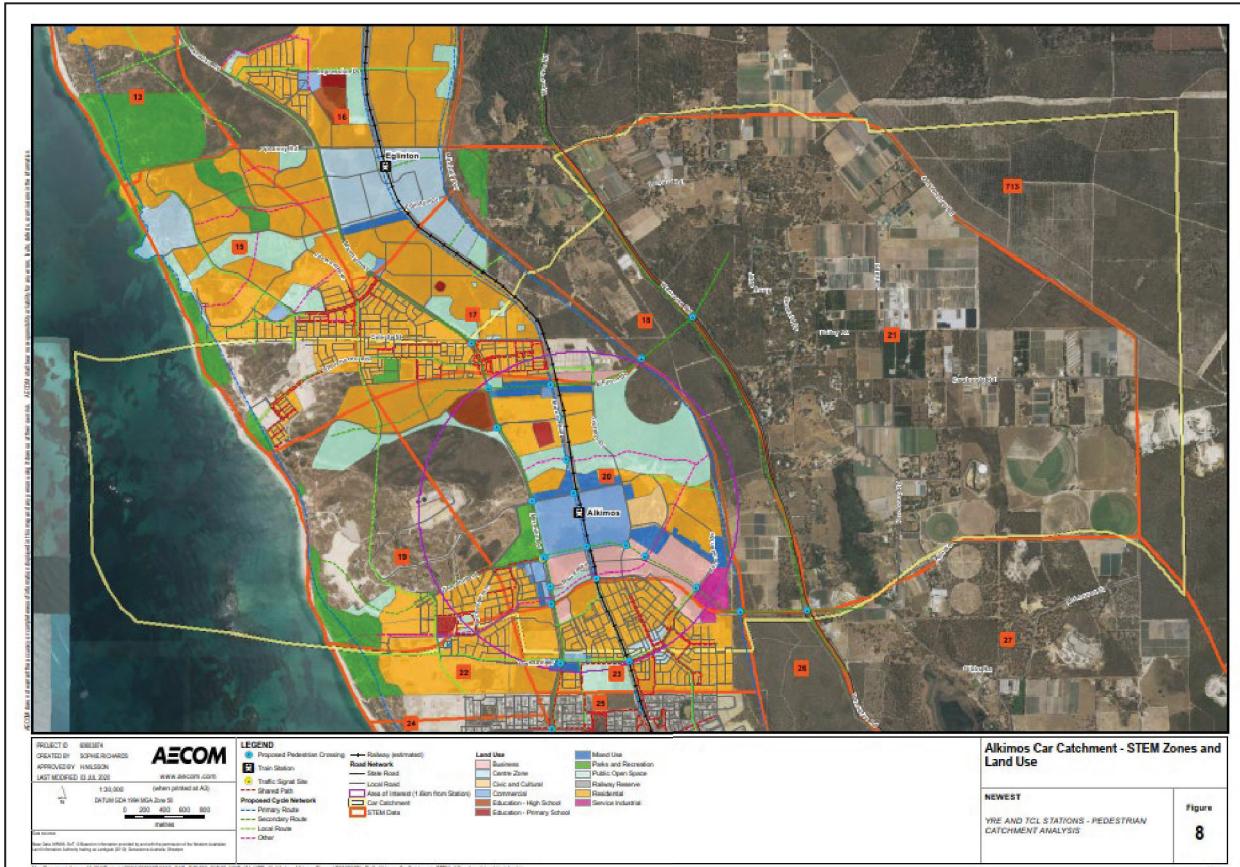


Table 3 highlights the proportion of each MLUFS zone captured within the overall station catchment, along with any adjustment made to the overlap percentage following consideration of the existing and planned detailed land use data sourced from Structure Plans.

# Memorandum

*Table 4: Future (2031) Overall Catchment and MLUFS Zone Adjusted Overlap*

MLUFS Zone	Overlap	Adjusted overlap	Car - 2031	Reason for adjustment
15	31%	10%	Most areas of MLUFS zone with land use (bushland) with low expected patronage falls inside catchment	
17	49%	35%	Most areas of MLUFS zone with land use (bushland) with low expected patronage falls inside catchment	
18	70%	0%	No residential or patronage-generating land use captured	
19	100%	100%		
20	100%	100%		
21	99%	99%		
22	4%	4%		
23	58%	58%		
713	2%	0%	No residential or patronage-generating land use captured	

## 4.3 Future (2031) Bus Catchment Potential

Figure 13 provides an overview of the area overlap between the bus catchment and the MLUFS zones, along with detailed land use data. The overlap serves as an indication of the proportion of population and employment within each MLUFS zone that will form part of the potential bus patronage for Alkimos Station.

## Memorandum

Figure 13: Future (2031) Bus Catchment, Land Use and MLUFS Zone Overlap

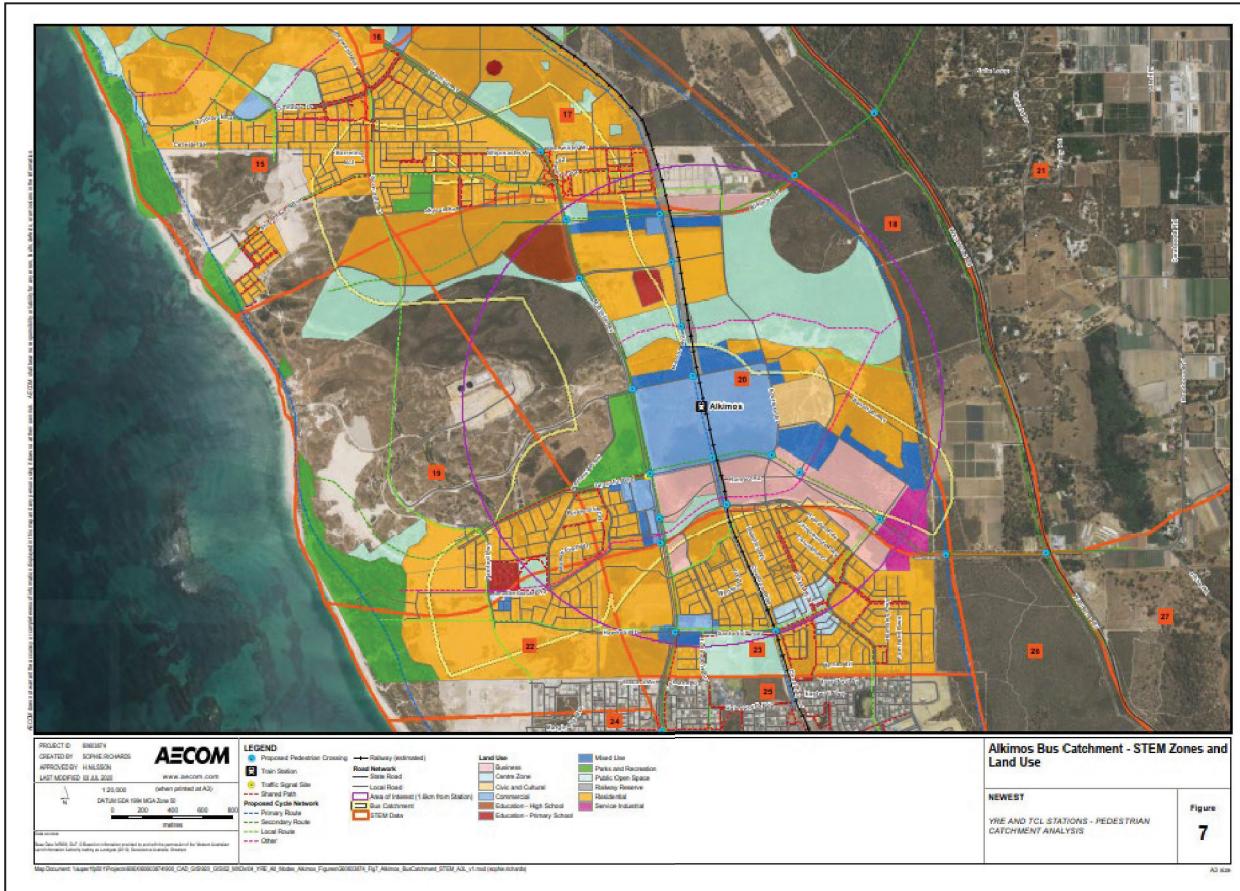


Table 4 provides an overview of the area based overlaps between the bus catchment and the MLUFS zones, along with any adjustment made to the overlap percentage following consideration of the existing and planned detailed land use data sourced from structure plans.

Table 5: Future (2031) Bus Catchment and MLUFS Zone Adjusted Overlap

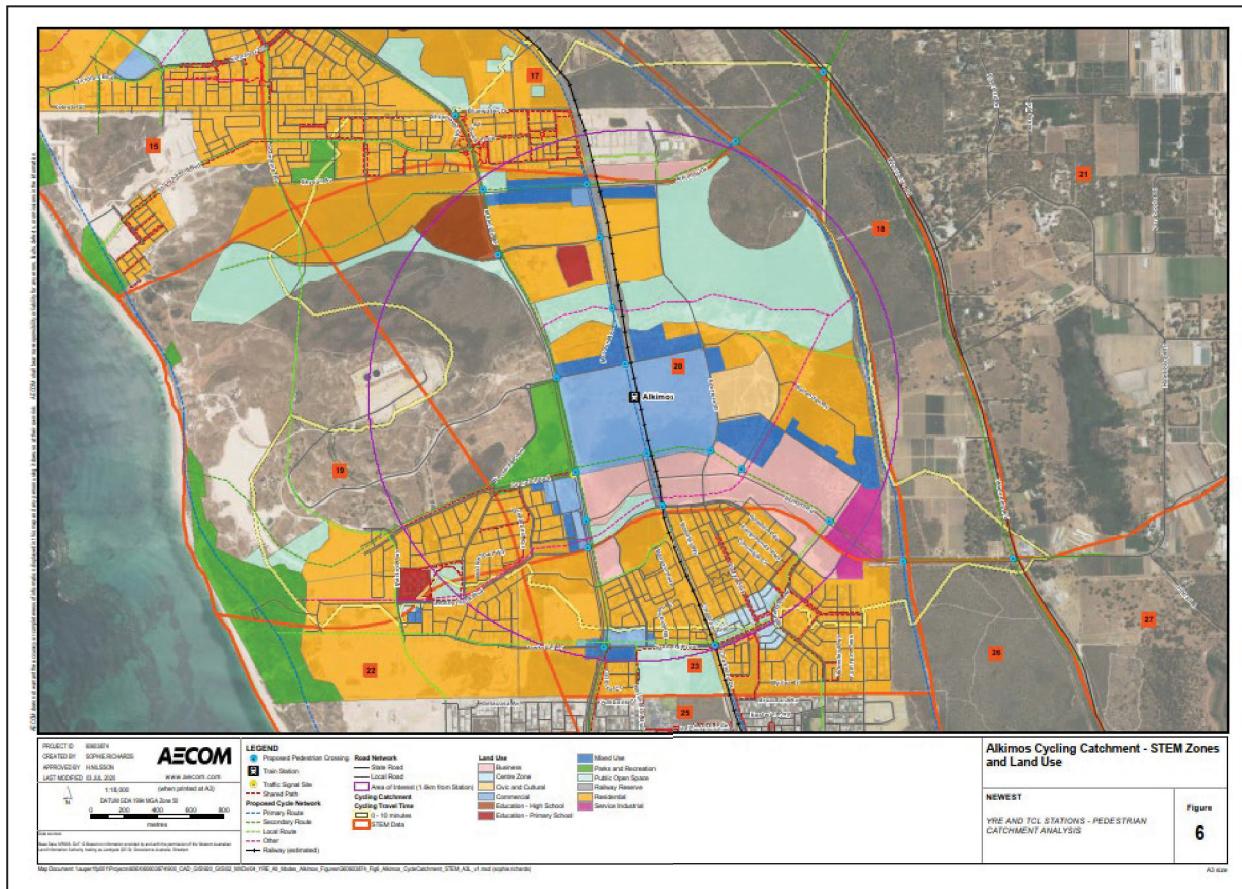
MLUFS Zone	Overlap	Adjusted overlap	Bus - 2031	Reason for adjustment
15	7%	3%		Large proportion of empty or low patronage land use of MLUFS zone within catchment
17	30%	40%		Areas of MLUFS zone with land use (bushland) with low expected patronage falls outside catchment
18	1%	0%		
19	23%	90%		Areas of MLUFS zone with land use (bushland) with low expected patronage falls outside catchment
20	61%	55%		Large proportion of empty or low patronage land use of MLUFS zone within catchment
22	33%	33%		
23	6%	6%		

# Memorandum

## 4.4 Future (2031) Cycling Catchment Potential

Figure 14 provides an overview of the area overlap between the cyclable catchment and the MLUFS zones, along with detailed land use data. The overlap serves as an indication of the proportion of population and employment within each MLUFS zone that will form part of the potential cycle patronage for Alkimos Station.

*Figure 14: Future (2031) Cyclable Catchment, Land Use and MLUFS Zone Overlap*



# Memorandum

Table 5 highlights the area-based overlaps between the cyclable catchment and the MLUFS zones, along with any adjustment made to the overlap percentage following consideration of the existing and planned detailed land use data sourced from structure plans.

*Table 6: Future (2031) Cyclable Catchment and MLUFS Zone Adjusted Overlap*

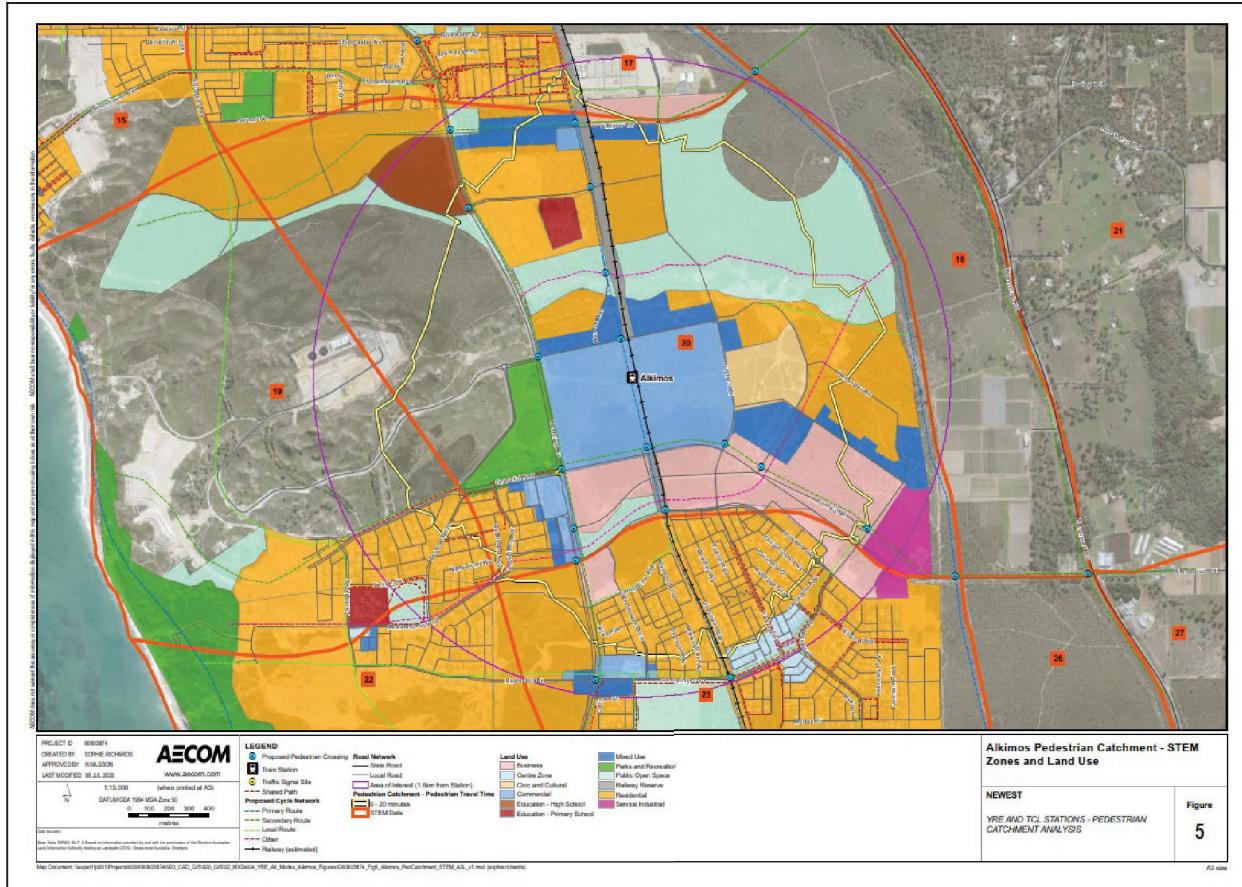
MLUFS Zone	Overlap	Adjusted overlap	Cycling - 2031	Reason for adjustment
17	38%	30%	Large proportion of area of MLUFS zone with land use (bushland) with low expected patronage falls inside catchment	
18	20%	0%	No residential or patronage-generating land use captured	
19	46%	80%	Most of patronage-generating land use within MLUFS zone falls within catchment	
20	97%	100%	Non-overlapping section of MLUFS zone is bushland	
22	1%	1%		
23	53%	53%		
26	1%	0%	No residential or patronage-generating land use captured	

# Memorandum

## 4.5 Future (2031) Walking Catchment Potential

Figure 15 provides an overview of the area overlap between the walkable catchment and the MLUFS zones, along with detailed land use data. The overlap serves as an indication of the proportion of population and employment within each MLUFS zone that will form part of the potential pedestrian patronage for Alkimos Station.

*Figure 15: Future (2031) Walkable Catchment, Land Use and MLUFS Zone Overlap*



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Table 6 highlights the area-based overlaps between the future walkable catchment and the MLUFS zones, along with any adjustment made to the overlap percentage following consideration of the existing and planned detailed land use data sourced from structure plans.

*Table 7: Future (2031) Walkable Catchment and MLUFS Zone Adjusted Overlap*

MLUF S Zone	Overlap	Adjusted overlap	Walking - 2031	Reason for adjustment
17	1%	1%		
19	4%	8%	Relatively small proportion of bushland in overlap compared to overall MLUFS zone	
20	64%	64%		
23	32%	32%		

### 4.6 Mode Share Potential

Table 7 summarizes the adjusted overlaps between the mode-specific catchments and the MLUFS zones, along with the resulting potential patronage volumes based on the adopted YRE Station forecasts presented in Section 3.0. It is important to note that these potential patronage volumes only denote the theoretical maximum patronage volumes for each mode.



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Table 8: Potential Patronage by Mode

MLUFS Zone	Adjusted overlap - 2031				Potential patronage - 2031			
	Car	Bus	Cycling	Walking	Car	Bus	Cycling	Walking
15	10%	3%	0%	0%	1,000	340	0	0
17	35%	40%	30%	1%	2,303	2,988	2,241	75
18	0%	0%	0%	0%	0	0	0	0
19	100%	90%	80%	8%	5,091	5,283	4,696	470
20	100%	55%	100%	64%	9,194	5,598	10,178	6,514
21	99%	0%	0%	0%	306	0	0	0
22	4%	33%	1%	0%	112	1,328	40	0
23	58%	6%	53%	32%	3,233	387	3,423	2,067
26	0%	0%	0%	0%	0	0	0	0
27	0%	0%	0%	0%	0	0	0	0
713	0%	0%	0%	0%	0	0	0	0

## Memorandum

The combined potential patronage volumes for all MLUFS zones and each mode serve as the basis for the upper limits of the mode shares. This is done by calculating the proportion of potential patronage for each mode relative to the potential car patronage, as summarised in Table 8.

*Table 9: Potential 2031 Mode Shares*

2031	Car	Bus	Cycling	Walking
Potential patronage	21,239	15,924	20,578	9,126
Potential mode share	100%	75%	97%	43%
Potential mode share (Arup, 2018; <i>car and walking only</i> )	100%	-	-	51%

### 5.0 Access Mode Share

The effective mode shares for 2031, presented in Table 9, have been derived using bench-marking analysis against similar stations (considering the station typologies and catchment conditions) and consideration of the potential mode shares derived in Section 4.0. These have subsequently been compared to the mode shares suggested by previous YRE 2018<sup>3</sup> analysis (Arup) and YRE 2019<sup>4</sup> analysis (WSP). The car access modes, 'Kiss and Ride' (KnR) and 'Park and Ride' (PnR) have been estimated separately, in order to be able to assess the required parking supply in Section 6.0.

It should be noted that the Arup analysis assumes a future year of 2051 and subsequently has a more optimistic target for active mode shares. The WSP analysis, which builds on the Arup analysis, is based on 2021 mode shares, but assumes fully built out and 100% occupied parking infrastructure at the station. Therefore, the WSP mode shares could potentially underestimate the active mode share targets for a 2031 scenario.

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Table 10: Effective Mode Shares 2031

Mode shares	YRE 2018 <sup>5</sup>	YRE 2019 <sup>6</sup>	STEM	YRE 2020 Analysis	2031	Comments
<b>Walking</b>	5%	3%	33%	18%	Based on the large potential pedestrian patronage for Alkimos Station, and benchmarking against Wellard Station (37%) and Butler Station (33.5%) existing mode shares, with a more conservative estimate of the Alkimos Station developable area (there is a large area of non-developable land to the west of the station).	
<b>Cycling</b>	20%	5%		7%	Based on very large potential cycling patronage for Alkimos Station, and benchmarking against Wellard Station (5%) and Butler Station (3%) target 2031 mode shares.	
<b>Walking + Cycling</b>	25%	8%	33%	25%	Still a conservative assumption compared to existing walking and cycling mode shares for Wellard and Butler Stations and the potential catchments for Alkimos, but does anticipate that development in the next 10 years will focus in Alkimos Town Centre zones closer to the Station.	
<b>Bus</b>	32%	41%	27%	30%	Based on a large potential bus patronage for Alkimos Station, and benchmarking against Butler Station (23%) and Warnbro Station (38%) existing bus mode shares – taking a mid-range mode share suitable for a Bus n Ride typology.	
<b>KnR</b>	17%	14%	14%	15%	Based on benchmarking against existing Butler Station Kiss n Ride mode share.	
<b>PnR</b>	26%	37%	26%	30%	Remaining mode share, and comparable to Butler Station as it currently operates as an end of line station (33.5%) and Warnbro Station which currently operates as a Park n Ride / Bus n Ride Station (33%). There is opportunity for a reduced Park n Ride mode share if active transport modes are strongly encouraged.	

A formalised assessment of effective modes shares for the year 2021 has not been undertaken owing to the uncertainty of the completion of the development surrounding the station. It is likely that much of the development supporting active station access modes will not be in place by 2021. Therefore, a larger proportion of the mode shares are likely to consist of car and bus modes at the Station opening, compared to 2031. An indicative assessment of the mode shares for 2021 is presented in Table 10 and includes a comparison with previous Arup and WSP analysis.

<sup>5</sup> YRE 2018 - Yanchep Rail Extension Strategic Access Planning (Arup, 2018)

<sup>6</sup> YRE 2019 - Yanchep Rail Extension Transport Assessment (WSP, 2019)

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Table 11: Effective Mode Shares 2021

Mode shares	YRE 2018 <sup>7</sup>	YRE 2019 <sup>8</sup>	YRE 2020 Catchment Analysis	2021	Comments
<b>Walking</b>	2%	3%	7%	A conservative estimate to reflect the low likelihood of nearby development being completed at opening, and therefore less than half of the anticipated walking mode share by 2031	
<b>Cycling</b>	10%	5%	5%	A conservative estimate to reflect the low likelihood of nearby development or east-west cycle connections being completed at opening	
<b>Walking + Cycling</b>	12%	8%	12%	A conservative estimate is suggested to reflect the low likelihood of nearby development or east-west cycle connections being completed at opening (but recognising the large potential for cycling as the existing development areas to the north and south of the Station should be directly connected to the PSP at the station opening).	
<b>Bus</b>	12%	41%	28%	A more conservative estimate than the previous WSP bus mode share to reflect a reduced bus network being in place at opening, but still reflecting the intention to for Alkimos to be a Bus n Ride Station Access Typology.	
<b>KnR</b>	31%	14%	20%	Assuming a greater proportion of passengers will originate from outside the walking and cycling catchment due to limited development in Alkimos Town Centre being completed by the Station opening.	
<b>PnR</b>	45%	37%	40%	Remaining mode share; if unlimited parking is provided.	

Table 11 presents the resulting patronage volumes for each mode for the years 2021 and 2031.

Table 12: Patronage by Mode

Patronage by mode	2021		2031
	Walking	Cycling	
<b>Walking</b>	152		486
<b>Cycling</b>	108		189
<b>Bus</b>	607		810
<b>KnR</b>	433		405
<b>PnR</b>	867		810

<sup>7</sup> YRE 2018 - Yanchep Rail Extension Strategic Access Planning (Arup, 2018)

<sup>8</sup> YRE 2019 - Yanchep Rail Extension Transport Assessment (WSP, 2019)

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## 6.0 Station Requirements

Based on the PnR patronage volumes estimated in Section 5.0, long-term parking supply requirements for Alkimos Station has been assessed, using an assumed 1.1 parking space turnover rate and 1.2 vehicle occupancy rate (comparable to the assumptions used in the previous Arup and WSP analysis). The resulting necessary parking supply is presented in Table 12, along with a comparison against previous YRE analysis, STEM modelling assumptions and current design provision. The analysis suggests that the current design provision exceeds estimated demand for parking in 2031.

If a greater proportion of development has been delivered by 2031 within the future station walking catchment, the Park n Ride mode share is likely to decrease (with increased active modes) and / or result in an increase in overall patronage.

For the station opening (2021), the assumed minimal delivery of east-west active mode connections to Alkimos Station, and assumed small proportion of new development being completed within the active mode catchments, will limit the walking and cycling mode share, with a conservative estimate of an 12% active mode share to the new Station as outlined in Table 10. Along with an assumed more limited bus network, this would result in an approximate Park n Ride mode share of 40%. If the forecast patronage of 2,167 daily boardings was met with this mode share, the proposed level of parking provision would still meet the demand. However, if there is a reduced walking, cycling and bus catchment by 2021 it is also likely there will be reduced overall patronage for the station, which would result the parking being oversupplied at the Station opening, and discouraging passengers from using any other access modes.

*Table 13: Future (2031) Parking Requirements*

Parking	YRE 2018 <sup>5</sup>	YRE 2019 <sup>6</sup>	STEM	Current 15% Design	YRE 2020 Catchment Analysis
2021	151	615		660	656
2031	493	615	600	636	614

## 7.0 Conclusions

This note has reviewed the future catchment and proposed station access mode shares for Alkimos Station. Based on this analysis, the proposed parking supply will meet demand for the 2021 and 2031 patronage forecasts.

In the interim period for the Station opening, and until the full potential development outlined in the Alkimos City Centre Structure Plan is realised, it is essential that quality and direct walking, cycling and bus connections are delivered in parallel to the METRONET Station project. This is particularly to the existing development to the north and south of the station which could be within a 20 minute walk and 10 minute cycle of the station, if direct east-west connections are provided to the proposed PSP via Romeo Road (to Marmion Avenue), and via the proposed rail crossings at LWP2 Rd and Santorini Promenade.

In addition, promotion of the walking, cycling and bus connections and the corresponding journey time to the stations via these modes should be a key part of marketing to the local community for the Station opening and as new developments are completed. This is critical to attract and service potential passengers for Alkimos Station and support the METRONET and Structure Plan objectives,



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with travel behaviour patterns formed from the opening of the Station likely to dictate how passengers continue to access

## **APPENDIX J**

## **TRANSPORT IMPACT ASSESSMENT**

# Alkimos Station: Transport Impact Assessment

METRONET Stage 1 Initiatives: Yanchep Railway Extension and Thornlie-Cockburn Link

## Document Approval

Rev	Date	Prepared by	Reviewed By	Approved by
A	15-Jul-2020	Ronan Tyrie-Phillips, Ryan Townsend	Teresa Matassa	Chris Deshon
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## Document Details

PTA Project:	180093 – METRONET Stage 1 Initiatives: Yanchep Railway Extension and Thornlie-Cockburn Link
PTA Document number:	
NEWest Document number:	TCY-DJV-YSA-TM-RPT-0001
Revision date:	15-Jul-2020
Revision:	A

## DETAILS OF REVISION AMENDMENTS AND PLAN TERMINOLOGY

### Document Control

The Transport Engineer is responsible for updating this plan to reflect changes as required.

### Amendments

Any revisions or amendments must be approved by the Transport Engineer and/or the Design Manager before being distributed or implemented.

### Revision Details

Revision	Details
A	Issued for 15% Design

### Terms and Definitions

Term	Meaning
DoS – Degree of Saturation	<p>The DoS is a measure of available capacity at a road intersection, and is the ratio of the demand to capacity. The reported figure in this report reflects the maximum forecast DoS at the intersection:</p> <ul style="list-style-type: none"> <li>- A DoS less than 90 percent indicates that a vehicle movement / intersection is able to operate within the practical capacity, and is less likely to experience significant movement delays.</li> <li>- A DoS over 90 percent indicates a vehicle movement / intersection has exceeded practical capacity and is more likely to experience some delay or congestion, with mitigation measures likely to be required to ensure adequate capacity for priority movements at peak periods.</li> </ul> <p>A DoS of 100 percent or more indicates an intersection has exceeded practical capacity which would likely result in delay for vehicle movements, and be generally considered an undesirable outcome.</p>
LoS – Level of Service	<p>The LoS is a measure of the forecast delay for vehicle movements at a road intersection. The LoS measure ranges from A to F, and provides an indicator of the performance of the network or individual movement based on the average delay per passenger car unit (pcu).</p> <p>For the YRE Station Accesses:</p> <ul style="list-style-type: none"> <li>- LoS D is considered acceptable at peak times</li> <li>- LoS E or F for a priority movement reflects unacceptable delay and / or queuing at an intersection. For minor movements, this may be acceptable if queuing does not result in safety issues or impact other movements.</li> </ul>
Aimsun	Transport network modelling software
SIDRA	Intersection analysis software used to analyse intersection performance

## Abbreviations and Acronyms

Abbreviation/Acronym	Definition
DoS	Degree of Saturation
LoS	Level of Service
PSP	Principle Shared Path
PTA	Public Transport Authority
ROM24	Regional Operations Model version 24— Main Roads strategic transport network model used for forecast road demand
WAPC	Western Australian Planning Commission
YRE	Yanchep Rail Extension

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## 1.0 INTRODUCTION AND BACKGROUND

### 1.1 METRONET YANCHEP RAIL EXTENSION BACKGROUND

The proposed Alkimos Station forms part of the wider METRONET Yanchep Rail Extension (YRE) project to deliver an extension of the existing rail line, north of the current terminus station at Butler. The project aims to deliver a 14.5km rail extension between Butler and Yanchep to support the ongoing growth in the region and alleviate traffic congestion along key routes by providing a wider reaching public transport service to the outer regions of Perth.

The YRE project is to be delivered by the NEWest Alliance, on behalf of the Public Transport Authority (PTA).

Yanchep has been identified as an emerging Strategic Metropolitan Centre by State Planning Policy 4.2 – Activity Centres for Perth and Peel (2010), the Yanchep Two-Rocks District Structure Plan (2010) and the Yanchep City Local Structure Plan No. 68 (2011). The City Centre will provide the economic core for the region accommodating a projected working population of 23,500 by the year 2031.

The primary components of the YRE project include the construction of three new train stations at the key locations of Alkimos, Eglinton and Yanchep. Each of the proposed new train stations will also include a bus station for public transport connectivity, Park & Ride, Kiss & Ride plus infrastructure for other active modes including walking and cycling.

*Figure 1. YRE Project Overview*



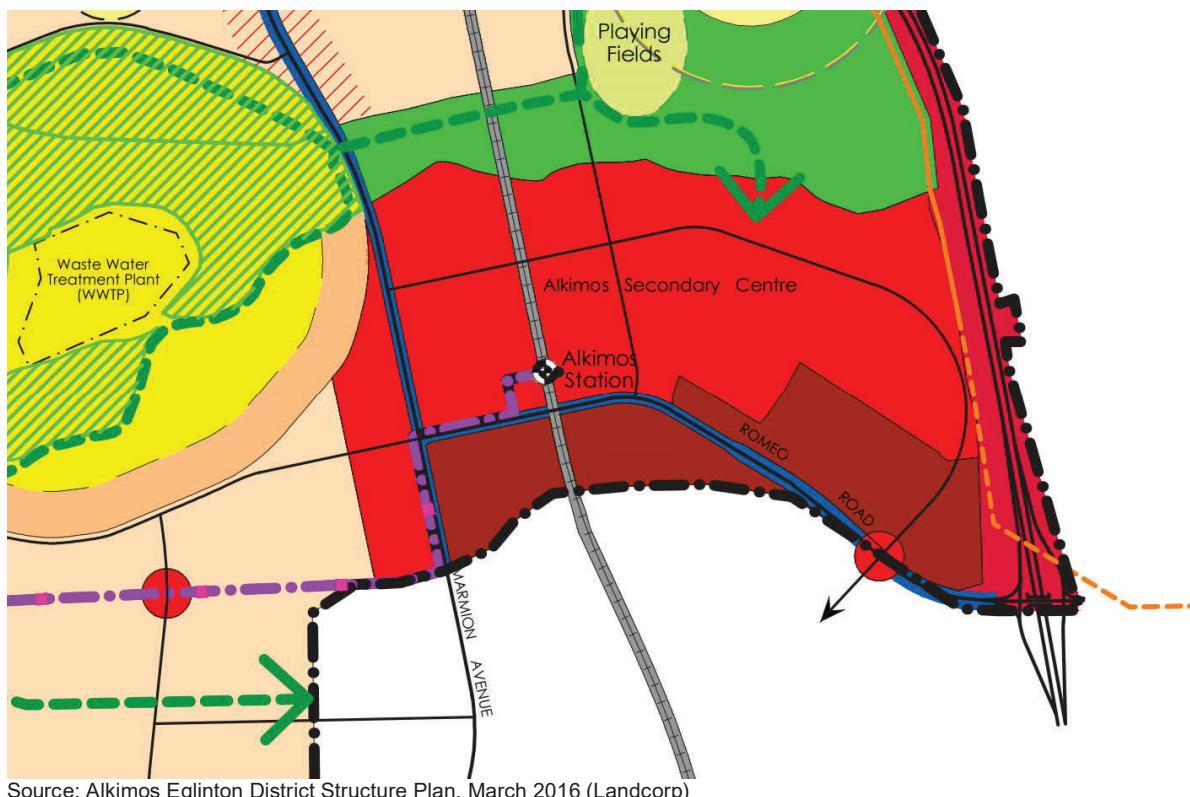
Source: METRONET

## 1.2 PROPOSED ALKIMOS STATION BACKGROUND

The proposed Alkimos Station is located on the Yanchep Rail Extension line, approximately 45km north of Perth. The proposed station site is to be located east of Marmion Avenue and north of the future Romeo Road alignment. Wanneroo Road is also located approximately 2km east of the station location, with road connectivity being provided by Romeo Road. Connectivity to a future Mitchell Freeway extension is also anticipated east of the station, again via Romeo Road.

As per the Alkimos Eglinton District Structure Plan, the Alkimos Secondary Centre in relation to the proposed train station, is shown in Figure 2.

Figure 2. Alkimos Secondary Centre



Alkimos Station will be the first of the new stations along the Yanchep Rail Extension line, extending north from the existing Butler train station. The Alkimos Station will allow for improved public transport access and connectivity from surrounding areas and reduce the distance required to be travelled for those living near Alkimos where Butler Station is currently their closest train station.

## 1.3 PURPOSE OF THIS DOCUMENT

This Transport Impact Assessment (TIA) has been prepared to support the development application of the proposed Alkimos Station and seeks to outline the existing and proposed transport elements associated with Alkimos Station, due to be constructed as part of the wider METRONET YRE project.

As per the Western Australian Planning Commission (WAPC) Transport Impact Assessment Guidelines for Individual Developments (Volume 4), it is anticipated that the station will generate in excess of 100 vehicle trips within the development peak hour – resulting in what is considered to be a ‘high’ level of impact. Therefore, a transport impact assessment level of investigation is deemed to be appropriate for this development.

As such, this document has been prepared in accordance with the framework established within the WAPC guidelines.

## 1.4 EXISTING SITUATION

### 1.4.1 PROJECT SITE

The site of the proposed Alkimos Station is located approximately 400m east of the existing intersection of Marmion Avenue and Brindabella Parkway. A future access point east of Brindabella Parkway is anticipated to serve as the main access between Marmion Avenue and the future station. Additional road connectivity to a future Mitchell Freeway extension east of the site is also expected to be provided via the nearby Romeo Road upgrade, to be completed over time as part of the wider road network upgrades in the area.

The proposed station is to be located on a currently unoccupied greenfield parcel of land. The approximate site boundary is shown in Figure 3.

*Figure 3. Proposed Alkimos Station Location*



Source: Google Maps

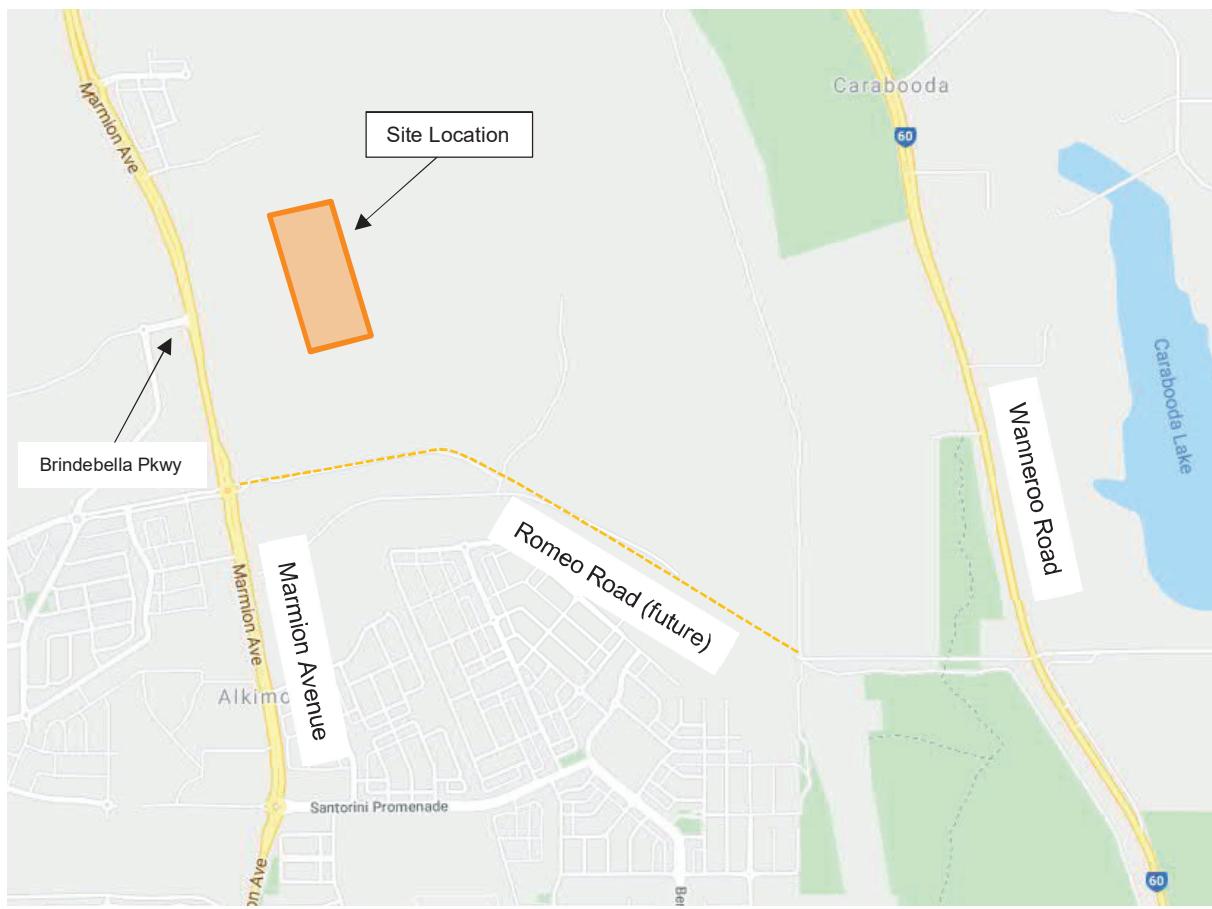
As the site is currently unoccupied, there are no existing land uses or traffic generation associated with site usage in or adjacent to the proposed Alkimos Station boundary.

## 1.5 SURROUNDING ROAD NETWORK

### 1.5.1 LOCAL ROAD NETWORK

The road network in the area surrounding the proposed Alkimos Station site is shown in Figure 4.

Figure 4. Alkimos Station Surrounding Road Network



The Alkimos Station site is expected to be primarily accessed from a new connector road at the intersection with Marmion Avenue (via an extension of the existing Brindabella Parkway east of Marmion Avenue). An upgraded intersection treatment at the existing Marmion Avenue / Brindabella Parkway junction will be required to accommodate the additional approach from the new station connection road. This access is expected to be constructed by others, in coordination with NEWest. The new connector will form part of the new internal road network surrounding the station and the developing area within the Alkimos Secondary Centre.

Marmion Avenue is the nearest major road running adjacent to the site and will likely serve as the major north-south distributor road for vehicles seeking to access the proposed station. Marmion Avenue provides key regional connectivity along the western coast of Perth from the West Coast Highway / Karrinyup Road intersection through to Yanchep Beach Road in the north.

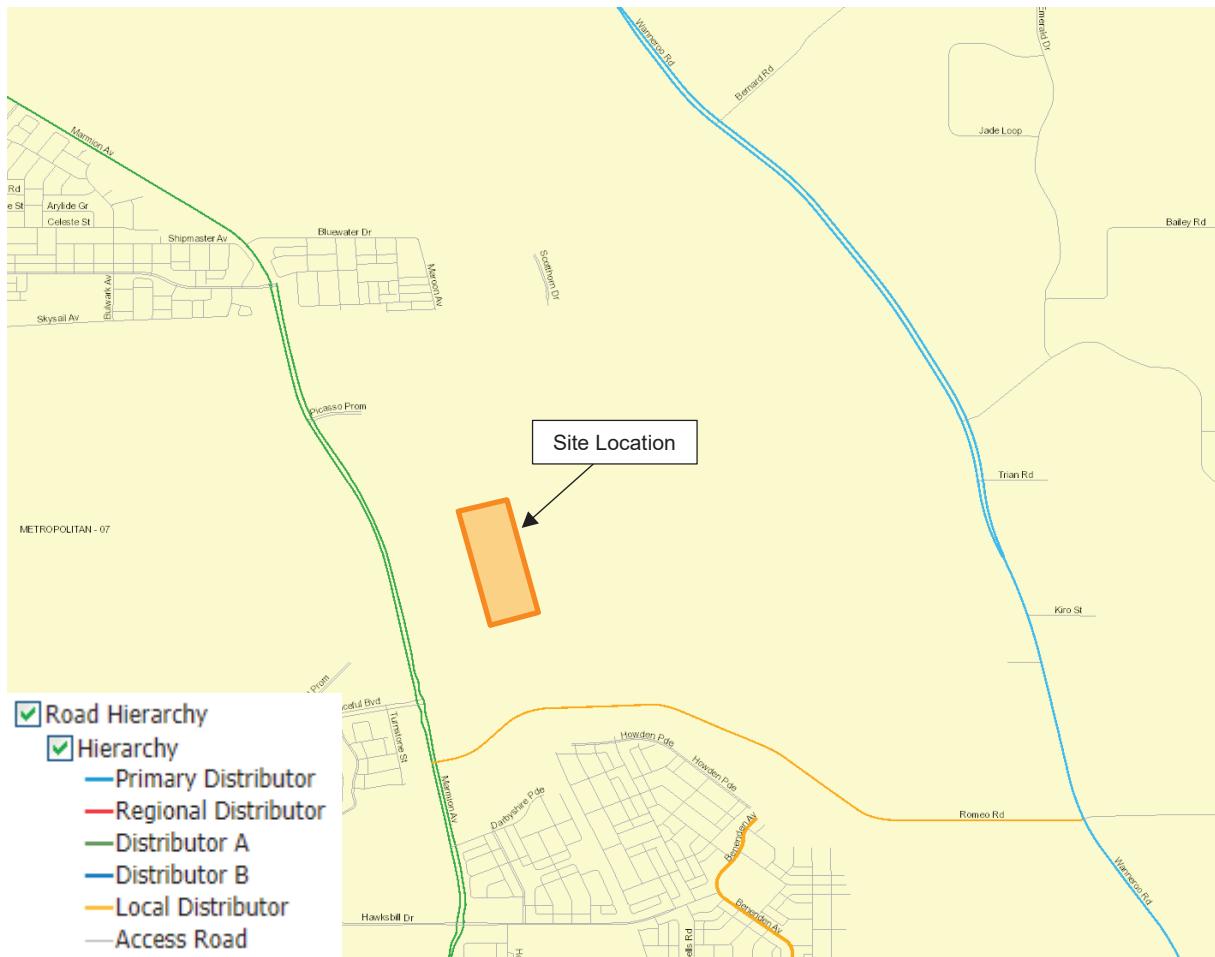
The City of Wanneroo is currently undertaking construction (with expected completion in early 2020) of a dual carriageway upgrade along Marmion Avenue from Reflection Boulevard in Brighton, through to Yanchep Beach Road. Therefore, the section of road adjacent to the proposed station location is currently being upgraded to a two-lane per direction dual carriageway (with median). Marmion Avenue currently has a speed limit of 80km/h in the vicinity of the proposed Alkimos Station.

Wanneroo Road, located east of the proposed station location, provides additional north-south distributor access through the region with future connectivity to the station area via the Romeo Road extension. Wanneroo Road is a one lane per direction single carriageway at the location of the existing intersection with Romeo Road. The current speed limit in this vicinity of Wanneroo Road is 90km/h.

### 1.5.2 MAIN ROADS WA ROAD HIERARCHY

The road hierarchy system of the surrounding network, as per the Main Roads WA Road Information Mapping System, is shown in Figure 5.

*Figure 5. Local Road Hierarchy*



Source: Main Roads WA Road Information Mapping System (<https://mrwebapps.mainroads.wa.gov.au/publicmaps/rim>)

As per the above functional road hierarchy in the vicinity of the proposed site location, Marmion Avenue is classified as a District Distributor A, indicating that this route is managed by the local government, City of Wanneroo.

Wanneroo Road is classified as a Primary Distributor and is therefore managed by Main Roads WA.

Finally, Romeo Road is classified as an access road and would be managed by local government, City of Wanneroo.

## 1.6 EXISTING TRAFFIC FLOW INFORMATION

### 1.6.1 MARMION AVENUE

Marmion Avenue traffic flow information was sourced from the Main Roads WA Traffic Map. The nearest segment of road to the project area with recent traffic data is from the detector located south of the Graceful Boulevard intersection in Alkimos (located approximately 600 metres south of the future station access point on Marmion Avenue). Latest data available for this segment of Marmion Avenue is from the 2017/18 period.

The recorded AM peak and PM peak counts for Marmion Avenue are summarised in Table 1 and Table 2, respectively.

*Table 1. Marmion Avenue 2017/18 AM Peak Counts*

Marmion Avenue	2017/18 AM Peak (08:00 – 09:00)	
	Northbound	Southbound
Light Vehicles	739	1,121
Heavy Vehicles	54	34
Total	793	1,155

*Table 2. Marmion Avenue 2017/18 PM Peak Counts*

Marmion Avenue	2017/18 PM Peak (15:00 – 16:00)	
	Northbound	Southbound
Light Vehicles	1,040	816
Heavy Vehicles	55	27
Total	1,095	843

### 1.6.2 WANNEROO ROAD

Traffic data for Wanneroo Road was also sourced from the Main Roads WA Traffic Map. Information was obtained from the detector located approximately 300 metres north of the Romeo Road intersection for the 2017/18 period.

The recorded AM peak and PM peak counts for Wanneroo Road are summarised in Table 3 and

Wanneroo Road	2017/18 AM Peak (08:00 – 09:00)	
	Northbound	Southbound
Light Vehicles	274	559
Heavy Vehicles	57	68
Total	331	627

Table 4, respectively.

Table 3. Wanneroo Road 2017/18 AM Peak Counts

Wanneroo Road	2017/18 AM Peak (08:00 – 09:00)	
	Northbound	Southbound
Light Vehicles	274	559
Heavy Vehicles	57	68
Total	331	627

Table 4. Wanneroo Road 2017/18 PM Peak Counts

Wanneroo Road	2017/18 PM Peak (15:00 – 16:00)	
	Northbound	Southbound
Light Vehicles	563	388
Heavy Vehicles	65	55
Total	628	443

## 1.7 EXISTING BUS ROUTES

Current Transperth bus route information for the area surrounding the Alkimos Station site has been sourced from Transperth timetables and network mapping.

The bus routes which currently operate in the vicinity are shown in Figure 6.

*Figure 6. Existing Transperth Bus Route Map*



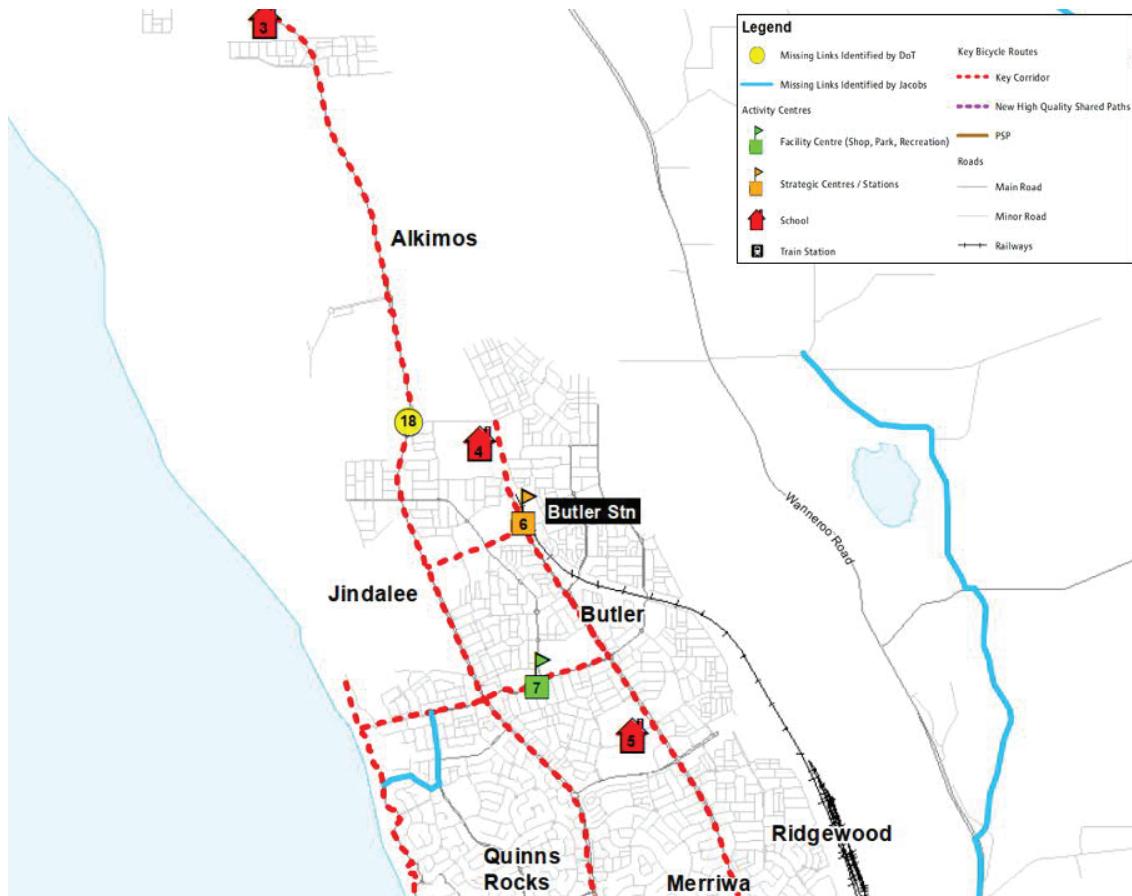
Source: Transperth Network Maps (<https://www.transperth.wa.gov.au/journey-planner/network-maps>)

From the Transperth network map, there are presently two bus routes which travel past the project site along Marmion Avenue, which connect Butler Station to both Yanchep (Routes 490, 491) and Two Rocks (Route 490). Currently, neither of these bus routes access east of Marmion Avenue where the future Alkimos Station access is expected to be located.

## 1.8 EXISTING PEDESTRIAN AND CYCLING NETWORK

The vicinity of the proposed Alkimos Station is not currently covered by the Department of Transport Joondalup and Stirling bike map, as this presently extends only as far as Butler. However, satellite maps indicate that Marmion Avenue currently provides sealed shoulders on either side of the road, both north and south of the Brindebella Parkway intersection. There are currently no footpaths on either side of Marmion Avenue in the subject area.

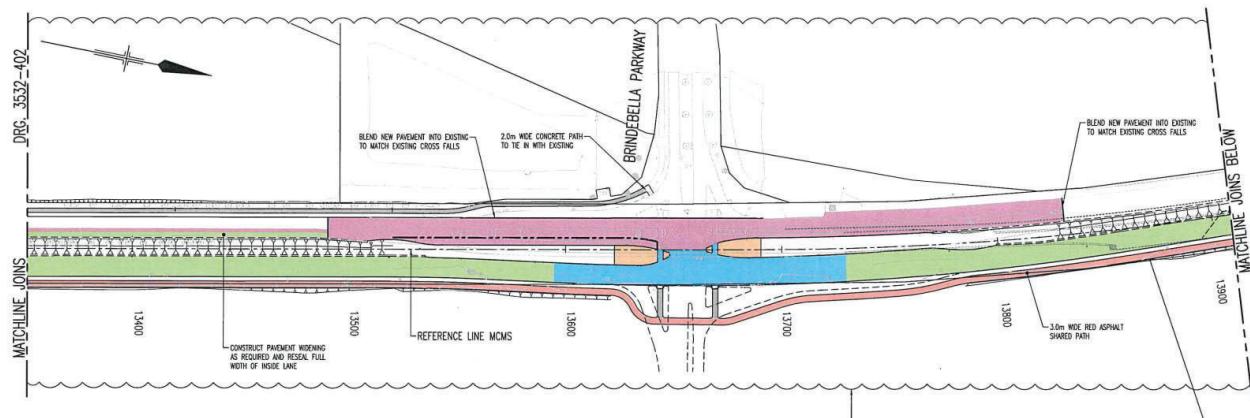
Figure 7. Alkimos Existing Pedestrian and Cycle Network



Source: City of Wanneroo ([https://www.wanneroo.wa.gov.au/downloads/download/323/city\\_of\\_wanneroo\\_bicycle\\_plan](https://www.wanneroo.wa.gov.au/downloads/download/323/city_of_wanneroo_bicycle_plan))

Given the duplication of Marmion Avenue that is currently underway, the existing pedestrian and cycle network is expected to receive some upgrades along Marmion Avenue as part of these works. Plans obtained from the City of Wanneroo information page on the Marmion Avenue dualling indicate that a new 3.0 metre wide shared path is to be provided along the eastern side of the roadway, between Santorini Promenade and Yanchep Beach Road. An excerpt of these plans adjacent to Brindebella Parkway is shown in Figure 8.

Figure 8. Marmion Avenue Duplication Plans (near Brindabella Parkway)



Source: City of Wanneroo ([https://www.wanneroo.wa.gov.au/directory\\_record/424/marmion\\_avenue\\_dualling\\_to\\_yanchep](https://www.wanneroo.wa.gov.au/directory_record/424/marmion_avenue_dualling_to_yanchep))

As a result of these works, it is expected that the provision of the new shared path will improve cycle and pedestrian connectivity along the Marmion Avenue corridor and allow for future connection via the new east-west extension of Brindabella Parkway, to the proposed Alkimos Station.

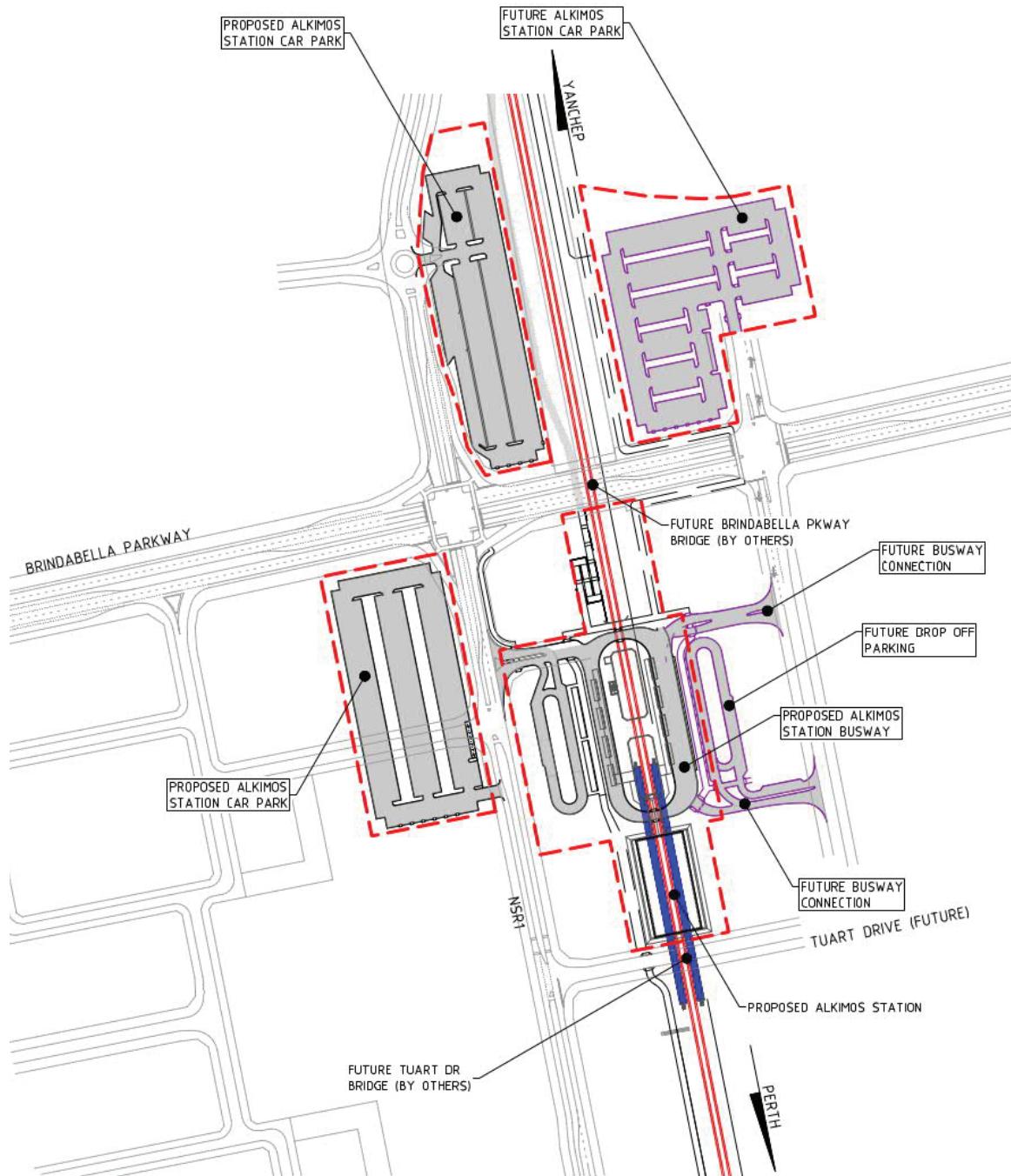
As Romeo Road is not yet fully established, there is currently no formal cycle or pedestrian provision along this roadway.

## 2.0 DEVELOPMENT PROPOSAL

### 2.1 STATION LAYOUT

The proposed Alkimos Station seeks to provide a two platform train station along the Yanchep rail line, along with supporting infrastructure including a 657 bay minimum parking area, drop-off parking zone, and a bus interchange. The general site layout for the station precinct (including both Phase 1 and Phase 2 development) is illustrated in Figure 9.

*Figure 9. Alkimos Station Overall Site Plan*



Critically for the Alkimos Station precinct, it is important to note that the development of the area will happen in two distinct phases. As the Station forms part of the overall Alkimos City Centre Structure Plan, it is required that the development of the station infrastructure occurs in line with this overall strategy and is compatible with the staging of the surrounding area. With this in mind, the development of the Alkimos Station is assumed to occur over the following key phases.

### 2.1.1 PHASE 1: OPENING YEAR

This phase represents the ‘Opening Year’ scenario (anticipated to be ~2021) of when the station will become open to the public and is anticipated to last for an interim timeframe of at least 5 years, or until further major elements of the overall structure plan are progressed (leading in to Phase 2).

In the opening year scenario, it is anticipated that land to the eastern side of the rail line is likely to be largely inaccessible and/or undeveloped, due to staged construction of bridge infrastructure over the rail corridor (including the Brindebella Parkway and Tuart Drive bridges). Therefore, in the opening year the supporting station infrastructure, including two car parking areas and drop-off area, will be located on the western side of the rail corridor and accessed via North-South Road 1 (NSR1).

In this scenario, Car Park #1 (located north-west of Alkimos Station) will be an interim car parking location from the opening year until Phase 2. Similarly, the drop-off parking area (located north of the station building) will be accessible from the opening of the station but will eventually move in Phase 2 of the development. Both of these areas in the opening year scenario will be accessible via NSR1, south of Brindebella Parkway. The Phase 1 drop-off area and the bus interchange will share an access point along NSR1.

Car Park #2 will be located north of the station and will be a permanent car parking location that will not be relocated in Phase 2 of the development. This parking area is accessed by NSR1, north of Brindebella Parkway.

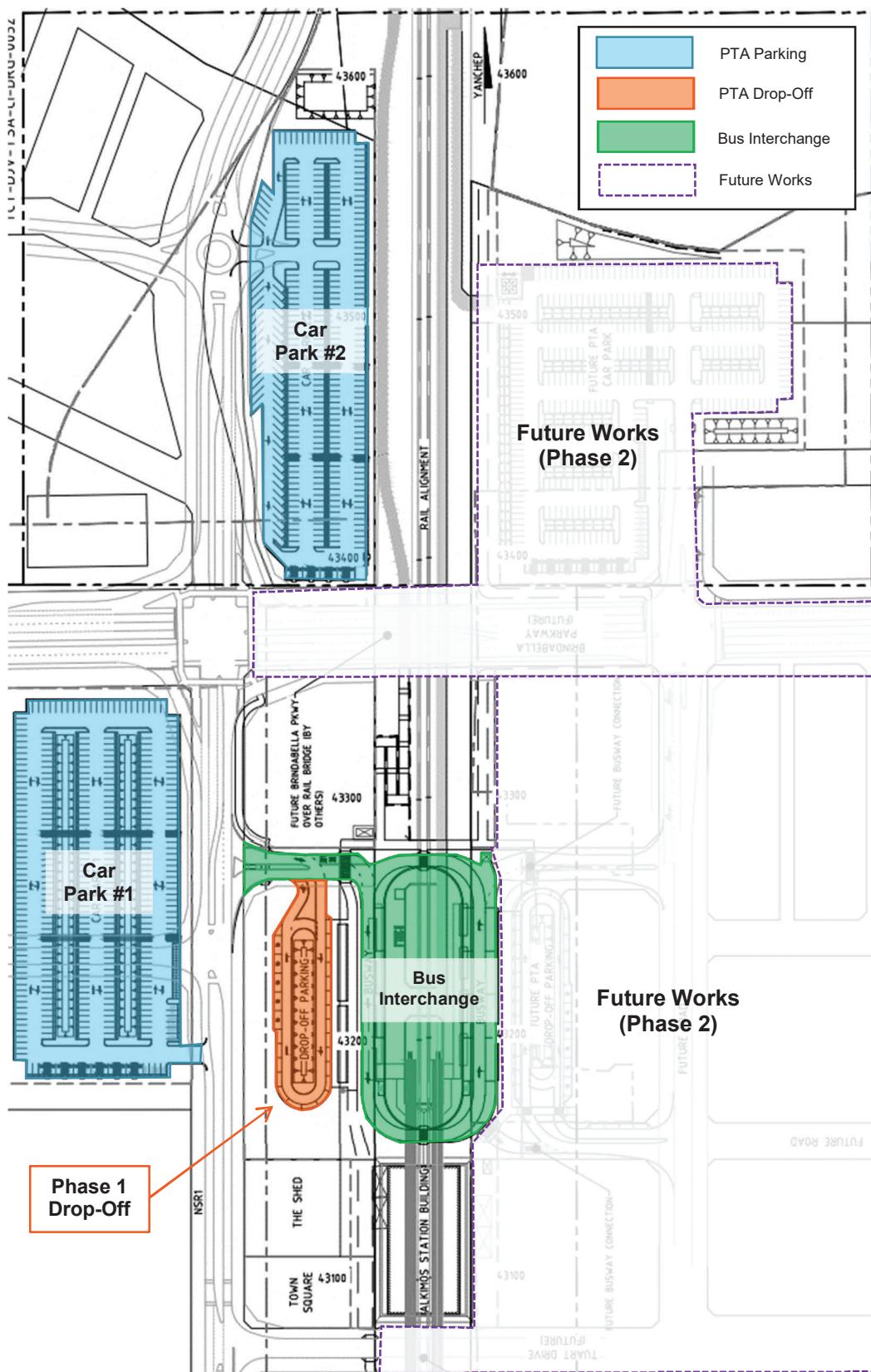
While the ultimate configuration at the intersection of Brindebella Parkway and NSR1 allows for a four-way signalised intersection, it is anticipated that in the opening year scenario this intersection will be constructed as a three-way priority controlled intersection which can be later modified to allow the Brindebella Bridge connection to the east and signal infrastructure to be installed.

PSP connectivity in the Phase 1 opening year scenario is also proposed to be located along the western side of the rail reserve. Further details on the PSP connectivity through the station precinct in Phase 1 are discussed in Section 3.6.

As the construction of both Brindebella Parkway and NSR1 are the responsibility of separate developer organisations, these common intersections that will be used to service the wider Alkimos City Centre will not form part of this Transport Impact Assessment. This assessment will focus primarily on the direct access points to / from the PTA site (including car parks and bus interchange) to inform the development of these access points and confirm that vehicle access to the Alkimos Station site is not likely to adversely impact the surrounding road network.

Phase 1 of the Alkimos Station development infrastructure is highlighted in Figure 10. Elements of the future Phase 2 development plan have also been partially greyed out to indicate that these are not part of the opening year scenario.

Figure 10. Phase 1: 'Opening Year' Station Works



## 2.1.2 PHASE 2: FUTURE YEAR

The future year phase of the Alkimos Station development represents the likely ultimate configuration of the station precinct once the remaining major infrastructure elements of the Alkimos City Centre have been completed. For the purposes of this assessment, it is assumed that Phase 2 of the development will be completed by the year 2031. However, as the staging of the surrounding development is to be driven largely by developers, the actual timeframe for when individual elements of the infrastructure are completed is not yet confirmed.

Phase 2 largely incorporates the completion of the Brindebella Parkway and Tuart Drive bridges, thereby opening up the land to the east of the rail corridor for development. Additionally, the land located to the west of the station precinct is to become the new Town Centre.

To facilitate this, Car Park #1 from Phase 1 of the works is to be relocated north-east of Alkimos Station in order to make the future Town Centre land open for development. The Station drop-off parking area will also be relocated to the eastern side of the rail corridor to allow other development to occur in its place. Both the future Car Park #1 and the relocated drop-off parking will be accessed via a new north-south local road connection located east of the station site (name of this road to be confirmed at a later date). The future Car Park #1 will have access via a new signalised intersection at Brindebella Parkway and the future north-south road (to be constructed by others).

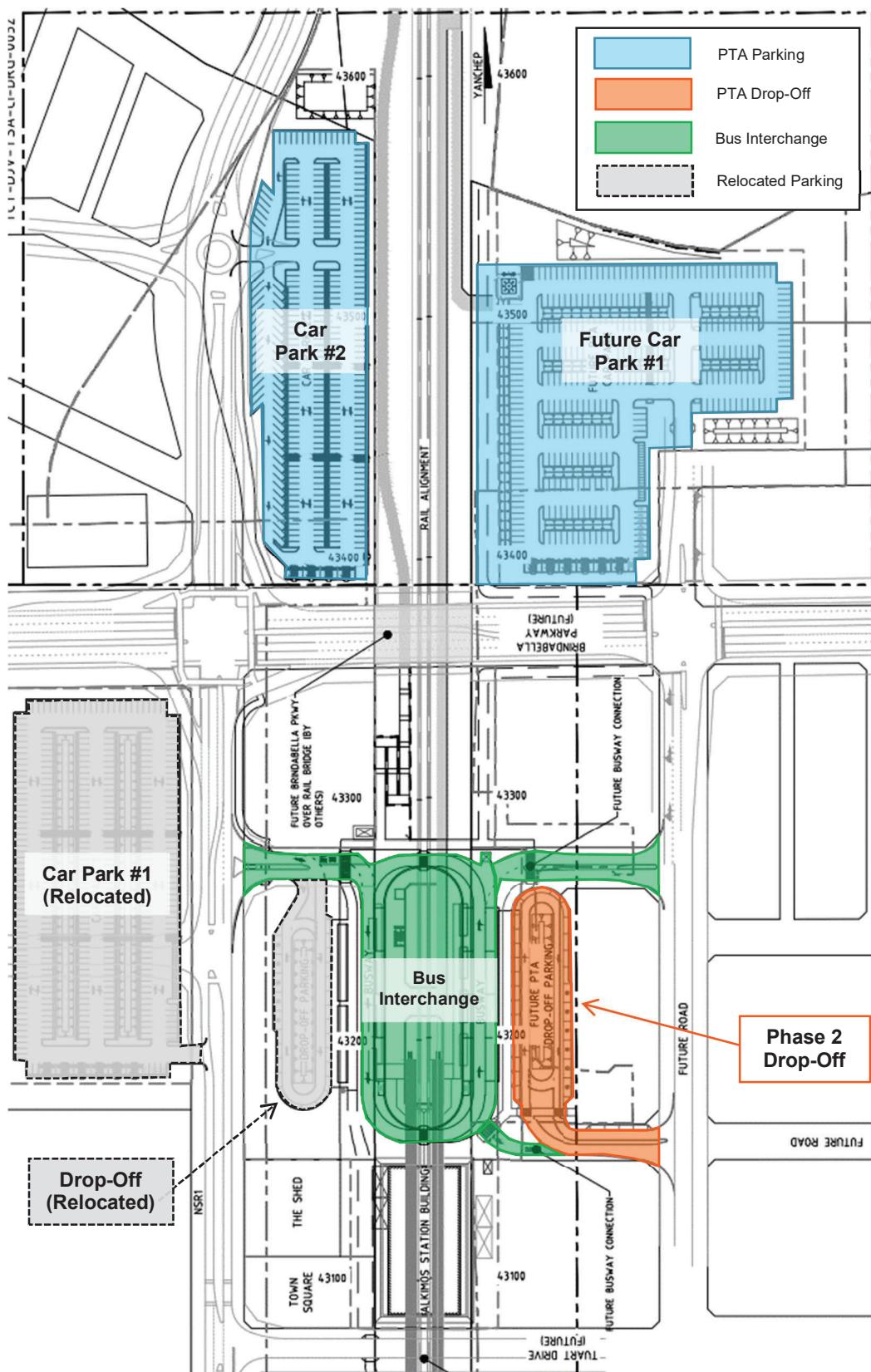
The location of Car Park #2 remains unchanged and is still accessed via NSR1 in this future year scenario. The location of the bus interchange also remains unchanged, however additional access points are to be provided to the east of the station in order to allow buses to approach the site from both the east (new access points) and the west (previous access point retained from Phase 1).

PSP connectivity is also to the eastern side of the rail reserve in Phase 2, along with the relocation of Car Park #1 and the station drop-off area. Further details on the PSP alignment changes through the station precinct are discussed in Section 3.6.

Finally, other local and distributor road connections to the south and to the east of the Alkimos Station site are expected to be completed by this time, in accordance with the Alkimos City Centre Structure Plan. This will improve the local connectivity in the region, further opening up the Alkimos City Centre and in turn the Alkimos Station to patrons in the nearby community.

Phase 2 of the Alkimos Station development infrastructure is highlighted in Figure 11. Note that elements of the previous Phase 1 development plan that have been relocated as part of Phase 2 have been partially greyed out to indicate that these are not part of the scenario.

Figure 11. Phase 2: 'Future Year' Station Works



## 2.2 CHANGES TO SURROUNDING TRANSPORT NETWORKS

As part of the wider Alkimos City Centre structure plan development, the construction of several new site access roads are required to provide vehicle connectivity to the area that includes the proposed Alkimos Station.

In the Phase 1 opening year scenario, this primarily includes the construction of an extension to the existing Brindebella Parkway east of Marmion Avenue. An upgraded intersection control (likely signals) at this location is also anticipated, in order to accommodate the turning vehicles on and off Marmion Avenue. The main north-south distributor road which will be used to access the station site will also be constructed in Phase 1, with this road currently referred to as North-South Road 1 (NSR1). Note that both the extension of Brindebella Parkway (including signals) and NSR1 are to be constructed by others, in coordination with NEWest.

Additionally, the anticipated construction of Romeo Road to the south of the Alkimos City Centre will be a major catalyst for vehicle movement in the region, as this will form a key new east-west arterial road that will ultimately connect to the planned future Mitchell Freeway extension. This is a key state project and will be delivered separately by Main Roads WA, however it is assumed that Romeo Road is likely to be constructed by the opening year of the Alkimos Station based on current understanding.

Beyond the access roadways which are expected to be constructed by others in Phase 1 alongside the Alkimos Station project, there are additional wider changes to the transport network in the surrounding area planned in future phases as part of the overarching *Alkimos City Centre Structure Plan No. 89 (August 2018)* that are separate to the Alkimos Station works. This local structure plan is the prevailing masterplan for the Alkimos area and is compliant with the wider Alkimos Eglinton District Structure Plan.

These future network modifications that are part of the latest Alkimos Masterplan are discussed in further detail within Section 2.4: Committed Developments and Other Transport Proposals.

## 2.3 INTEGRATION WITH SURROUNDING AREA

The proposed Alkimos Station is to be located on an area of land east of Marmion Avenue which is currently unoccupied and has no existing land use. Similarly, the area surrounding the proposed station site is undeveloped. Therefore, the integration of the proposed station with the surrounding area, based on the existing land use, is neither positive nor negative.

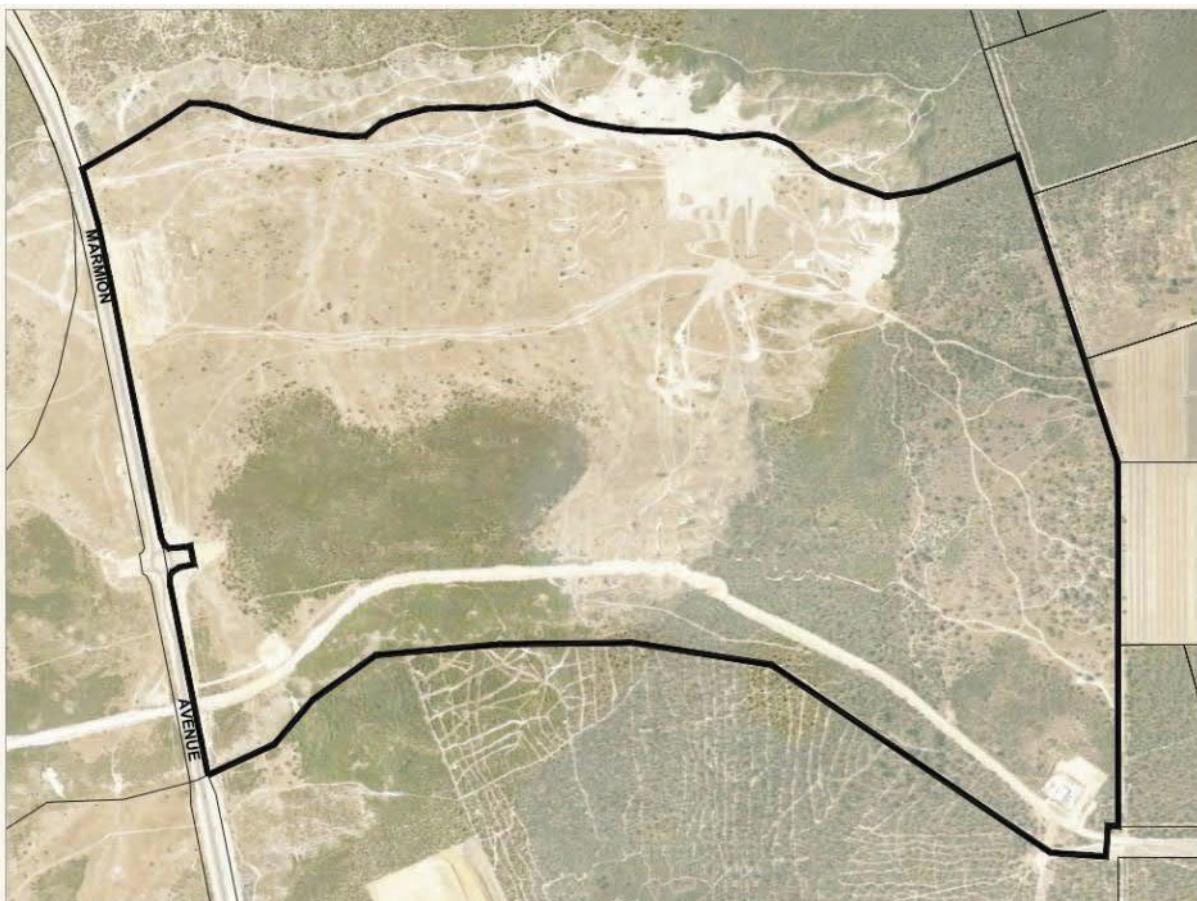
However, Alkimos Station is expected to become one of the key features of the future Alkimos City Centre Structure Plan and the future residential / retail development associated with this local region. Therefore, the presence of the proposed Alkimos Station is expected to become a focal point for the future development of the local area and act as a catalyst for the development of the future city centre via the provision of a transit hub to support the surrounding precinct.

## 2.4 COMMITTED DEVELOPMENTS AND OTHER TRANSPORT PROPOSALS

As noted above, the *Alkimos City Centre Structure Plan No. 89 (August 2018)* is the primary planning document which underpins the surrounding Alkimos area, of which the proposed Alkimos Station forms a critical component.

As per the masterplan, the current Alkimos City Centre area is bounded by Marmion Avenue to the west and the future Mitchell Freeway extension to the east. The future extension of Romeo Road also forms the southern boundary to the site. The site area for the Alkimos City Centre is illustrated in Figure 12.

Figure 12. Alkimos City Centre Site Boundary



Included within the wider Alkimos City Centre Structure Plan is a region allocated for the Alkimos Station, indicated within the Masterplan as the 'Station Precinct'. Other aspects of the Masterplan allow for various areas including residential, commercial, mixed use and civic land uses.

In regard to the Station Precinct, the Alkimos City Centre Structure Plan states the following:

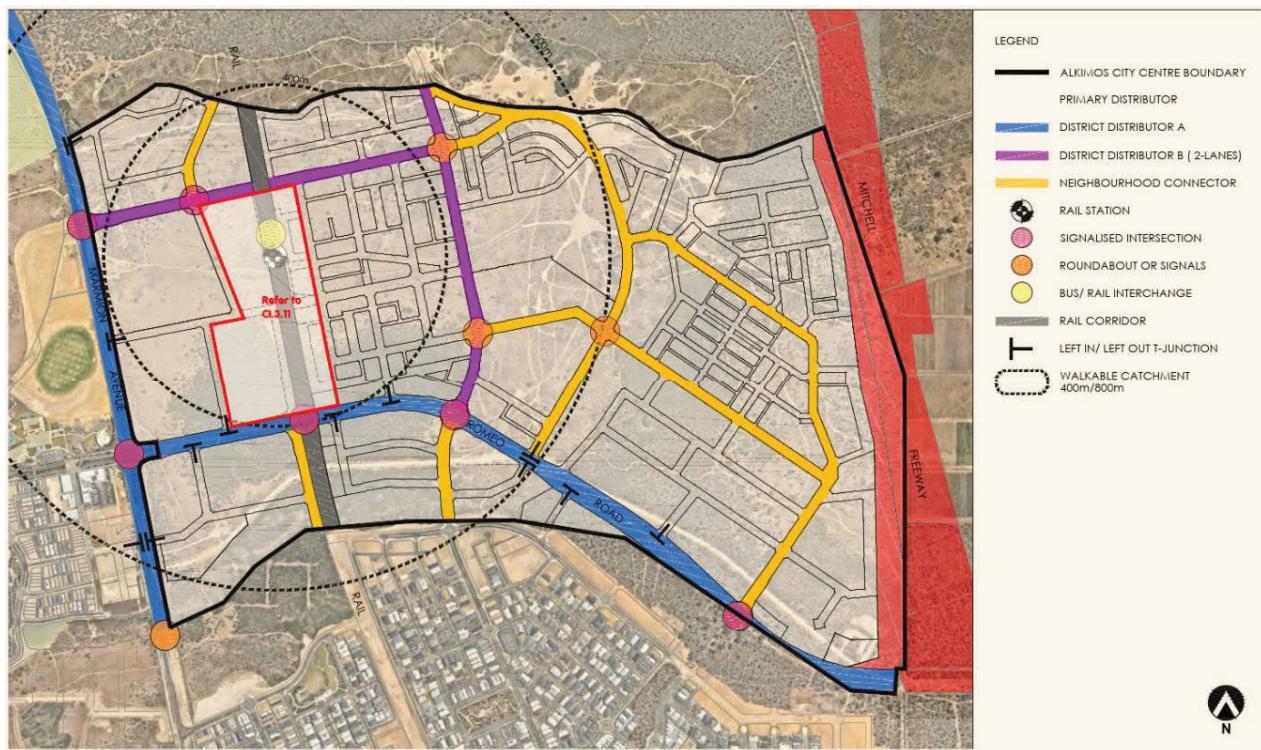
*"The northern rail extension to Yanchep, including the construction of a rail station in the activity centre plan area, is proposed to occur by 2021. The final design of the rail station and associated bus interchange is yet to be finalised by METRONET and the landowner. It has therefore been agreed to specifically identify the transit station site and surrounding area as the "Station Precinct" and for this precinct to have detailed subdivision and development provisions.*

*Once the rail station and bus interchange design has been finalised the detailed subdivision and development provisions for the Station Precinct are required to be provided and approved by the Western Australian Planning Commission in accordance with Clause 40 of the Deemed Provisions of the Planning and Development (Local Planning Schemes) Regulations 2015."*

Therefore, as part of the Alkimos Station development, it will be necessary to ensure that proposed road network changes as part of the station project are compatible with the proposed movement network included within the Alkimos City Centre Structure Plan.

The Structure Plan outlines a proposed ultimate movement network for the city centre that will be implemented over time. The proposed movement network as defined within the Alkimos City Centre Structure Plan is illustrated in Figure 13.

Figure 13. Alkimos City Centre Structure Plan: Proposed Movement Network



Key future changes to the movement network in the area surrounding the Station Precinct include the extension of Romeo Road (indicated as a District Distributor A), which is expected to bound the southern edge of the station site and provide further regional accessibility, particularly in the east-west direction.

The movement network also indicates that Romeo Road will provide connectivity via a future interchange with the next stage of the Mitchell Freeway extension, which bounds the eastern edge of the Alkimos City Centre. Several other future district distributor type roadways also surround the Station Precinct, providing further local connectivity to the various future land uses surrounding the Alkimos Station.

The proposed movement network also indicates that several intersections within the surrounding area may potentially require signalised intersection treatment, including the primary site access point east of the existing Brindabella Parkway intersection. It is again noted that while the signalised upgrade to the Marmion Avenue / Brindabella Parkway intersection is expected to be delivered by the opening of Alkimos Station, this intersection is not covered by this study and will instead be addressed in a separate study on behalf of the developers that are building this local road infrastructure.

Furthermore, the Structure Plan also outlines both the proposed bus network and the indicative pedestrian and cycle network for the ultimate structure plan layout. Note that the bus route plan may be modified following future consultation with Transperth and the community. These networks as shown in the Alkimos City Centre Structure Plan are illustrated in Figure 14 and Figure 15, respectively.

*Figure 14. Alkimos City Centre Structure Plan: Proposed Public Transport Routes*

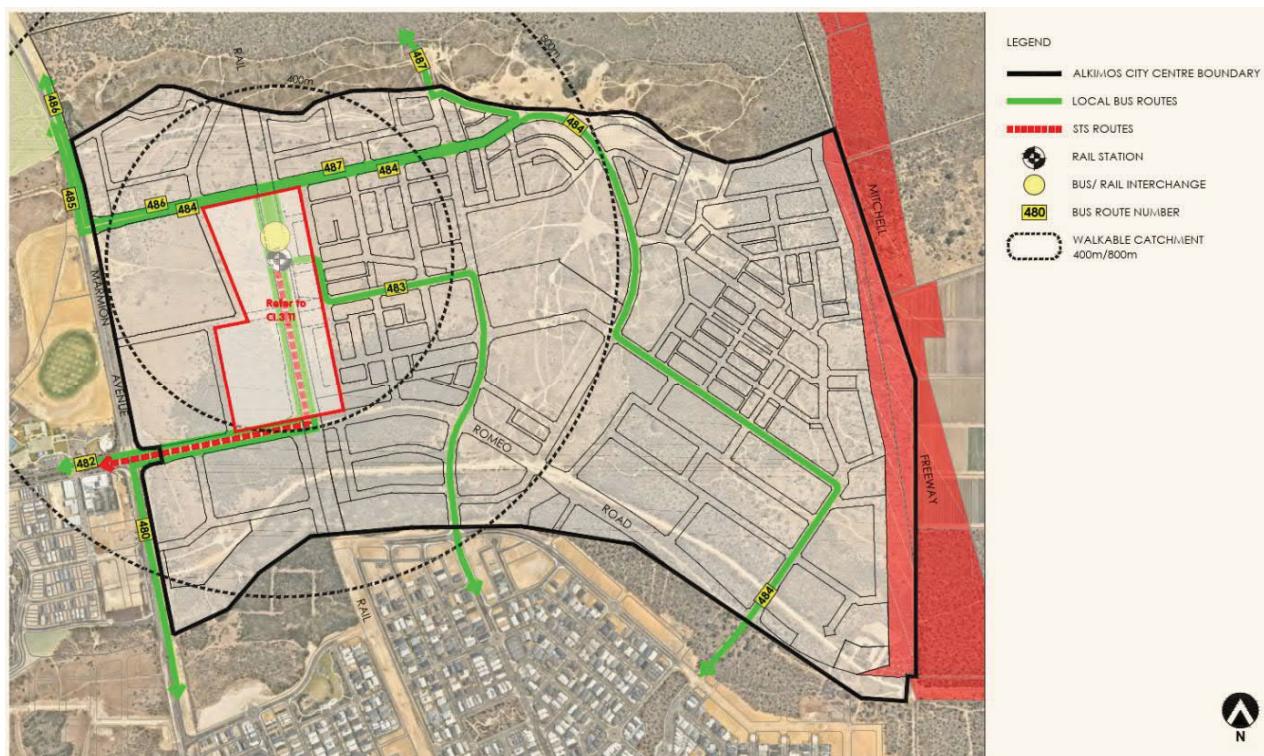
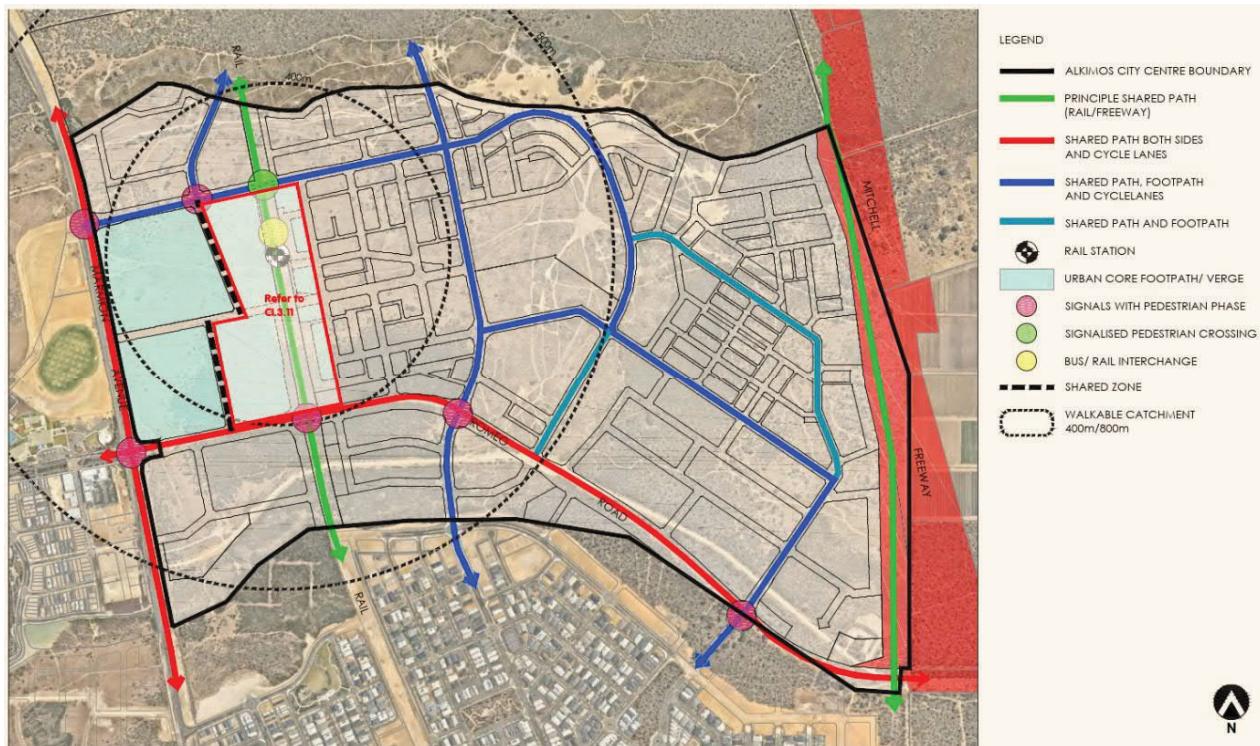


Figure 15. Alkimos City Centre Structure Plan: Proposed Pedestrian & Cycle Networks



Currently, the implementation of the Alkimos City Centre Structure Plan is in the early stages as the vast majority of the land identified in the scheme is still currently undeveloped and much of the supporting transport network has not yet been implemented. However, the presence of the proposed Alkimos Station is a critical element of the overall structure plan and a major catalyst for the future development of the region.

Therefore, while the proposed Alkimos Station development does not include construction of the adjacent movement network as part of the project, the surrounding local district is prepared for the future expansion and development of the Station Precinct, as demonstrated by the planning included in the Alkimos City Centre Structure Plan.

## 3.0 ANALYSIS OF TRANSPORT NETWORKS

### 3.1 BACKGROUND AND APPROACH

The traffic assessment of the network surrounding the proposed Alkimos Station development is detailed within this section of the report. The goal of this assessment is to demonstrate that the transport infrastructure provided as part of the project is suitable for use and is capable of adequately accommodating the forecast transport demands associated with the future station.

#### 3.1.1 ASSESSMENT YEARS / TIME PERIODS

For the Alkimos Station transport infrastructure assessment, the study focuses on the proposed opening year of 2021, and a post-opening year of 2031 to account for the medium term development in the area and presence of nearby major infrastructure changes, particularly the surrounding development of the Alkimos City Centre which includes the major elements of transport infrastructure and land use associated with that plan.

As the station is largely expected to accommodate work related trips to / from the Perth CBD, the assessment will focus primarily on the AM and PM peak periods. While weekend traffic is anticipated, both the station patronage and background traffic flows during the weekend are expected to be significantly lower than the respective weekday peaks.

The peak period intervals are primarily based on the typical arrival profiles for train stations located on the outer edges of the Perth metropolitan passenger rail network, and demonstrates that the AM peak hour is likely to occur from 07:00 to 08:00 and the PM peak hour from 17:00 to 18:00.

#### 3.1.2 ASSUMED ROAD NETWORK

The Alkimos Station Transport Impact Assessment focuses on the opening year (2021) and future year (2031) scenarios, and is consistent with the Alkimos City Centre Structure Plan which is the key planning framework guiding new development over this timeframe. The road network connections which are assumed to be delivered within these timeframes are critical to understanding the distribution of flows to and from the Alkimos Station site.

Based on the Alkimos City Centre Staging Plan 1 and Staging Plan 2 information, plus liaison with private developers of the local road connections and GTA Consultants (currently working on behalf of DevelopmentWA), an assumed staging for the road network plan has been prepared for the opening scenario and future year scenario that is formed on the best understanding of the information currently available.

The assumed road network and connectivity for each assessed stage of the Alkimos Station Transport Impact Assessment is shown in Figure 16 and Figure 17 for the opening year scenario and future year scenario, respectively.

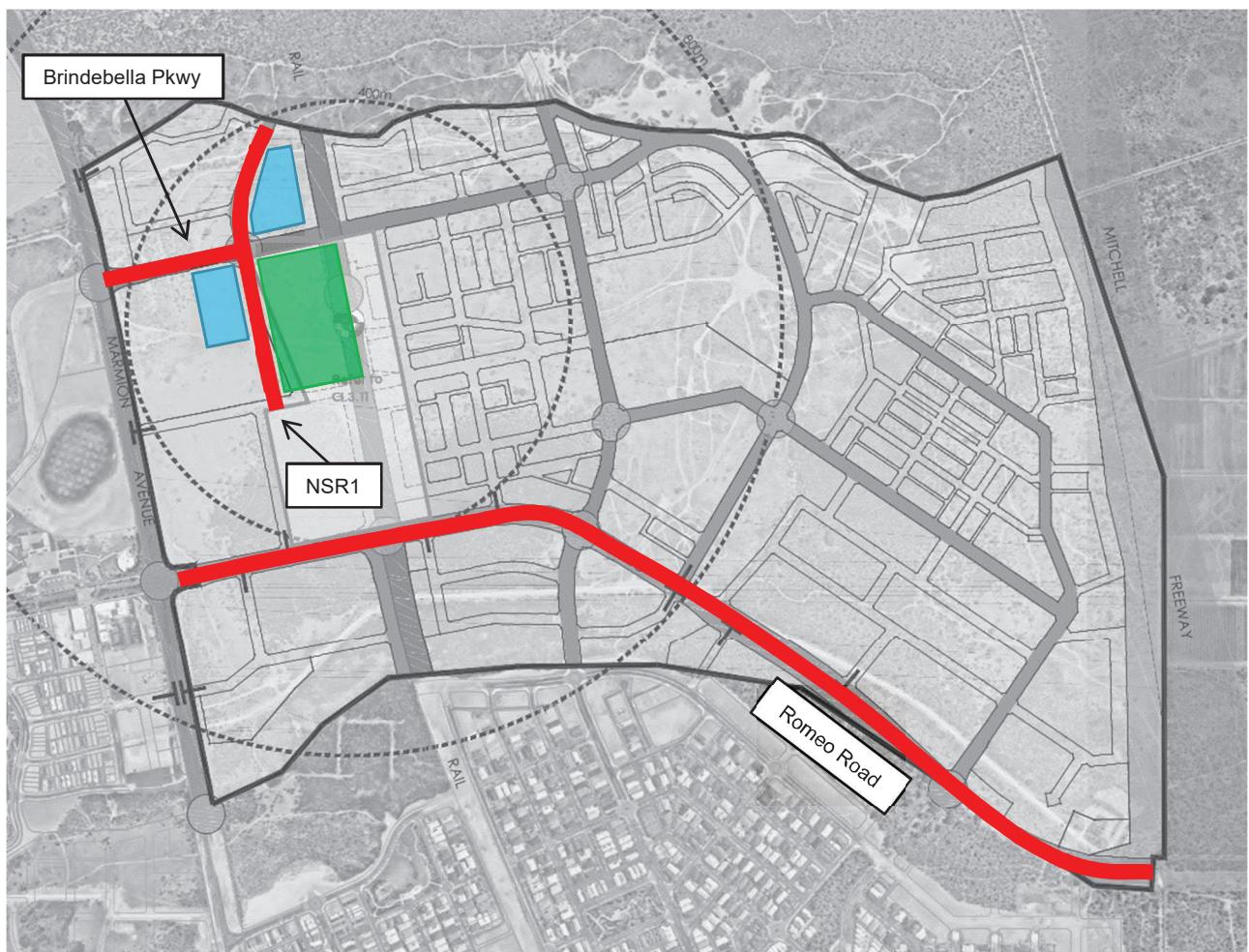
Note that the assumed road network represents the minimum road infrastructure that is expected to be constructed by these timeframes. Additional road connectivity may be in place in these scenarios depending on individual developer schedules and the progress of independent land development.

The road network in the Alkimos Station opening year scenario of 2021 primarily consists of the minimum road connections required to access the station, car parking areas and the bus interchange. This includes the partial construction of Brindebella Parkway (up to the NSR1 roadway) and NSR1 from the Alkimos Station frontage through to Car Park #2.

Brindebella Parkway may be constructed further to the east in the opening year scenario (via the proposed Brindebella Parkway bridge across the YRE rail corridor), however this construction timeframe is not yet confirmed. Therefore, for the purposes of this assessment, it has been assumed that Brindebella Parkway connectivity to the east of the rail corridor is not available in 2021.

Further to this, it is assumed that the wider road network will include the construction of Romeo Road, south of the station site. However, no connectivity between NSR1 and Romeo Road is anticipated in the opening year scenario.

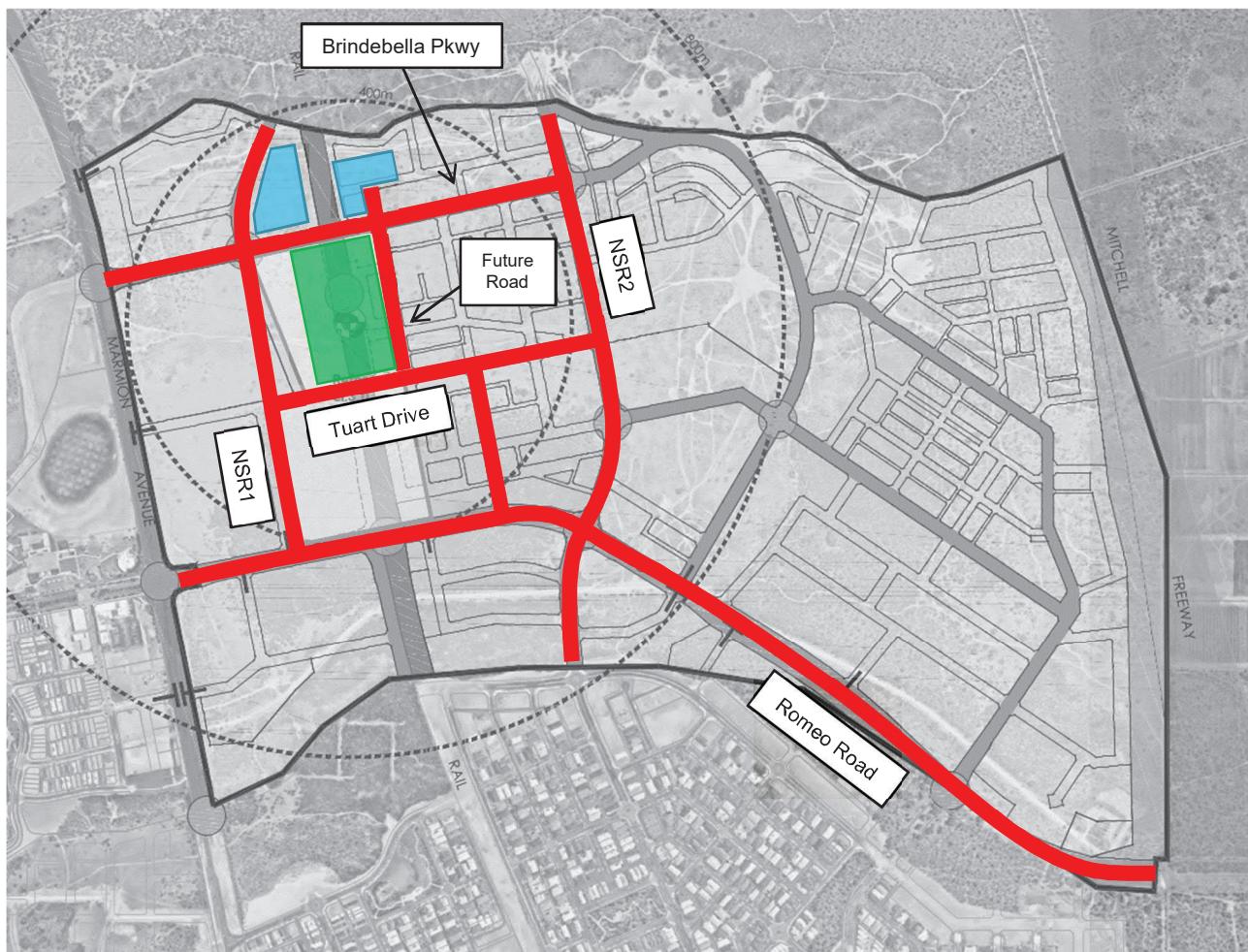
*Figure 16. Alkimos City Centre Assumed Road Network: 2021 Opening Year Scenario*



The road network in the Alkimos Station future year scenario of 2031 includes the further completion of multiple internal road connections within the Alkimos City Centre. In particular, the 2031 scenario assumes that the proposed bridge connections to the east over the rail corridor via Brindebella Parkway and Tuart Drive are completed. The proposed NSR2 road which provides a north-south connection to the east of the rail reserve to Romeo Road and the existing community to the south of Romeo Road.

Other key local road connections include the future roadway to the east of the Alkimos Station site which will provide access to the relocated Car Park #1 (located north-east of the station) and the future drop-off area.

*Figure 17. Alkimos City Centre Assumed Road Network: 2031 Future Year Scenario*



### 3.1.3 INTERSECTIONS TO BE ASSESSED

#### 3.1.3.1 Opening Year Scenario (2021)

The access arrangement for the opening year scenario of Alkimos Station proposes that all vehicular traffic (including Transperth buses) enter and exit the site via the Brindebella Parkway connection and then distribute along NSR1 to the respective car parking areas or the bus interchange.

While the intersections at Marmion Avenue / Brindebella Parkway and NSR1 / Brindebella Parkway are not covered as part of this assessment (as they are to be delivered by other developers), the access points along NSR1 to and from the Alkimos Station parking areas and bus interchange are included in this assessment.

Therefore, the intersections assessed as part of this study include the following:

1. NSR1 / Car Park #1 access
2. NSR1 / Bus Interchange and Drop-Off access
3. NSR1 / Car Park #2 access

The above intersections are highlighted on the overall station layout plan in Figure 18.

#### 3.1.3.2 Future Year Scenario (2031)

In the future year scenario of 2031, the majority of the Alkimos Station vehicle movements shift to the eastern side of the rail reserve with the relocation of Car Park #1 and the station drop-off area. This is facilitated by the construction of the Brindebella Road and Tuart Drive bridges. Car Park #2 remains in the original location north of the station site, and the existing bus interchange access via NSR1 is also retained.

To access the relocated parking areas, a new local north-south connection is required east of the station site – currently indicated only as ‘Future Road’ (formal name to be confirmed at a later date). It is expected that this Future Road will be delivered by a separate developer by the year 2031. This ‘Future Road’ also forms an intersection with the extended Brindebella Parkway, with the intersection of these two roads currently expected to require signalised treatment. Although this signalised treatment is anticipated to be delivered by others, the notional configuration of this intersection is assessed as part of this study as vehicles accessing the relocated Car Park #1 are required to pass through this intersection.

Therefore, the intersections assessed as part of this study include the following:

1. NSR1 / Bus Interchange access (west)
2. NSR1 / Car Park #2 access
3. Brindebella Parkway / Future Road signalised intersection
4. Future Road / Bus Interchange access (east)
5. Future Road / Drop-Off access

The above intersections are highlighted on the overall station layout plan in Figure 19.

Figure 18. Intersections to be Assessed (Opening Year Scenario 2021)

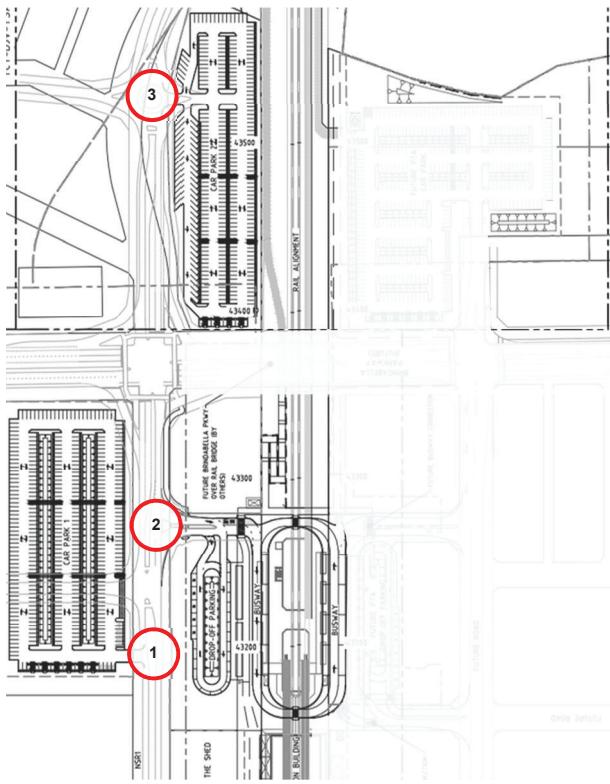
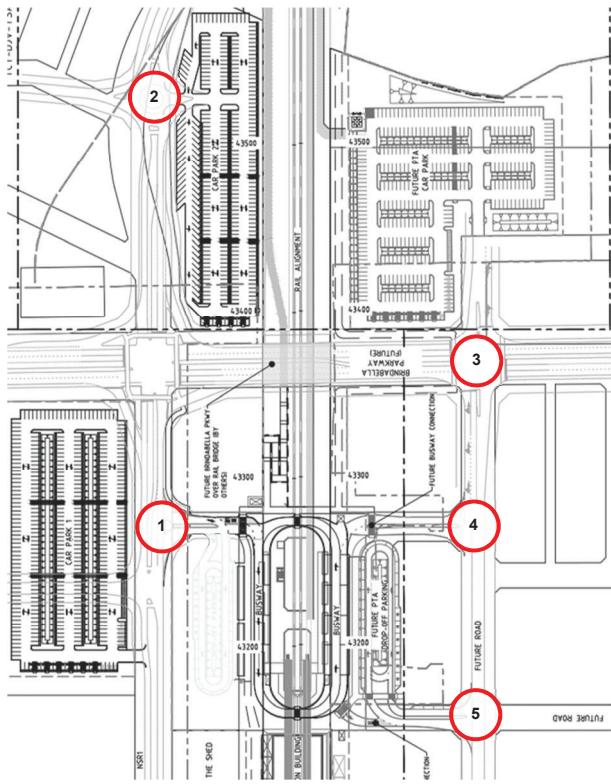


Figure 19. Intersections to be Assessed (Future Year Scenario 2031)



### 3.1.4 METHODOLOGY AND APPROACH

The overall approach to the transport assessment undertaken in this report is largely in line with the previous *Yanchep Rail Extension Transport Assessment (May 2019)* undertaken by WSP as part of the preliminary works leading up to the current engagement. However, some adjustments to this methodology have been made for this assessment.

As each of the roads being assessed as part of this study do not currently exist, background traffic flows along these connections are unable to be extracted from existing datasets. Additionally, given that the land usage and forecasting within the Alkimos City Centre is a complex task, NEWest has worked in liaison with GTA Consultants who are currently partnered with DevelopmentWA to prepare a mesoscopic traffic generation model of the Alkimos City Centre area.

To assist with the traffic analysis works undertaken as part of this assessment, and to ensure that both the Alkimos Station and the wider DevelopmentWA works are compatible with one another, GTA Consultants have supplied NEWest with preliminary peak hour traffic generation estimates from their modelling on the future road connections in both the 2021 and 2031 timeframes.

These forecasts estimate the background peak period traffic along the future road network based on several factors including land use forecasts, background traffic growth, available road connectivity and daily trip generation profiles. The background traffic estimates from the GTA modelling represent the total estimated background flow on the new road connections **excluding** the Alkimos Station traffic (including car parking, bus interchange). Modelling outputs provided to NEWest by GTA Consultants are included within Appendix A.

Peak period traffic flows generated by the station development (including both Park & Ride areas, Drop-Off area, as well as bus interchange) were then added to the background traffic estimates supplied to NEWest, based on the forecast station patronage for that time period. The methodology used to estimate the traffic generated by the Alkimos Station activity is outlined in Section 3.2.

### 3.1.5 PERFORMANCE METRICS AND LEVEL OF SERVICE TARGETS

The network results of the analysis summarised in this report are presented in terms of:

- Delay – The average delay experienced per passenger car unit (measured in seconds).
- Level of Service (LoS) – The LoS (ranging from A to F) provides an indicator of the performance of the network or individual movement based on the average delay per passenger car unit (pcu).
- Degree of Saturation (DoS) – The DoS is a ratio of the demand to capacity, with DoS over 90 percent indicating a congested intersection, and DoS of 100 percent indicating an intersection at capacity and DOS over 100 percent indicating oversaturated conditions. The DoS provided represents the maximum DoS at the intersection.
- Queue – The length of the average maximum back of queue (measured in number of passenger car units) on the approach measured over a number of cycles.
- As per the “8803-000-005 Specification - Station Building and Civil Works”, the level of service requirements for intersection performance specified by the Scope of Work and Technical Criteria (SWTC) are as follows:

#### 3.3 Level of Service for Intersections

*The overall level of service (LOS) for intersections during peak periods (as defined in Transportation Research Board's Highway Capacity Manual - Special Report 209) shall be Level D or higher, with no individual major movement having a LOS lower than Level D and no individual minor movement having a LOS lower than Level E.*

## 3.2 DEVELOPMENT TRIP GENERATION AND DISTRIBUTION

This section outlines the key methodology and figures / assumptions utilised in order to determine the forecast trip generation and distribution profile associated with the proposed Alkimos Station.

### 3.2.1 TRIP GENERATION

One of the major factors in calculating the trip generation associated with the site is the number of estimated daily station boardings. The agreed daily boardings have been developed through the Department of Transport STEM model and have been sourced from the Project Definition Report to remain consistent with previous assessments.

The forecast daily boardings for the Alkimos Station are shown in Table 5.

*Table 5. Alkimos Station Daily Boardings Forecast*

Year	2021	2031
Daily Boardings (passengers / day)	2,167	2,700

The Alkimos Station access mode share has been sourced from the *Yançep Rail Extension Transport Assessment* (WSP, May 2019), which in turn based the adopted mode share figures from the *Yançep Rail Extension Strategic Access Planning Report* (Arup, February 2018).

The distribution of the mode share is based on Murdoch Station surveys undertaken by PTA in 2012, and has also been adjusted based on the forecast daily boardings and a Park & Ride occupancy of 1.2 persons per vehicle. The assumed mode share at Alkimos Station for the opening year of 2021 is shown in Table 6.

*Table 6. Adopted 2021 Alkimos Station Mode Share*

Access Mode	Mode Share (2021)
Walking	3%
Cycling	5%
Bus	41%
Kiss & Ride	14%
Park & Ride	37%
Total	100%

Based on the above mode share figures, this translates to a maximum parking accumulation of 608 vehicles in the year 2021. The current proposed long term parking provision at the Alkimos Station is 638 standard bays plus 20 accessible (disabled) bays and 2 electric car bays. Therefore, this parking accumulation equates to approximately 95% parking occupancy in the opening year scenario.

As the forecast daily boardings increase through to the year 2031 (by approximately 24%), it would be expected that the associated vehicle trip generation would also increase. However, as the Alkimos Station has a parking cap of 636 total long term parking bays in the year 2031 (including standard and accessible), the proportion of the mode share utilising the Park & Ride facility is also capped accordingly.

Therefore, the mode share for the future scenario of 2031 has been adjusted to account for this Park & Ride cap (assuming Park & Ride is 100% utilised by 2031), while also accommodating the overall increase in patronage in the other transport modes, particularly via walking. The final mode share for this assessment at Alkimos Station for 2031 is shown in Table 7.

*Table 7. Adopted 2031 Alkimos Station Mode Share*

Access Mode	Mode Share (2031)
Walking	10%
Cycling	5%
Bus	39%
Kiss & Ride	15%
Park & Ride	31% (cap)
Total	100%

Lastly, the arrival and departure profile of vehicles is a critical element of the station trip generation. As per the methodology adopted in the earlier previous Yanchep Rail Extension Transport Assessment (WSP, May 2019), the daily profile of boardings at Alkimos Station has been assumed to be comparable to the existing Clarkson Station due to the similar journey time to the Perth CBD.

Based on data collected at the Clarkson Station, the inbound and outbound trip distribution for both Park & Ride and Kiss & Ride modes assumed for the Alkimos Station is summarised in Table 8.

Table 8. Adopted daily passenger Boarding / Alighting trip generation profile

Time (Hour Beginning)	Vehicle Trips (Train Passenger Boardings)		Vehicle Trips (Train Passenger Alightings)	
	Park & Ride	Kiss & Ride	Park & Ride	Kiss & Ride
5:00	10%	6%	0%	0%
6:00	24%	14%	0%	0%
7:00	44%	31%	0%	1%
8:00	7%	11%	0%	1%
9:00	5%	6%	0%	2%
10:00	1%	5%	0%	1%
11:00	1%	3%	1%	2%
12:00	0%	3%	2%	2%
13:00	1%	2%	4%	2%
14:00	1%	2%	6%	5%
15:00	0%	3%	8%	8%
16:00	2%	2%	19%	16%
17:00	1%	5%	31%	13%
18:00	2%	3%	19%	13%
19:00	1%	2%	5%	11%
20:00	0%	1%	2%	11%
21:00	0%	0%	1%	9%
Total	100%	99%	98%	97%

- Note: Some figures do not add up to 100% as the data does not cover a full 24 hour period.
- Note: Kiss & Ride Inbound and outbound vehicle trips for each passenger boarding and alighting are accounted for and are equal (i.e. inbound vehicle trips and outbound vehicle trips are equal for a given time period).

### 3.2.2 DIRECTIONAL DISTRIBUTION OF TRAFFIC FLOWS

The directional distribution adopted for this assessment has largely utilised the same methodology employed in the previous *Yanchep Rail Extension Transport Assessment* by WSP. The approach / departure behaviour and distribution of vehicles accessing the Alkimos Station parking facility assumes the following factors:

- i. Within the assessment timeframe (opening year and +10 year scenario) the majority of Park & Ride traffic is assumed to arrive / depart from Brindabella Parkway (primarily via Marmion Avenue). The remainder of the traffic is expected to arrive / depart via Romeo Road to the south in the future year scenario.
- ii. Kiss & Ride traffic distribution is assumed to be largely similar to the Park & Ride distribution above.
- iii. Internal traffic distribution to the separate parking areas within the Alkimos Station precinct is based on a proportional split of the approximate number of bays contained in each parking lot.

Directional distribution diagrams have been prepared based on the proposed access arrangements for both Park & Ride and Kiss & Ride transport modes. Given that the long term parking and drop-off parking locations shift between the 2021 opening year and the 2031 future year, separate directional flow diagrams have been prepared for each scenario.

Diagrams for the 2021 opening year peak period directional distribution are shown in Figure 20 and Figure 21. Equivalent diagrams for the 2031 future year peak period directional distribution are shown in Figure 22 and Figure 23. These proportions have been adopted for the purposes of calculating the anticipated traffic impact detailed within Section 3.3: Road Network Impact Analysis.

Figure 20. 2021 Opening Year Scenario – Park & Ride Directional Distribution

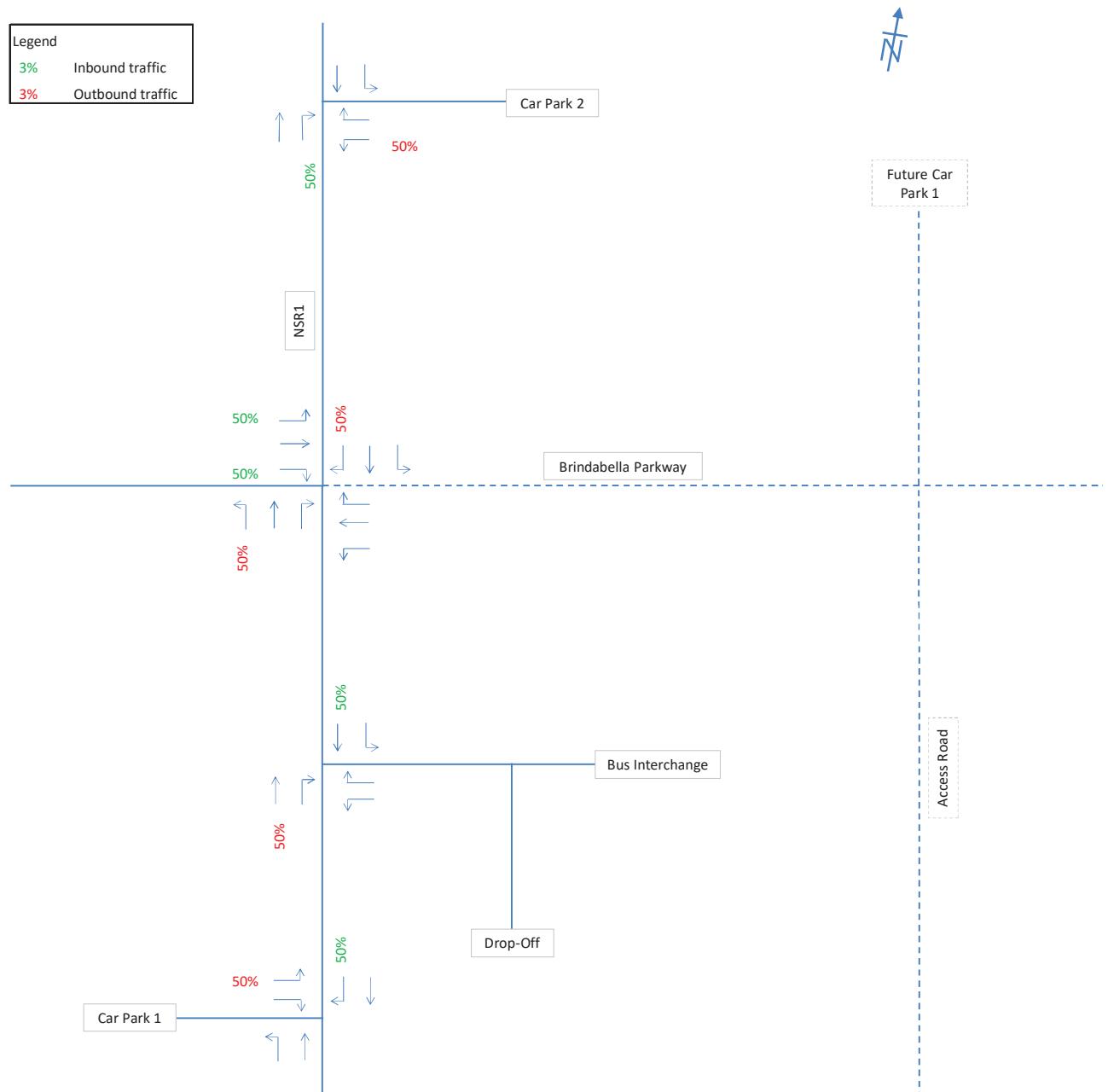


Figure 21. 2021 Opening Year Scenario – Kiss & Ride Directional Distribution

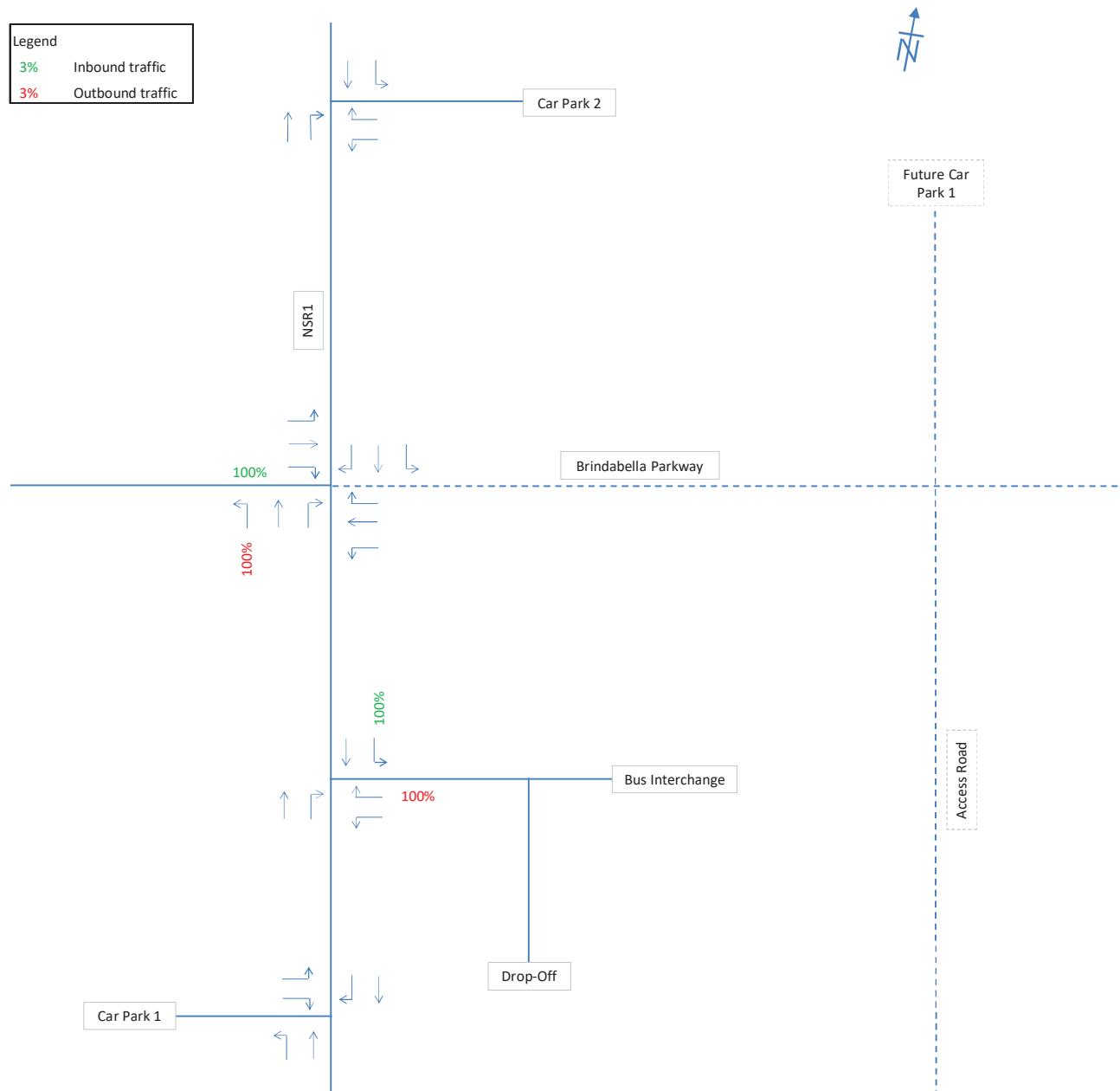


Figure 22. 2031 Future Year Scenario – Park & Ride Directional Distribution

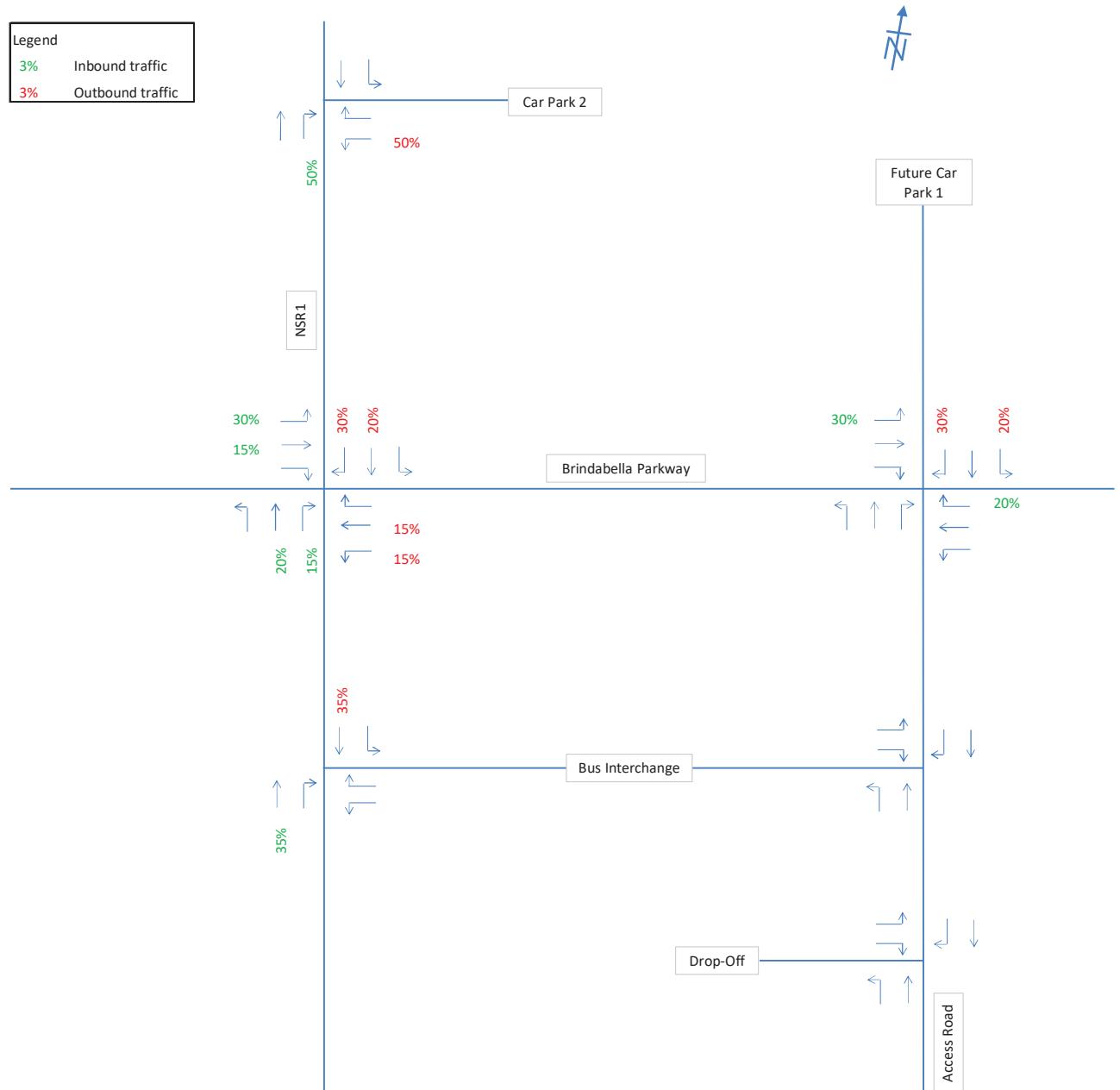
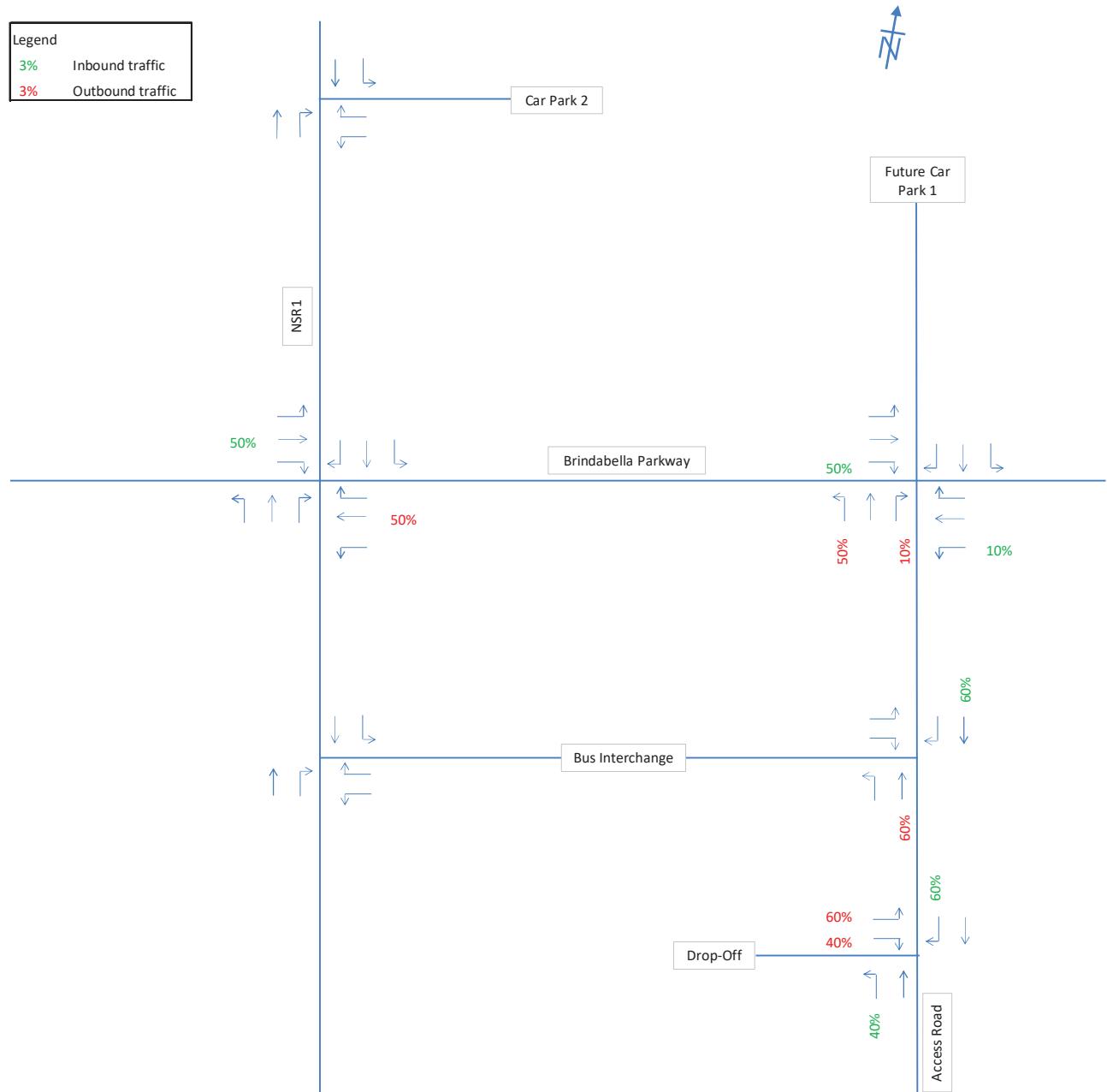


Figure 23. 2031 Future Year Scenario – Kiss & Ride Directional Distribution



### 3.2.3 FINAL DEVELOPMENT TRAFFIC FLOWS

Based on a combination of the previously discussed passenger daily boardings, mode share assumptions and arrival / departure profiles, the final development traffic flows for the Alkimos Station site have been developed.

Note that these flows include both the peak hour background traffic as forecast from the GTA Consultants modelling outputs, plus the peak hour traffic generated by the development car park and bus interchange.

The final 2021 'opening year' AM and PM peak traffic flows are shown in Figure 24 and Figure 25, respectively. The final 2031 'future year' development flows for AM and PM peak periods are shown in Figure 26 and Figure 27, respectively.

Figure 24. 2021 AM Peak Development Traffic Flows (07:00 – 08:00)

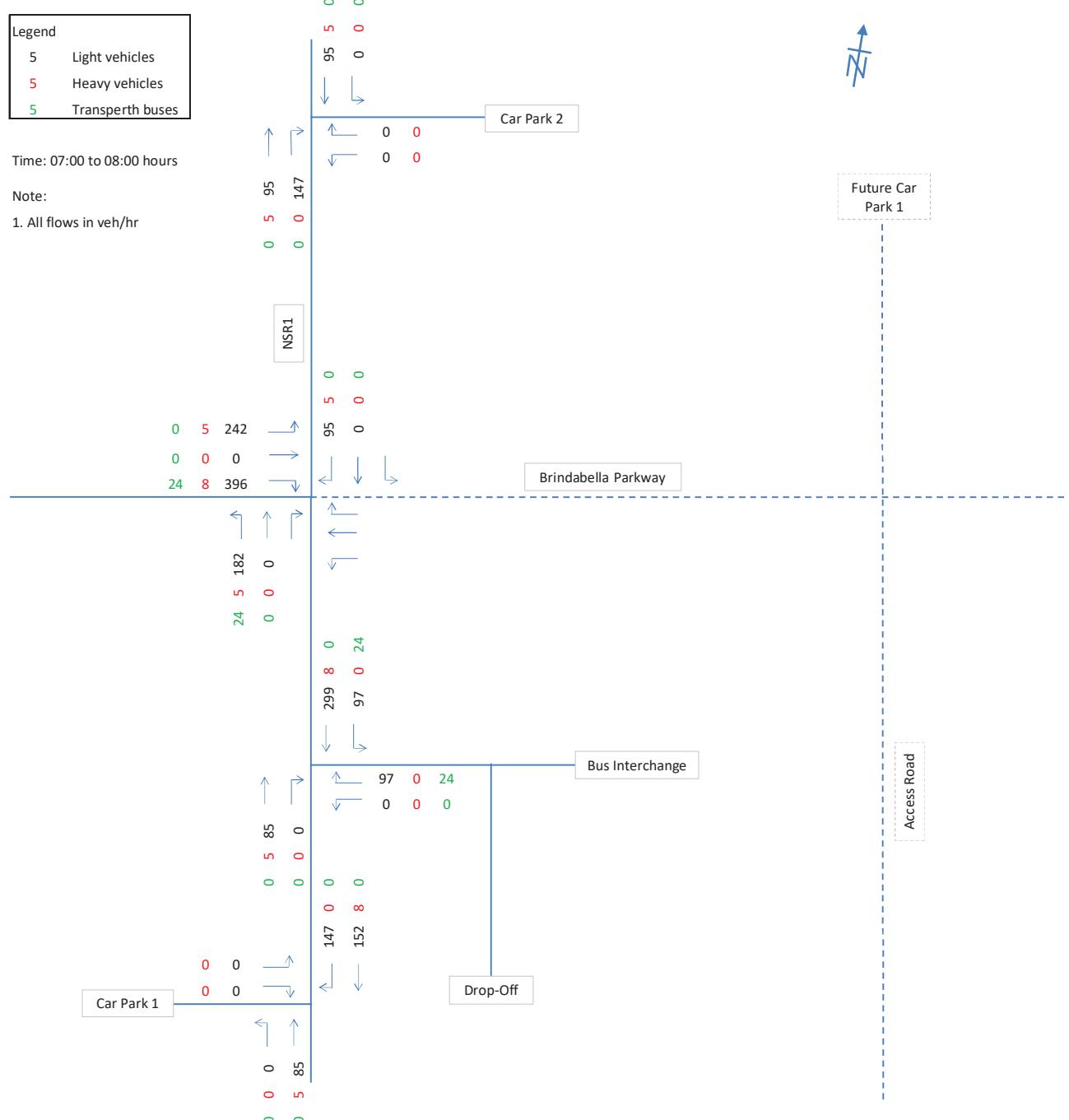


Figure 25. 2021 PM Peak Development Traffic Flows (17:00 – 18:00)

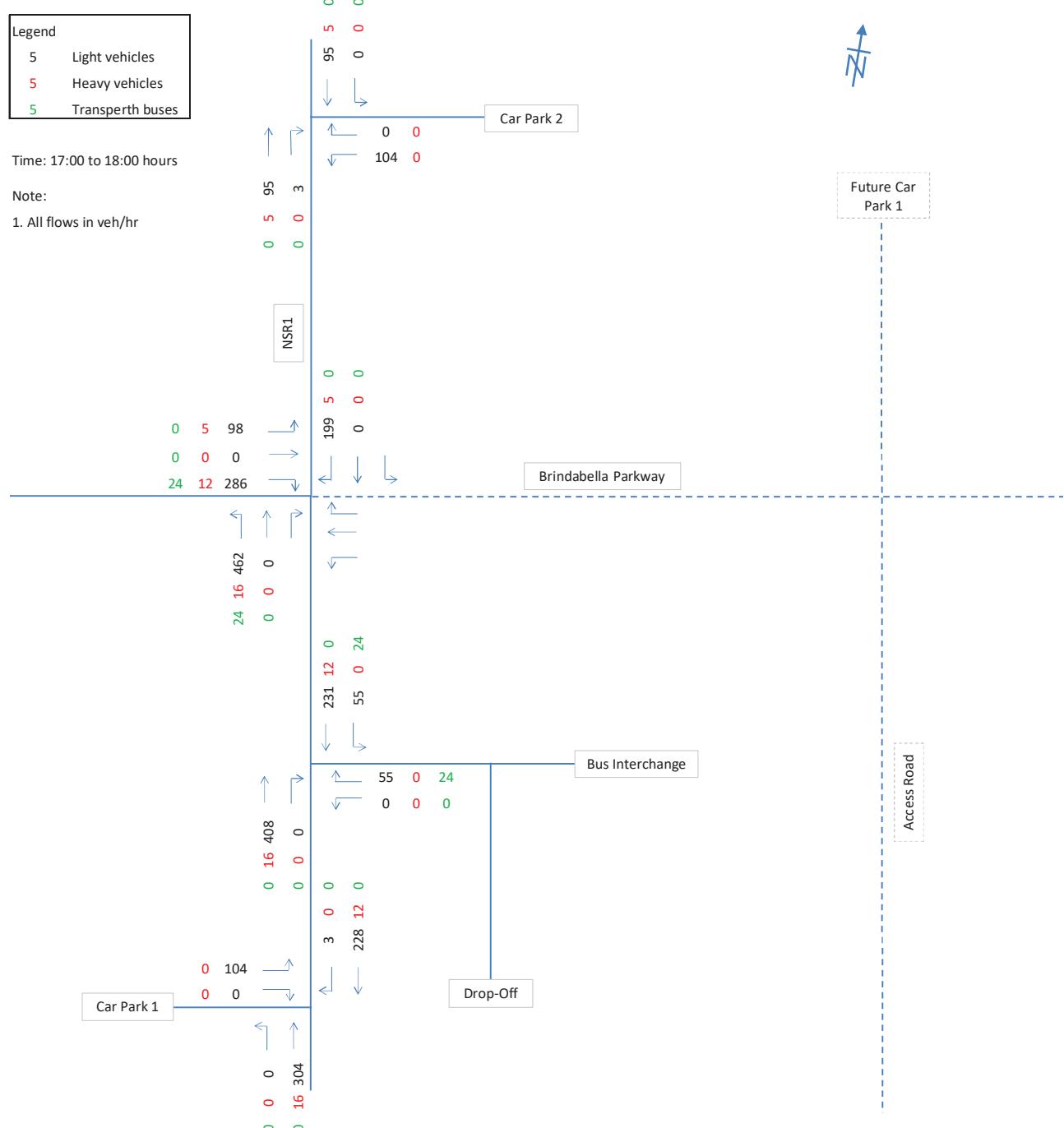


Figure 26. 2031 AM Peak Development Traffic Flows (07:00 – 08:00)

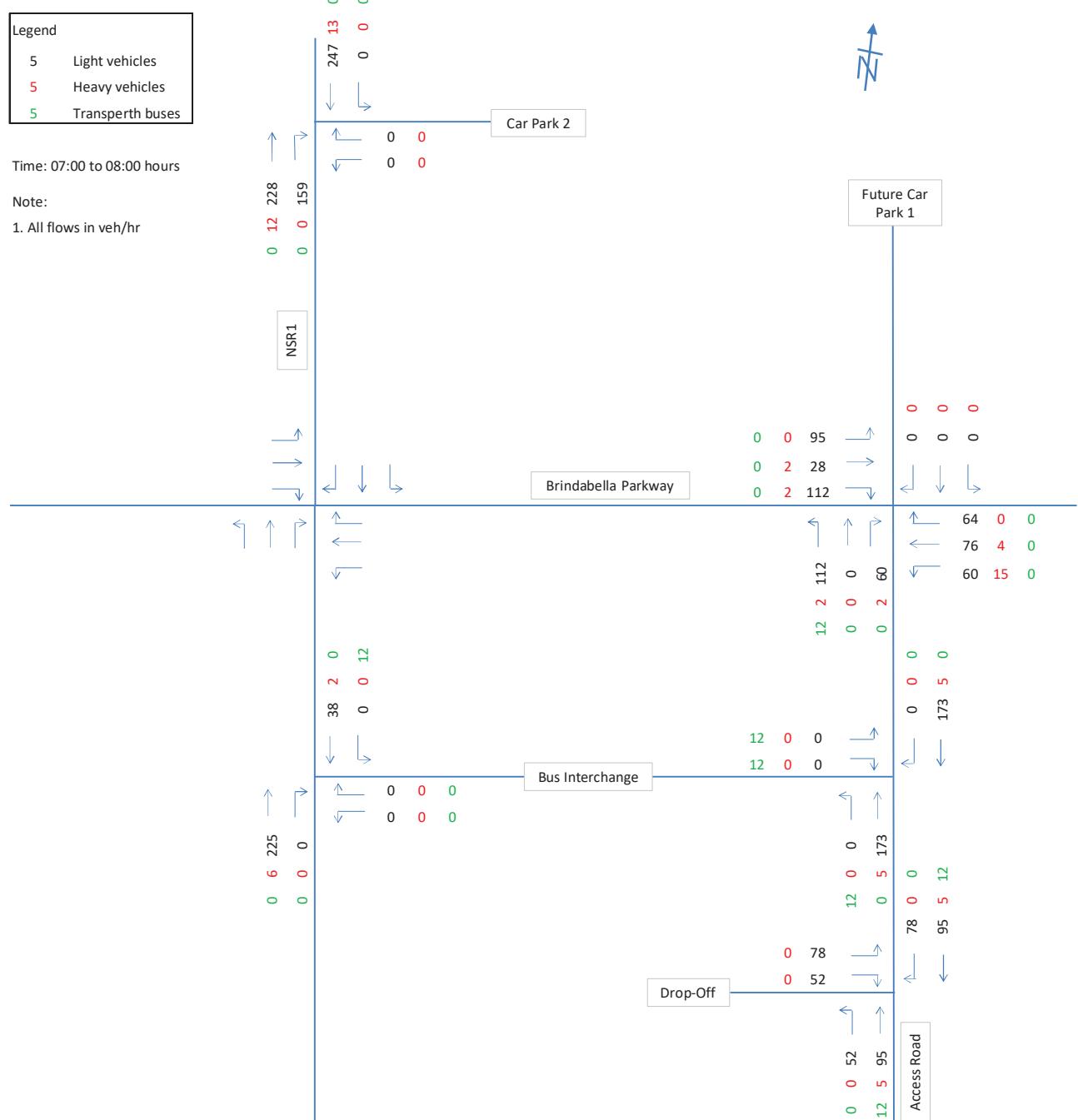
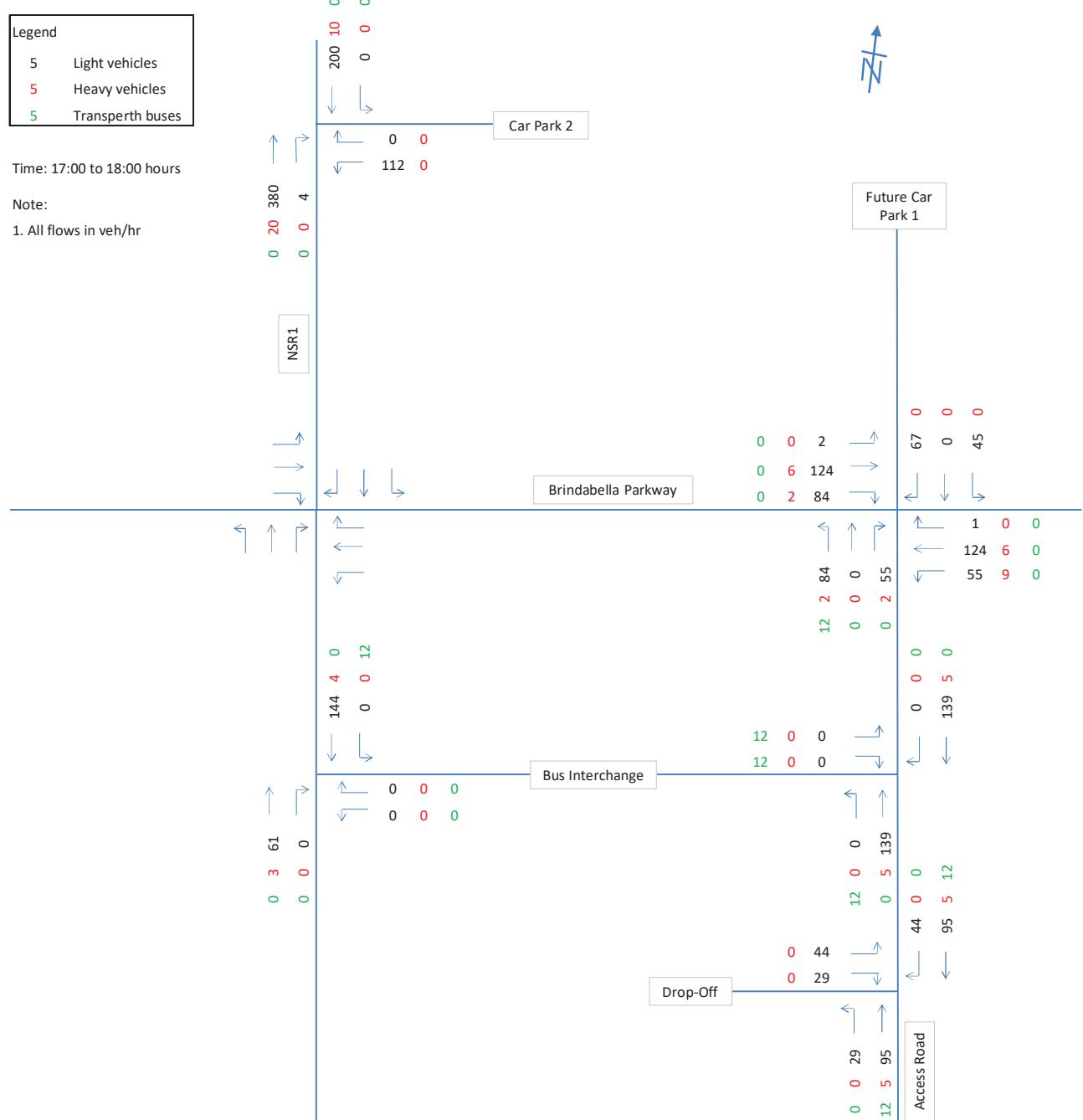


Figure 27. 2031 PM Peak Development Traffic Flows (17:00 – 18:00)



### 3.3 ROAD NETWORK IMPACT ANALYSIS

#### 3.3.1 2021 OPENING YEAR SCENARIO

The results of the network impact analysis using SIDRA Intersection analysis software for each of the Alkimos Station access points are outlined in the following sections.

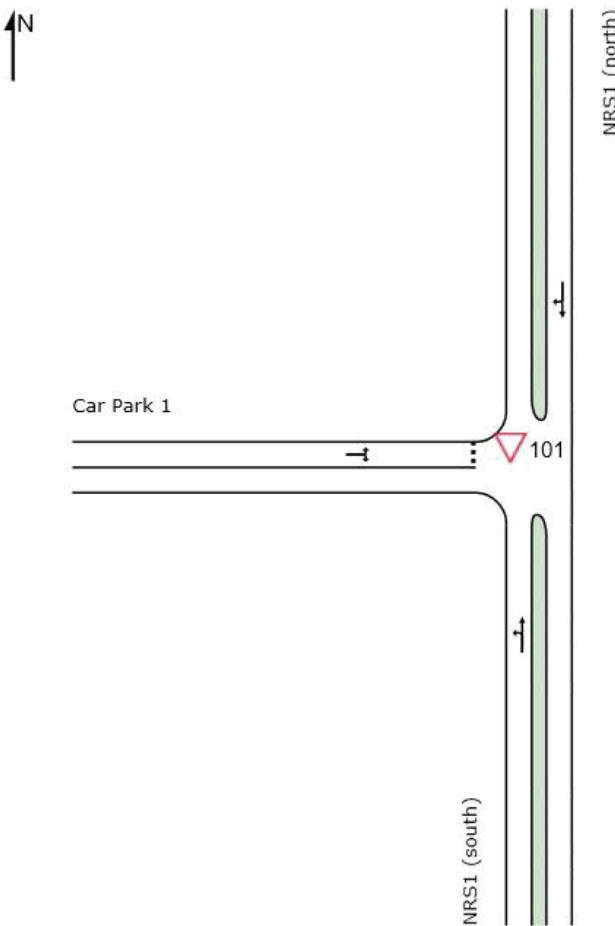
##### 3.3.1.1 NSR1 / Car Park #1 Access

In the opening year scenario, Car Park #1 will be located along the west side of NSR1, approximately 50 metres west of Alkimos Station. The car park access will be located approximately 80 metres south of the NSR1 and Brindabella Parkway intersection.

In the vicinity of the Car Park #1 access, it is expected that NSR1 will operate as a two-way, dual-lane road with divided carriageway. The access point to the car park will operate as give-way intersection.

For the purposes of this Transport Assessment, an equivalent to this layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods during the 2021 opening year scenario. The SIDRA layout of the NSR1 and Car Park #1 intersection is shown in Figure 28.

*Figure 28. NSR1 and Car Park #1 Access Intersection Layout*



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance. The SIDRA Intersection results for the 2021 morning and afternoon peaks are summarised in Figure 29 and Figure 30.

Figure 29. NSR1 / Car Park #1 Access – 2021 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
<b>South: NRS1 (south)</b>												
10	L2	1	0.0	0.049	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	26.6
11	T1	90	5.6	0.049	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.7
Approach		91	5.5	0.049	0.1	NA	0.0	0.0	0.00	0.01	0.00	49.4
<b>North: NRS1 (north)</b>												
5	T1	160	5.0	0.174	0.2	LOS A	0.8	6.1	0.18	0.26	0.18	39.3
6	R2	147	0.0	0.174	4.9	LOS A	0.8	6.1	0.18	0.26	0.18	34.8
Approach		307	2.6	0.174	2.5	NA	0.8	6.1	0.18	0.26	0.18	37.4
<b>West: Car Park 1</b>												
7	L2	1	0.0	0.001	0.2	LOS A	0.0	0.0	0.16	0.11	0.16	27.0
9	R2	1	0.0	0.001	1.1	LOS A	0.0	0.0	0.16	0.11	0.16	26.5
Approach		2	0.0	0.001	0.7	LOS A	0.0	0.0	0.16	0.11	0.16	26.8
All Vehicles		400	3.3	0.174	1.9	NA	0.8	6.1	0.14	0.20	0.14	39.9

Figure 30. NSR1 / Car Park #1 Access – 2021 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
<b>South: NRS1 (south)</b>												
10	L2	1	0.0	0.171	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	26.6
11	T1	320	5.0	0.171	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		321	5.0	0.171	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.8
<b>North: NRS1 (north)</b>												
5	T1	240	5.0	0.130	0.0	LOS A	0.0	0.2	0.01	0.01	0.01	49.5
6	R2	3	0.0	0.130	5.8	LOS A	0.0	0.2	0.01	0.01	0.01	47.8
Approach		243	4.9	0.130	0.1	NA	0.0	0.2	0.01	0.01	0.01	49.5
<b>West: Car Park 1</b>												
7	L2	104	0.0	0.087	1.2	LOS A	0.3	2.5	0.39	0.27	0.39	25.6
9	R2	1	0.0	0.087	1.6	LOS A	0.3	2.5	0.39	0.27	0.39	25.1
Approach		105	0.0	0.087	1.2	LOS A	0.3	2.5	0.39	0.27	0.39	25.6
All Vehicles		669	4.2	0.171	0.2	NA	0.3	2.5	0.07	0.05	0.07	44.8

The intersection analysis results for Car Park #1 via NSR1 indicate that the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets for both the opening year scenario during both AM and PM peaks.

### 3.3.1.2 NSR1 / Bus Interchange & Drop-Off Access

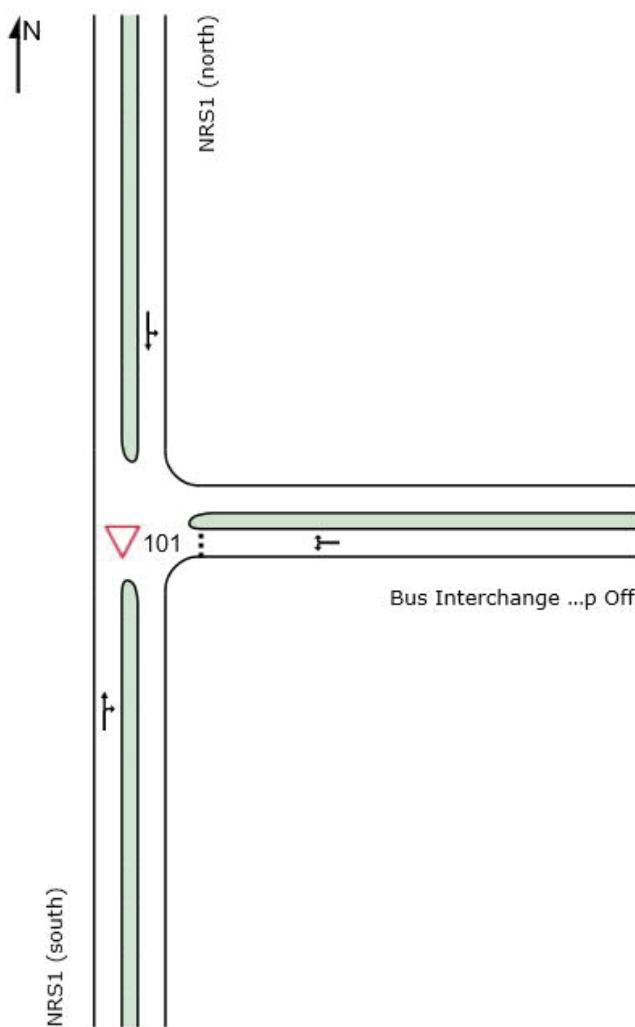
The entry and exit point to the bus interchange and drop-off areas of Alkimos Station will be located along NSR1 to west of the station. This access point is located 40 metres south of the NSR1 and Brindebella Parkway intersection, and approximately 40 metres north of the Car Park #1 access.

For the opening year scenario of 2021, this intersection will function as the primary access point to the Alkimos Station passenger drop-off area and the Alkimos bus interchange. This is expected to remain the case for drop-off and bus access until the future year scenario (currently estimated at 2031) when the drop-off parking area will relocate to the eastern side of the rail reserve and additional bus access points are also provided via the Future Road to the east.

At the access point, it is expected that NSR1 will operate as a two-way, dual-lane road with divided carriage. The junction with the bus interchange and drop-off area will function as a basic three-way priority controlled intersection, allowing all movements (in the opening year scenario). Note that the intersection access may change in the future year scenario as the arrangement is modified.

For the purposes of this Transport Impact Assessment, an equivalent to this layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods during the 2021 opening year scenario. The SIDRA layout of the NSR1 / bus interchange and drop-off intersection is shown in Figure 31.

*Figure 31. NSR1 / Bus Interchange & Drop-Off Access Intersection Layout*



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance. The SIDRA Intersection results for the 2021 morning and afternoon peaks are summarised in Figure 32 and Figure 33.

Figure 32. NSR1 / Bus Interchange & Drop Off Access – 2021 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No Cycles	Average Speed km/h
<b>South: NRS1 (south)</b>												
8	T1	90	5.6	0.049	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.5
9	R2	1	0.0	0.049	6.0	LOS A	0.0	0.1	0.01	0.01	0.01	44.4
Approach		91	5.5	0.049	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.5
<b>East: Bus Interchange &amp; Drop Off</b>												
10	L2	1	0.0	0.113	1.1	LOS A	0.3	2.8	0.31	0.35	0.31	24.1
12	R2	121	19.8	0.113	1.6	LOS A	0.3	2.8	0.31	0.35	0.31	25.9
Approach		122	19.7	0.113	1.6	LOS A	0.3	2.8	0.31	0.35	0.31	25.9
<b>North: NRS1 (north)</b>												
1	L2	121	19.8	0.251	4.7	LOS A	0.0	0.0	0.00	0.15	0.00	26.7
2	T1	307	2.6	0.251	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	45.1
Approach		428	7.5	0.251	1.3	NA	0.0	0.0	0.00	0.15	0.00	38.9
All Vehicles		641	9.5	0.251	1.2	NA	0.3	2.8	0.06	0.17	0.06	37.2

Figure 33. NSR1 / Bus Interchange & Drop Off Access – 2021 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No Cycles	Average Speed km/h
<b>South: NRS1 (south)</b>												
8	T1	424	3.8	0.224	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	49.9
9	R2	1	0.0	0.224	5.8	LOS A	0.0	0.1	0.00	0.00	0.00	44.9
Approach		425	3.8	0.224	0.0	NA	0.0	0.1	0.00	0.00	0.00	49.9
<b>East: Bus Interchange &amp; Drop Off</b>												
10	L2	1	0.0	0.095	0.8	LOS A	0.2	2.7	0.40	0.47	0.40	22.8
12	R2	79	30.4	0.095	2.5	LOS A	0.2	2.7	0.40	0.47	0.40	24.2
Approach		80	30.0	0.095	2.5	LOS A	0.2	2.7	0.40	0.47	0.40	24.2
<b>North: NRS1 (north)</b>												
1	L2	79	30.4	0.199	4.7	LOS A	0.0	0.0	0.00	0.13	0.00	27.0
2	T1	243	4.9	0.199	0.0	LOS A	0.0	0.0	0.00	0.13	0.00	46.1
Approach		322	11.2	0.199	1.2	NA	0.0	0.0	0.00	0.13	0.00	40.4
All Vehicles		827	9.2	0.224	0.7	NA	0.2	2.7	0.04	0.10	0.04	42.5

The intersection analysis results for bus interchange and drop-off access via NSR1 indicate that the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets for the opening year AM and PM peaks.

As the primary access to the bus interchange and drop-off area during opening year, the analysis results suggest that the average delay to enter via the access is less than 10 seconds. Similarly, the delay to exit on to NSR1 is expected to be less than 5 seconds on average.

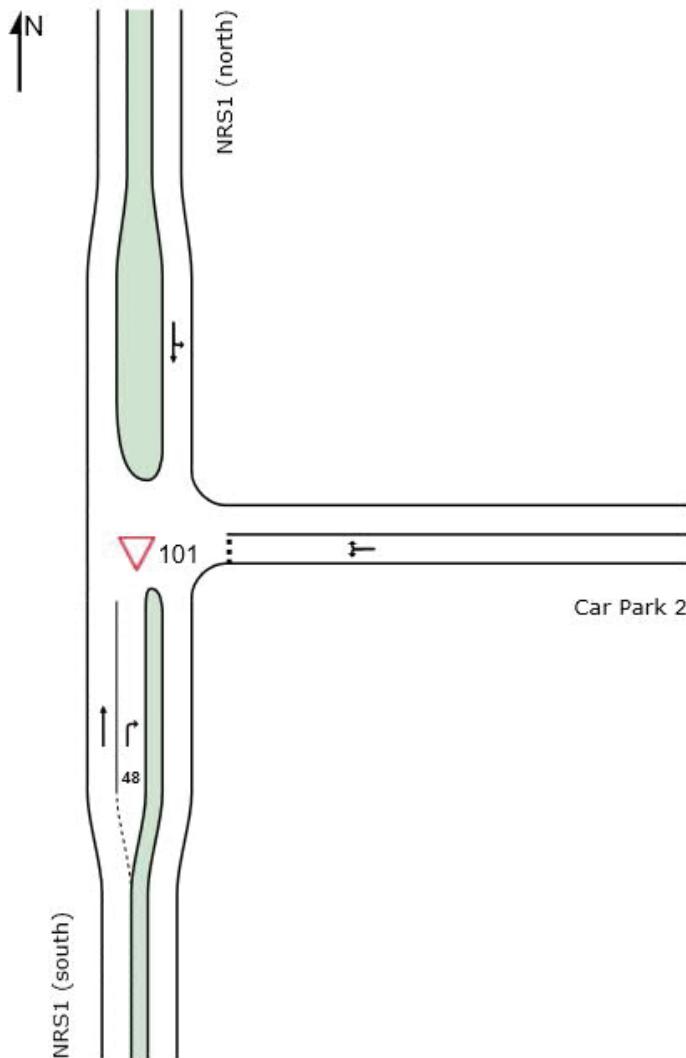
### 3.3.1.3 NSR1 / Car Park #2 Access

The access point to Car Park #2 is proposed to be located on the eastern side of NSR1, approximately 250 metres north of Alkimos Station. From the year of opening, NSR1 will function as the primary road servicing Car Park #2. As the location of Car Park #2 is to be permanent and remain unchanged through to the future year scenario, this access point will be sole access in and out of the parking area for the foreseeable future.

Adjacent to Car Park #2, NSR1 operates as a two-way, two-lane road with divided carriageway. In the opening year scenario the access point to / from Car Park #2 is expected to be via a basic priority control intersection, also allowing room for a right turn pocket within the designated median for vehicles approaching from the south (via Brindebella Parkway).

For the purposes of this Transport Impact Assessment, an equivalent to this layout has been modelled within SIDRA Intersection and assessed for the relevant peak periods during the 2021 opening year scenario. The SIDRA layout of the NSR1 and Car Park #2 intersection is shown in Figure 34.

*Figure 34. NSR1 and Car Park #2 Access Intersection Layout*



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance. The SIDRA Intersection results for the 2021 morning and afternoon peaks are summarised in Figure 35 and Figure 36.

Figure 35. NSR1 / Car Park #2 Access – 2021 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h		
<b>South: NRS1 (south)</b>												
5	T1	100	5.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	147	0.0	0.089	4.9	LOS A	0.4	3.1	0.21	0.52	0.21	25.9
Approach		247	2.0	0.089	2.9	NA	0.4	3.1	0.13	0.31	0.13	32.8
<b>East: Car Park 2</b>												
7	L2	1	0.0	0.002	0.3	LOS A	0.0	0.0	0.20	0.13	0.20	24.8
9	R2	1	0.0	0.002	1.4	LOS A	0.0	0.0	0.20	0.13	0.20	24.5
Approach		2	0.0	0.002	0.9	LOS A	0.0	0.0	0.20	0.13	0.20	24.6
<b>North: NRS1 (north)</b>												
10	L2	1	0.0	0.054	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	28.8
11	T1	100	5.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach		101	5.0	0.054	0.0	NA	0.0	0.0	0.00	0.01	0.00	49.5
All Vehicles		350	2.9	0.089	2.1	NA	0.4	3.1	0.09	0.22	0.09	36.5

Figure 36. NSR1 / Car Park #2 Access – 2021 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h		
<b>South: NRS1 (south)</b>												
5	T1	100	5.0	0.053	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	3	0.0	0.002	4.8	LOS A	0.0	0.1	0.20	0.50	0.20	25.9
Approach		103	4.9	0.053	0.1	NA	0.0	0.1	0.01	0.01	0.01	48.8
<b>East: Car Park 2</b>												
7	L2	104	0.0	0.070	0.3	LOS A	0.3	2.1	0.20	0.08	0.20	25.0
9	R2	1	0.0	0.070	1.1	LOS A	0.3	2.1	0.20	0.08	0.20	24.7
Approach		105	0.0	0.070	0.3	LOS A	0.3	2.1	0.20	0.08	0.20	25.0
<b>North: NRS1 (north)</b>												
10	L2	1	0.0	0.054	4.6	LOS A	0.0	0.0	0.00	0.01	0.00	28.8
11	T1	100	5.0	0.054	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	49.8
Approach		101	5.0	0.054	0.0	NA	0.0	0.0	0.00	0.01	0.00	49.5
All Vehicles		309	3.2	0.070	0.2	NA	0.3	2.1	0.07	0.03	0.07	37.6

The intersection analysis results for Car Park #2 access via NSR1 indicates the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets in the opening year scenario during peak periods.

The results show that the average delay to enter Car Park #2 from NSR1 in either direction is expected to be less than 5 seconds during peak periods. Likewise, the delay for vehicles exiting Car Park #2 is also expected to be fewer than 5 seconds on average.

### 3.3.2 2031 FUTURE YEAR SCENARIO

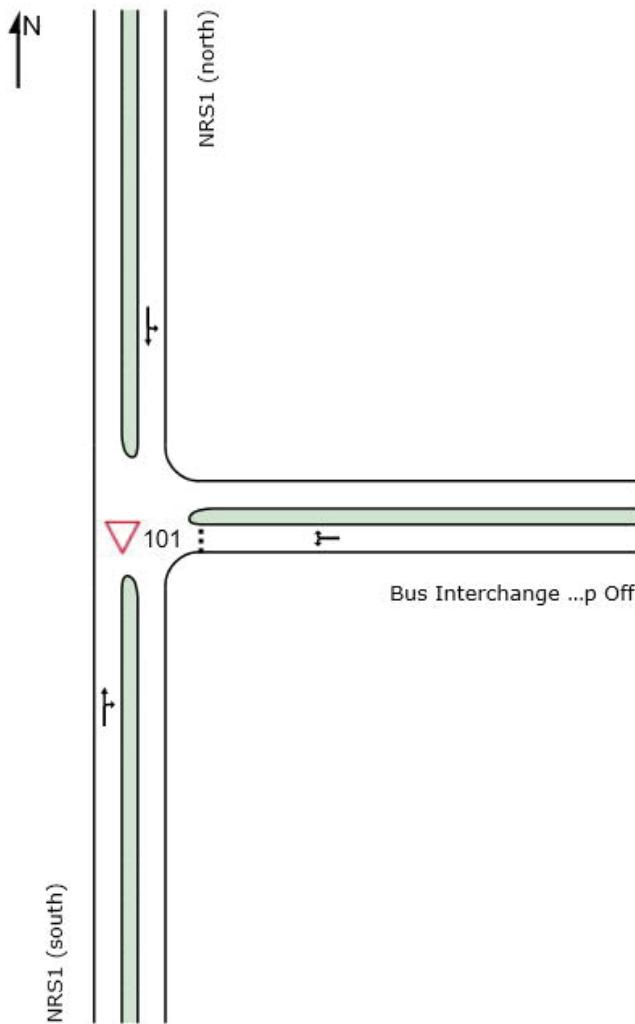
The results of the network impact analysis using SIDRA Intersection analysis software for each of the Alkimos Station access points are outlined in the following sections. Note that in the future year scenario, multiple access points have changed, and the locations of Car Park #1 and the station drop-off parking area have both relocated east of the rail reserve.

#### 3.3.2.1 NSR1 / Bus Interchange Access (West)

Although the drop-off parking area has been relocated to the eastern side of the rail reserve in the future year scenario, the access to the bus interchange along NSR1 remains open in 2031 to allow for bus access exclusively. Therefore, the intersection has been re-assessed for the future year scenario to demonstrate the forecast performance.

The SIDRA layout of the NSR1 and bus interchange access is shown in Figure 37.

*Figure 37. NSR1 and Bus Interchange Access Intersection Layout*



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance. The SIDRA Intersection results for the 2031 morning and afternoon peaks are summarised in Figure 38 and Figure 39.

Figure 38. NSR1 / Bus Interchange Access – 2031 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
South: NRS1 (south)												
8	T1	231	2.6	0.121	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	49.9
9	R2	1	0.0	0.121	4.5	LOS A	0.0	0.1	0.00	0.00	0.00	44.9
Approach		232	2.6	0.121	0.0	NA	0.0	0.1	0.00	0.00	0.00	49.9
East: Bus Interchange & Drop Off												
10	L2	1	0.0	0.001	0.1	LOS A	0.0	0.0	0.09	0.08	0.09	25.9
12	R2	1	0.0	0.001	0.9	LOS A	0.0	0.0	0.09	0.08	0.09	28.6
Approach		2	0.0	0.001	0.5	LOS A	0.0	0.0	0.09	0.08	0.09	27.3
North: NRS1 (north)												
1	L2	12	100.0	0.041	4.8	LOS A	0.0	0.0	0.00	0.20	0.00	26.5
2	T1	40	5.0	0.041	0.0	LOS A	0.0	0.0	0.00	0.20	0.00	45.3
Approach		52	26.9	0.041	1.8	NA	0.0	0.0	0.00	0.20	0.00	40.0
All Vehicles		286	7.0	0.121	0.2	NA	0.0	0.1	0.00	0.04	0.00	47.6

Figure 39. NSR1 / Bus Interchange Access – 2031 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
South: NRS1 (south)												
8	T1	64	4.7	0.035	0.0	LOS A	0.0	0.1	0.01	0.01	0.01	49.5
9	R2	1	0.0	0.035	4.8	LOS A	0.0	0.1	0.01	0.01	0.01	44.4
Approach		65	4.6	0.035	0.1	NA	0.0	0.1	0.01	0.01	0.01	49.4
East: Bus Interchange & Drop Off												
10	L2	1	0.0	0.001	0.4	LOS A	0.0	0.0	0.20	0.12	0.20	25.0
12	R2	1	0.0	0.001	0.8	LOS A	0.0	0.0	0.20	0.12	0.20	27.8
Approach		2	0.0	0.001	0.6	LOS A	0.0	0.0	0.20	0.12	0.20	26.4
North: NRS1 (north)												
1	L2	12	100.0	0.097	4.8	LOS A	0.0	0.0	0.00	0.07	0.00	27.8
2	T1	148	2.7	0.097	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	48.4
Approach		160	10.0	0.097	0.7	NA	0.0	0.0	0.00	0.07	0.00	46.4
All Vehicles		227	8.4	0.097	0.3	NA	0.0	0.1	0.00	0.06	0.00	47.0

The intersection analysis results for bus interchange access via NSR1 indicate that the proposed intersection arrangement is expected to perform at LoS A. By the future year of 2031, this intersection is primarily expected to be used for buses entering the interchange, therefore delays are expected to be minimal. However, should routing require that buses exit via this access point in the future scenario also, it would be expected that this would result in satisfactory performance given relatively low numbers of buses and the low forecast background traffic along NSR1.

### 3.3.2.2 NSR1 / Car Park #2 Access

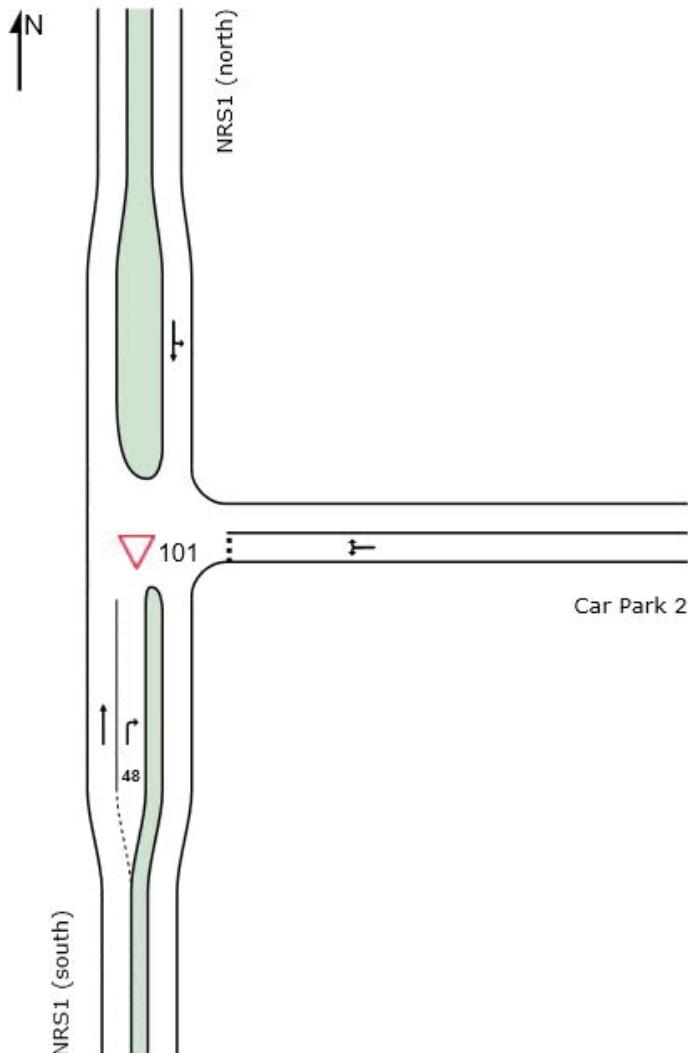
The location of Car Park #2 is proposed to remain unchanged in the future year scenario. Therefore, the access to this parking area via NSR1 is required to be re-assessed for this forecast year.

Through the development of the Alkimos Station site, it has been noted that potential future year plans for the Alkimos City Centre suggest that the intersection of NSR1 and Car Park #2 may be converted to a full movement roundabout to enable access to future development sites located to the west of NSR1. However, the timeframe and responsibility for these network upgrades is currently unknown.

Therefore, for the purposes of this assessment it has been assumed that the NSR1 / Car Park #2 access will remain unchanged and continue to operate as a three-way priority controlled intersection through to at least the future year of 2031. If network modifications are implemented after this date, then further traffic assessments would be required at this location.

The SIDRA layout of the NSR1 and Car Park #2 intersection is shown in Figure 40.

*Figure 40. NSR1 and Car Park #2 Access Intersection Layout*



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the access point and determine if any additional adjustments would be required to achieve the desired level of service targets for intersection performance. The SIDRA Intersection results for the 2031 morning and afternoon peaks are summarised in Figure 41 and Figure 42.

Figure 41. NSR1 / Car Park #2 Access – 2031 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
<b>South: NRS1 (south)</b>												
5	T1	350	34.9	0.241	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	159	0.0	0.113	5.5	LOS A	0.5	3.8	0.37	0.58	0.37	25.1
Approach		509	24.0	0.241	1.7	NA	0.5	3.8	0.12	0.18	0.12	39.0
<b>East: Car Park 2</b>												
7	L2	1	0.0	0.002	0.8	LOS A	0.0	0.1	0.38	0.25	0.38	23.5
9	R2	1	0.0	0.002	3.5	LOS A	0.0	0.1	0.38	0.25	0.38	23.2
Approach		2	0.0	0.002	2.1	LOS A	0.0	0.1	0.38	0.25	0.38	23.3
<b>North: NRS1 (north)</b>												
10	L2	1	0.0	0.139	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	28.8
11	T1	260	5.0	0.139	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		261	5.0	0.139	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.8
All Vehicles		772	17.5	0.241	1.1	NA	0.5	3.8	0.08	0.12	0.08	42.1

Figure 42. NSR1 / Car Park #2 Access – 2031 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Demand Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
<b>South: NRS1 (south)</b>												
5	T1	400	5.0	0.213	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
6	R2	4	0.0	0.003	5.2	LOS A	0.0	0.1	0.31	0.51	0.31	25.4
Approach		404	5.0	0.213	0.1	NA	0.0	0.1	0.00	0.01	0.00	49.6
<b>East: Car Park 2</b>												
7	L2	112	0.0	0.084	0.7	LOS A	0.3	2.5	0.30	0.18	0.30	24.5
9	R2	1	0.0	0.084	2.9	LOS A	0.3	2.5	0.30	0.18	0.30	24.1
Approach		113	0.0	0.084	0.7	LOS A	0.3	2.5	0.30	0.18	0.30	24.5
<b>North: NRS1 (north)</b>												
10	L2	1	0.0	0.112	4.6	LOS A	0.0	0.0	0.00	0.00	0.00	28.8
11	T1	210	4.8	0.112	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach		211	4.7	0.112	0.0	NA	0.0	0.0	0.00	0.00	0.00	49.7
All Vehicles		728	4.1	0.213	0.1	NA	0.3	2.5	0.05	0.03	0.05	43.3

The intersection analysis results for Car Park 2 access via NSR1 indicate that the proposed intersection arrangement is expected to perform at LoS A. In the future year scenario assessed above, the results indicate that the delay for vehicles entering and exiting Car Park #2 remains relatively low with a forecast average delay of approximately 5 seconds in both the morning and afternoon peak periods.

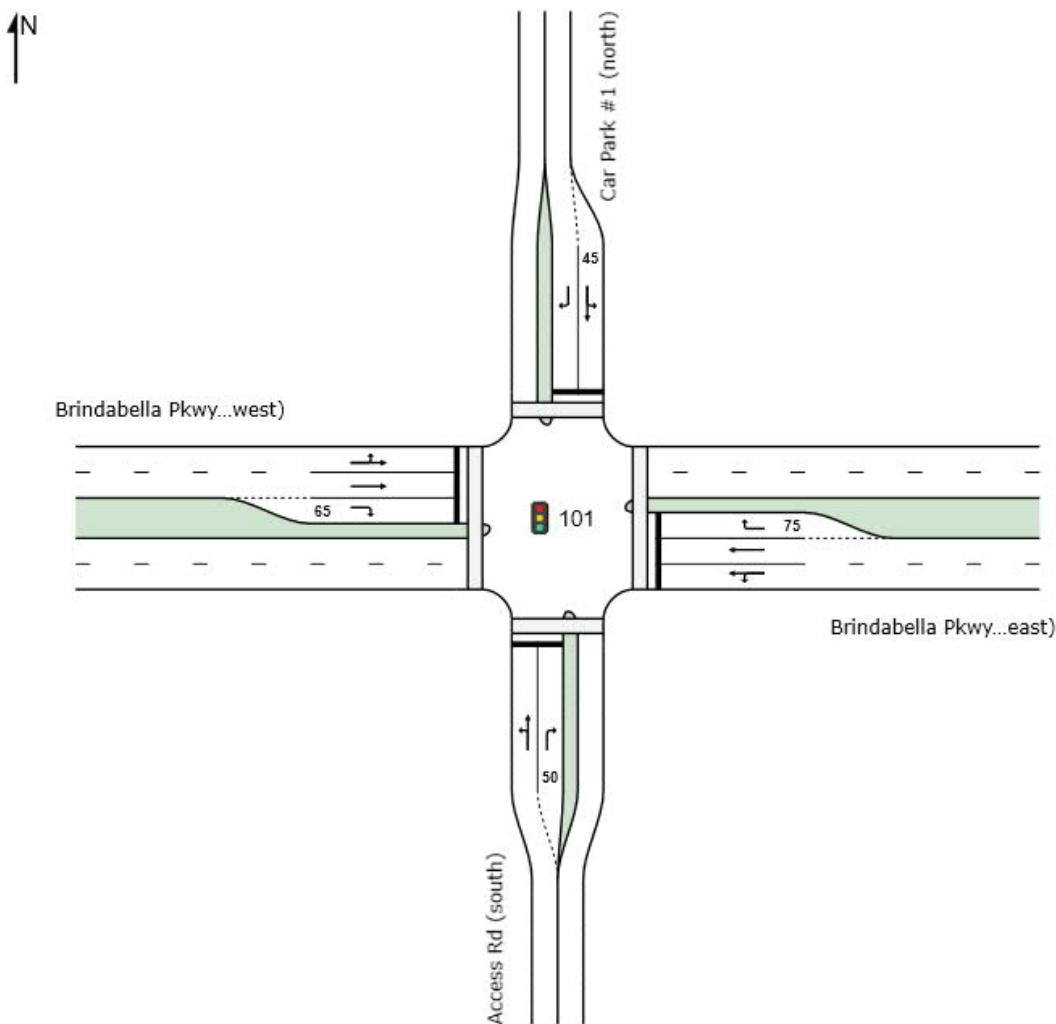
### 3.3.2.3 Brindabella Parkway / Future Car Park #1 Access

The anticipated completion of the Brindabella Parkway Bridge by the future year of 2031 will provide an important linkage to the eastern side of YRE rail corridor in Alkimos. With this connection, it is expected that the proposed north-south 'Future Road' (running along the eastern edge of the station site) will be constructed and Car Park #1 will be relocated to the proposed location north-east of Alkimos Station.

Access to the future Car Park #1 location is expected to be via new signals to be constructed at the future intersection of Brindabella Parkway and the Future Road. Note that this signalised infrastructure is not understood to be delivered by PTA as part of the station works, but instead it is understood to form part of the wider Alkimos City Centre movement network being delivered by DevelopmentWA. However, as this intersection is critical to the access to and from the relocated Car Park #1 for Alkimos Station, the forecast performance at this site has been assessed based on a preliminary layout sketch of the future signalised infrastructure.

For the purposes of this assessment, a simple four phase movement sequence has been assumed, with the Car Park #1 and Future Road legs assumed to be operating in split phases due to geometry. The SIDRA layout of the Brindabella Parkway and Car Park #1 access is shown in Figure 43.

*Figure 43. Brindabella Parkway / Future Road Intersection Layout*



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the intersection and determine if the layout was likely to satisfy the performance targets. The SIDRA Intersection results for the 2031 morning and afternoon peaks are summarised in Figure 44 and Figure 45.

Figure 44. Brindabella Parkway / Future Car Park #1 Access – 2031 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
<b>South: Access Rd (south)</b>												
1	L2	133	11.1	0.419	29.2	LOS C	3.6	29.4	0.93	0.78	0.93	22.0
2	T1	1	0.0	0.419	29.7	LOS C	3.6	29.4	0.93	0.78	0.93	15.9
3	R2	65	3.2	0.194	27.8	LOS C	1.7	12.9	0.88	0.73	0.88	31.4
Approach		199	8.5	0.419	28.8	LOS C	3.6	29.4	0.91	0.76	0.91	25.8
<b>East: Brindabella Pkwy (east)</b>												
4	L2	79	20.0	0.412	33.4	LOS C	2.3	20.7	0.97	0.76	0.97	28.7
5	T1	84	5.0	0.378	28.2	LOS C	2.4	19.0	0.96	0.74	0.96	31.6
6	R2	67	0.0	0.239	30.1	LOS C	1.8	13.5	0.92	0.74	0.92	26.3
Approach		231	8.7	0.412	30.6	LOS C	2.4	20.7	0.95	0.75	0.95	29.0
<b>North: Car Park #1 (north)</b>												
7	L2	1	0.0	0.007	23.7	LOS C	0.1	0.4	0.87	0.54	0.87	27.7
8	T1	1	0.0	0.007	23.7	LOS C	0.1	0.4	0.87	0.54	0.87	17.0
9	R2	1	0.0	0.004	23.6	LOS C	0.0	0.2	0.87	0.51	0.87	17.4
Approach		3	0.0	0.007	23.7	LOS C	0.1	0.4	0.87	0.53	0.87	21.6
<b>West: Brindabella Pkwy (west)</b>												
10	L2	100	0.0	0.457	33.2	LOS C	2.9	21.7	0.97	0.77	0.97	15.2
11	T1	32	6.7	0.143	27.1	LOS C	0.9	6.9	0.93	0.67	0.93	32.1
12	R2	120	1.8	0.432	31.0	LOS C	3.4	25.5	0.95	0.77	0.95	21.3
Approach		252	1.7	0.457	31.4	LOS C	3.4	25.5	0.96	0.76	0.96	20.6
All Vehicles		684	6.0	0.457	30.3	LOS C	3.6	29.4	0.94	0.76	0.94	25.4

Figure 45. Brindabella Parkway / Future Car Park #1 Access – 2031 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
<b>South: Access Rd (south)</b>												
1	L2	103	14.3	0.389	34.7	LOS C	3.4	27.7	0.94	0.77	0.94	19.9
2	T1	1	0.0	0.389	35.1	LOS D	3.4	27.7	0.94	0.77	0.94	14.4
3	R2	60	3.5	0.209	33.4	LOS C	1.9	14.2	0.91	0.74	0.91	29.3
Approach		164	10.3	0.389	34.2	LOS C	3.4	27.7	0.93	0.76	0.93	24.1
<b>East: Brindabella Pkwy (east)</b>												
4	L2	67	14.1	0.243	29.1	LOS C	2.8	23.2	0.86	0.73	0.86	31.0
5	T1	137	4.6	0.243	24.3	LOS C	3.0	23.5	0.86	0.69	0.86	33.0
6	R2	1	0.0	0.005	34.7	LOS C	0.0	0.2	0.90	0.59	0.90	24.9
Approach		205	7.7	0.243	26.0	LOS C	3.0	23.5	0.86	0.70	0.86	32.3
<b>North: Car Park #1 (north)</b>												
7	L2	47	0.0	0.164	28.5	LOS C	1.5	11.0	0.90	0.67	0.90	26.1
8	T1	1	0.0	0.164	28.5	LOS C	1.5	11.0	0.90	0.67	0.90	15.5
9	R2	71	0.0	0.239	28.9	LOS C	2.2	16.2	0.91	0.70	0.91	15.7
Approach		119	0.0	0.239	28.8	LOS C	2.2	16.2	0.91	0.69	0.91	20.7
<b>West: Brindabella Pkwy (west)</b>												
10	L2	2	0.0	0.159	28.3	LOS C	1.9	15.0	0.84	0.65	0.84	18.0
11	T1	137	4.6	0.159	23.7	LOS C	1.9	15.0	0.84	0.65	0.84	33.5
12	R2	91	2.3	0.429	37.7	LOS D	3.1	23.2	0.97	0.77	0.97	19.0
Approach		229	3.7	0.429	29.3	LOS C	3.1	23.2	0.89	0.69	0.89	28.2
All Vehicles		718	5.7	0.429	29.4	LOS C	3.4	27.7	0.89	0.71	0.89	27.3

The analysis results demonstrate that during both the AM and PM peak periods, the Brindabella Parkway and Future Road intersection is expected to operate at a satisfactory LoS C overall, based on the background flows provided and the estimated traffic generated by the relocated Car Park #1 site.

Closer analysis of the results indicates that several individual movements may achieve a forecast LoS D, while the majority of individual movements operate at LoS C. These performance results satisfy the minimum performance metrics outlined in the METRONET Scope of Works and Technical Criteria document. Therefore, the operation of the Brindabella Parkway and Future Road intersection is expected to be satisfactory. However, it would be recommended that further assessment of this site be conducted as part of the future works and ongoing development of the Alkimos City Centre to confirm the preliminary results outlined above.

### **3.3.2.4 Future Road / Bus Interchange Access (East)**

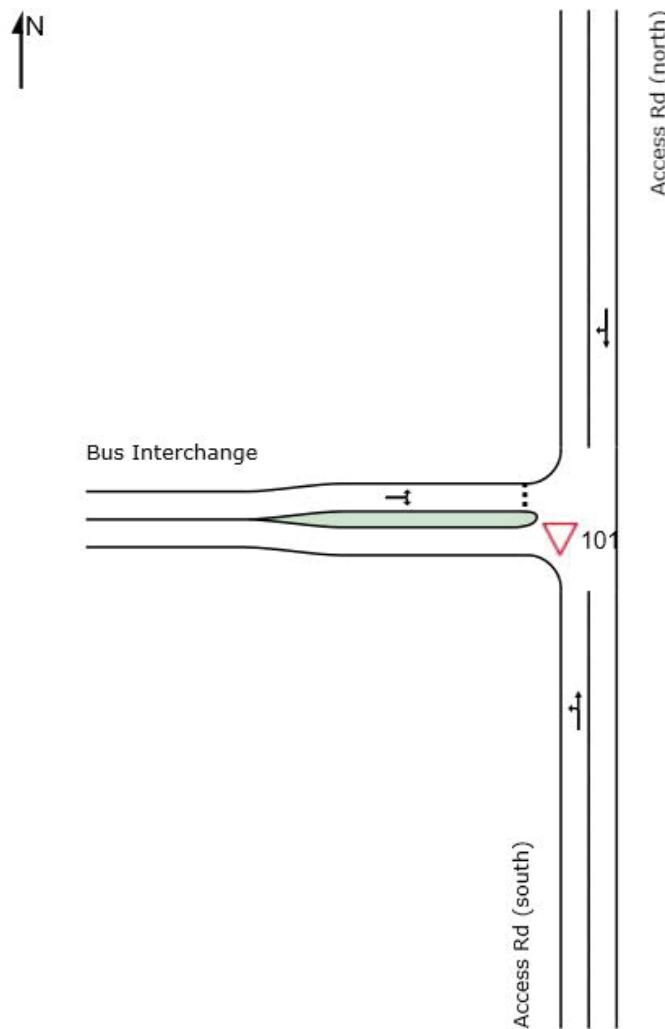
In the future year scenario of 2031, a secondary access point for the bus interchange will be incorporated on the eastern side of the bus interchange to allow bus movements via the proposed new Future Road (and in turn through the new Brindabella Parkway / Future Road intersection).

The new bus-only interchange access will be located on the western side of the Future Road. This access point will be separated from the new drop-off access point, to allow buses to have priority access to and from the interchange. This access point is proposed to be approximately 80 metres south of the Brindabella Parkway intersection.

While the configuration of the Future Road has not yet been confirmed, it is expected that this will likely be a two-way road with one lane per direction, potentially divided by a narrow median. The formation with the bus interchange access with the Future Road is likely to be a basic priority controlled intersection, with the bus interchange approach yielding to traffic along the Future Road.

The SIDRA layout of the Future Road and Bus Interchange intersection is shown in Figure 46Figure 34.

Figure 46. Future Road and Bus Interchange Access (East) Intersection Layout



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the intersection and determine if the layout was likely to satisfy the performance targets. The SIDRA Intersection results for the 2031 morning and afternoon peaks are summarised in Figure 47 and Figure 48.

Figure 47. Future Road / Bus Interchange Access – 2031 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
<b>South: Access Rd (south)</b>												
1	L2	12	100.0	0.113	5.1	LOS A	0.0	0.0	0.00	0.06	0.00	34.0
2	T1	178	2.8	0.113	0.0	LOS A	0.0	0.0	0.00	0.06	0.00	48.6
Approach		190	8.9	0.113	0.6	NA	0.0	0.0	0.00	0.06	0.00	47.3
<b>North: Access Rd (north)</b>												
8	T1	178	2.8	0.094	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	49.9
9	R2	1	0.0	0.094	3.8	LOS A	0.0	0.1	0.00	0.00	0.00	37.8
Approach		179	2.8	0.094	0.0	NA	0.0	0.1	0.00	0.00	0.00	49.8
<b>West: Bus Interchange</b>												
10	L2	12	100.0	0.029	1.2	LOS A	0.1	1.9	0.30	0.24	0.30	18.0
12	R2	12	100.0	0.029	1.9	LOS A	0.1	1.9	0.30	0.24	0.30	25.2
Approach		24	100.0	0.029	1.6	LOS A	0.1	1.9	0.30	0.24	0.30	22.0
All Vehicles		393	11.7	0.113	0.3	NA	0.1	1.9	0.02	0.05	0.02	45.8

Figure 48. Future Road / Bus Interchange Access – 2031 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows		Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
<b>South: Access Rd (south)</b>												
1	L2	12	100.0	0.096	5.1	LOS A	0.0	0.0	0.00	0.08	0.00	33.9
2	T1	144	3.5	0.096	0.0	LOS A	0.0	0.0	0.00	0.08	0.00	48.3
Approach		156	10.9	0.096	0.7	NA	0.0	0.0	0.00	0.08	0.00	46.8
<b>North: Access Rd (north)</b>												
8	T1	144	3.5	0.076	0.0	LOS A	0.0	0.1	0.00	0.00	0.00	49.8
9	R2	1	0.0	0.076	3.7	LOS A	0.0	0.1	0.00	0.00	0.00	37.8
Approach		145	3.4	0.076	0.0	NA	0.0	0.1	0.00	0.00	0.00	49.8
<b>West: Bus Interchange</b>												
10	L2	12	100.0	0.028	1.0	LOS A	0.1	1.8	0.27	0.20	0.27	18.2
12	R2	12	100.0	0.028	1.6	LOS A	0.1	1.8	0.27	0.20	0.27	25.4
Approach		24	100.0	0.028	1.3	LOS A	0.1	1.8	0.27	0.20	0.27	22.3
All Vehicles		325	14.2	0.096	0.3	NA	0.1	1.8	0.02	0.05	0.02	45.0

The intersection analysis results for the bus interchange access via the Future Road indicate that the proposed intersection arrangement is expected to perform at LoS A and achieve satisfactory performance targets in the 2031 future year scenario.

Results indicate that the average delay to enter the bus interchange from the Future Road in both directions is expected to be approximately 5 seconds during peak periods. The average delay for buses exiting the bus interchange is also expected to be less than 5 seconds during peak periods.

### 3.3.2.5 Future Road / Drop-Off Access

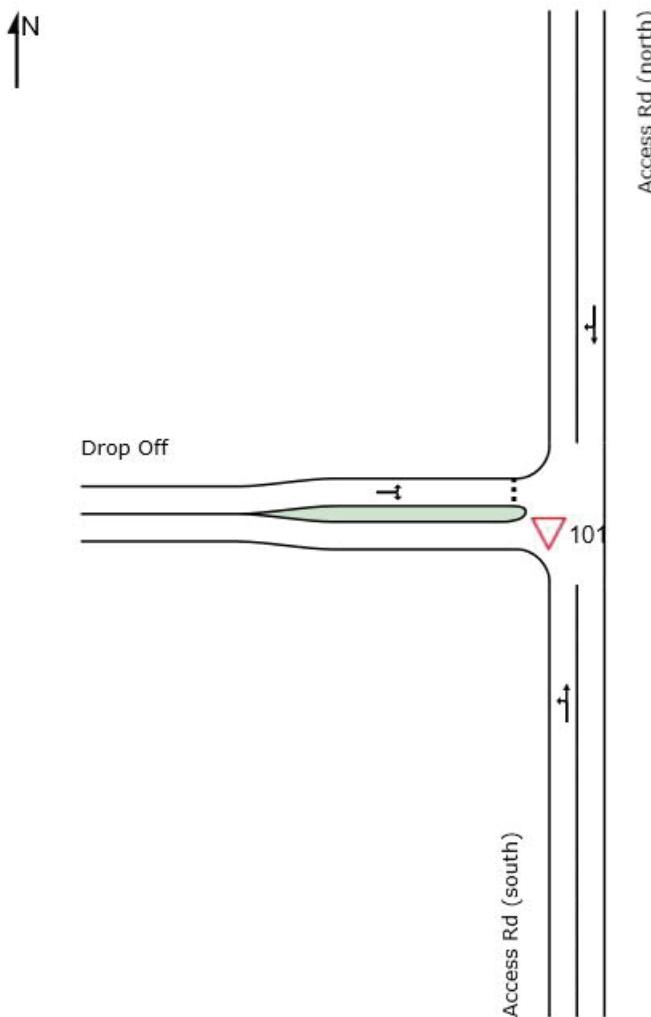
One of the primary components of the 2031 future year scenario is the relocation of the Alkimos Station drop-off area to the eastern side of the rail line, in order to make way for the ongoing development of the town centre as part of the Alkimos City Centre precinct.

Vehicle access to the relocated station passenger drop-off area is also proposed to be via the north-south Future Road, east of the station site. This access point will allow both entry and exit for vehicles using the drop-off parking area, and will also allow a southern entry-only point to the bus interchange for future Transperth services which are expected to approach from the south-east.

The access point to the future drop-off area is proposed to be located approximately 200 metres south of the Brindebella Parkway intersection. Again, the configuration of the Future Road has not yet been confirmed, but it is expected that this will likely be a two-way road with one lane per direction, potentially divided by a narrow median. The formation with the drop-off parking access with the Future Road is proposed to be a basic priority controlled intersection.

The SIDRA layout of the Future Road and drop-off parking access is shown in Figure 49Figure 34.

*Figure 49. Future Road and Drop-Off Access Intersection Layout*



Based on the above layout, peak hour intersection analyses were undertaken to determine the forecast performance of the intersection and determine if the layout was likely to satisfy the performance targets. The SIDRA Intersection results for the 2031 morning and afternoon peaks are summarised in Figure 50 and Figure 51.

Figure 50. Future Road / Drop-Off Access – 2031 AM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
<b>South: Access Rd (south)</b>												
1	L2	52	0.0	0.099	4.6	LOS A	0.0	0.0	0.17	0.00	32.3	
2	T1	112	15.2	0.099	0.0	LOS A	0.0	0.0	0.17	0.00	43.3	
Approach		164	10.4	0.099	1.5	NA	0.0	0.0	0.17	0.00	39.1	
<b>North: Access Rd (north)</b>												
8	T1	112	15.2	0.117	0.3	LOS A	0.4	3.7	0.22	0.22	42.0	
9	R2	78	0.0	0.117	3.7	LOS A	0.4	3.7	0.22	0.22	30.1	
Approach		190	8.9	0.117	1.7	NA	0.4	3.7	0.22	0.22	37.8	
<b>West: Drop Off</b>												
10	L2	78	0.0	0.092	0.4	LOS A	0.3	2.3	0.20	0.15	0.20	19.0
12	R2	52	0.0	0.092	1.1	LOS A	0.3	2.3	0.20	0.15	0.20	29.2
Approach		130	0.0	0.092	0.7	LOS A	0.3	2.3	0.20	0.15	0.20	23.4
<b>All Vehicles</b>		484	7.0	0.117	1.3	NA	0.4	3.7	0.14	0.19	0.14	33.4

Figure 51. Future Road and Drop-Off Access – 2031 PM Peak Results

Movement Performance - Vehicles												
Mov ID	Turn	Demand Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
<b>South: Access Rd (south)</b>												
1	L2	29	0.0	0.087	4.6	LOS A	0.0	0.0	0.11	0.00	33.4	
2	T1	112	15.2	0.087	0.0	LOS A	0.0	0.0	0.11	0.00	45.4	
Approach		141	12.1	0.087	0.9	NA	0.0	0.0	0.11	0.00	42.2	
<b>North: Access Rd (north)</b>												
8	T1	112	15.2	0.096	0.2	LOS A	0.3	2.3	0.15	0.15	0.15	44.2
9	R2	44	0.0	0.096	3.6	LOS A	0.3	2.3	0.15	0.15	0.15	32.1
Approach		156	10.9	0.096	1.2	NA	0.3	2.3	0.15	0.15	0.15	41.4
<b>West: Drop Off</b>												
10	L2	44	0.0	0.051	0.4	LOS A	0.2	1.3	0.19	0.14	0.19	19.0
12	R2	29	0.0	0.051	1.0	LOS A	0.2	1.3	0.19	0.14	0.19	29.3
Approach		73	0.0	0.051	0.6	LOS A	0.2	1.3	0.19	0.14	0.19	23.4
<b>All Vehicles</b>		370	9.2	0.096	1.0	NA	0.3	2.3	0.10	0.13	0.10	37.0

The intersection analysis results for the drop-off area access via the Future Road indicate that the proposed intersection arrangement is expected to operate at LoS A during both morning and afternoon peaks. Results of the analysis demonstrate that the forecast average delay to enter the bus interchange from the Future Road in both directions is anticipated to be less than 5 seconds during peak periods. Vehicles exiting the drop-off area are similarly forecast to experience an average delay of less than 5 seconds during the peaks.

### 3.4 PUBLIC TRANSPORT ROUTES AND SERVICING

With the introduction of the new Yanchep Rail Extension and the associated bus interchanges at each of the stations along the route, adjustments to existing bus routes and the introduction of new services are expected.

The future Transperth bus network proposed to service the Alkimos Station bus interchange is outlined in Table 9. This information has been supplied by PTA / Transperth and is subject to changes or adjustments pending future planning and community consultation.

*Table 9. Alkimos Station – Planned Bus Services*

Route	Headway (mins)		Notes
	Peak	Inter-Peak / Off-Peak	
480 via Marmion (South)	10	30	Route 480 & 482 are operating on a temporary alignment awaiting connection of NS1 to Romeo Road.
482 via Marmion (south)	20	30	
485 via Marmion (north)	10	30	
Route 486 via Marmion (north)	10	30	

- Route 483 & 484 will not serve Alkimos Station upon opening due to incomplete road network. Staging-wise, they are expected to operate once NSR1 connects to Romeo, and then be rerouted once development occurs to the east of the Station.
- Route 487 will not operate upon opening.

The assumed Alkimos Station bus routes and potential entry / exit paths for the opening year and future year are illustrated in Figure 52 and Figure 53, respectively.

Figure 52. Alkimos Station – Assumed Bus Routing (Opening Year 2021)

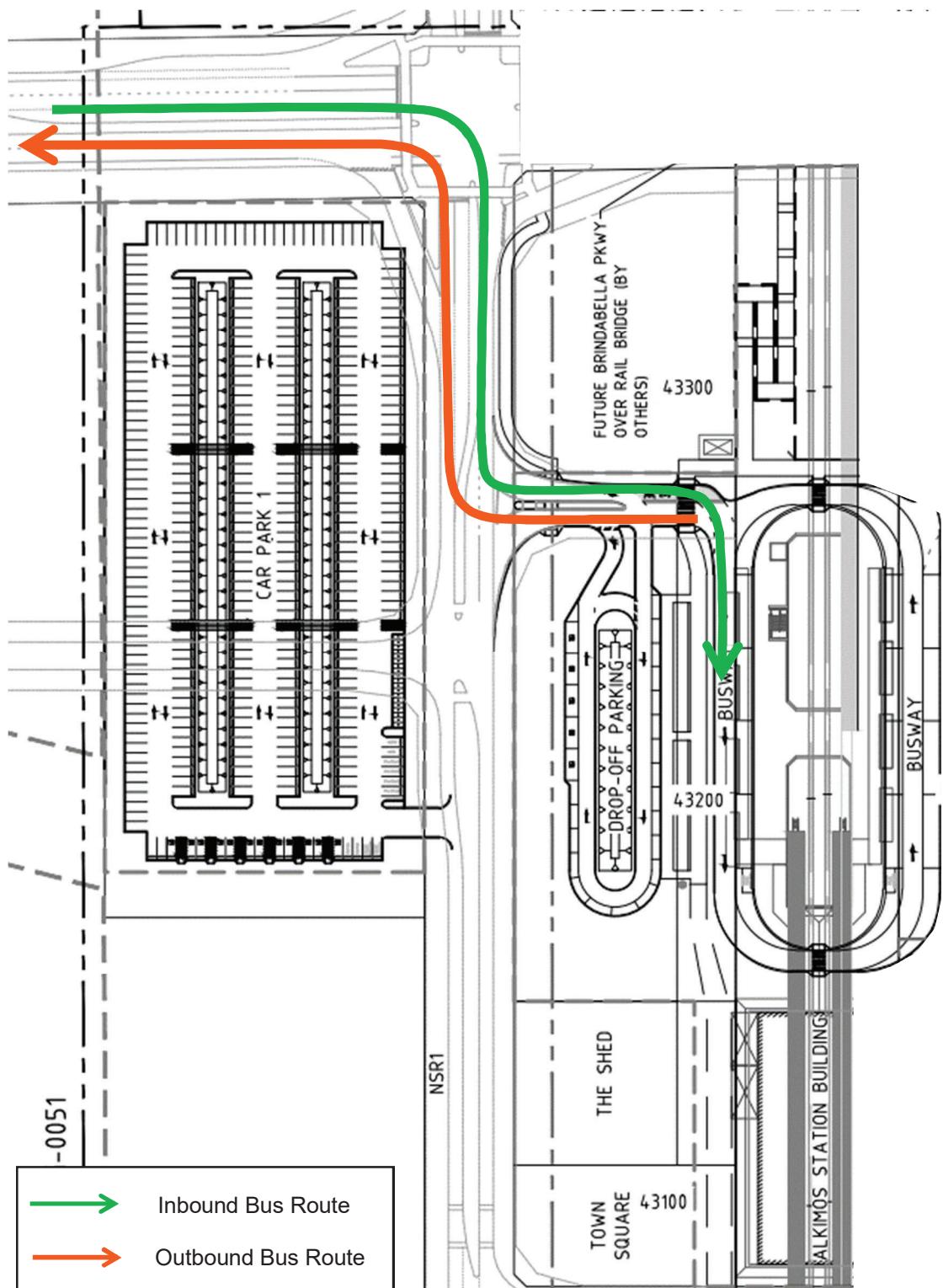
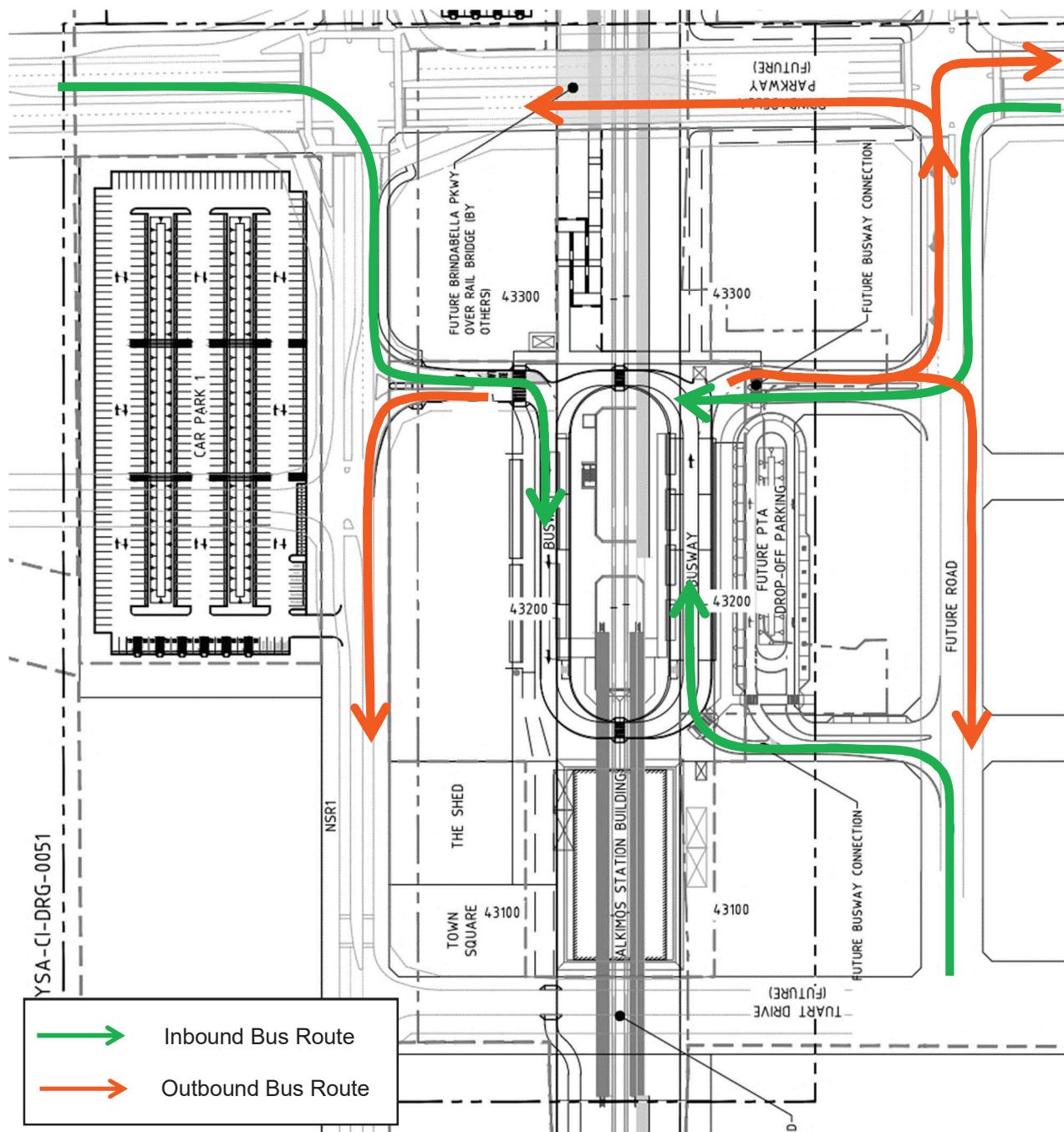


Figure 53. Alkimos Station – Assumed Bus Routing (Future Year 2031)



### 3.5 BUS INTERCHANGE

The proposed Alkimos Station design provides for an integrated bus interchange which will be located to the north of the main station building. The active and layover bays will be split on both the eastern and the western sides of the rail corridor.

For the opening year scenario, buses will be able to access the interchange from the west via the intersection of Marmion Avenue / Brindebella Drive and will travel along the NSR1 access road to enter and exit the interchange (illustrated in Figure 54). In the 2031 scenario with the addition of new local connectivity, the interchange is expected to be accessible from both the eastern and western sides of the rail corridor via future roads (illustrated in Figure 55). In both scenarios, the design of the bus interchange will allow buses to re-circulate within the station busway.

The Schedule of Accommodation requires the bus interchange to include a minimum of 8 active bays and 4 layover bays, which the proposed design satisfies. Each of the following figures illustrates how Transperth buses and pedestrians are expected to move within the bus interchange and the potential location of the active and layover bays for the opening year and future year scenarios.

Figure 54. Alkimos Station – Bus Interchange Layout & Access (Opening Year 2021)

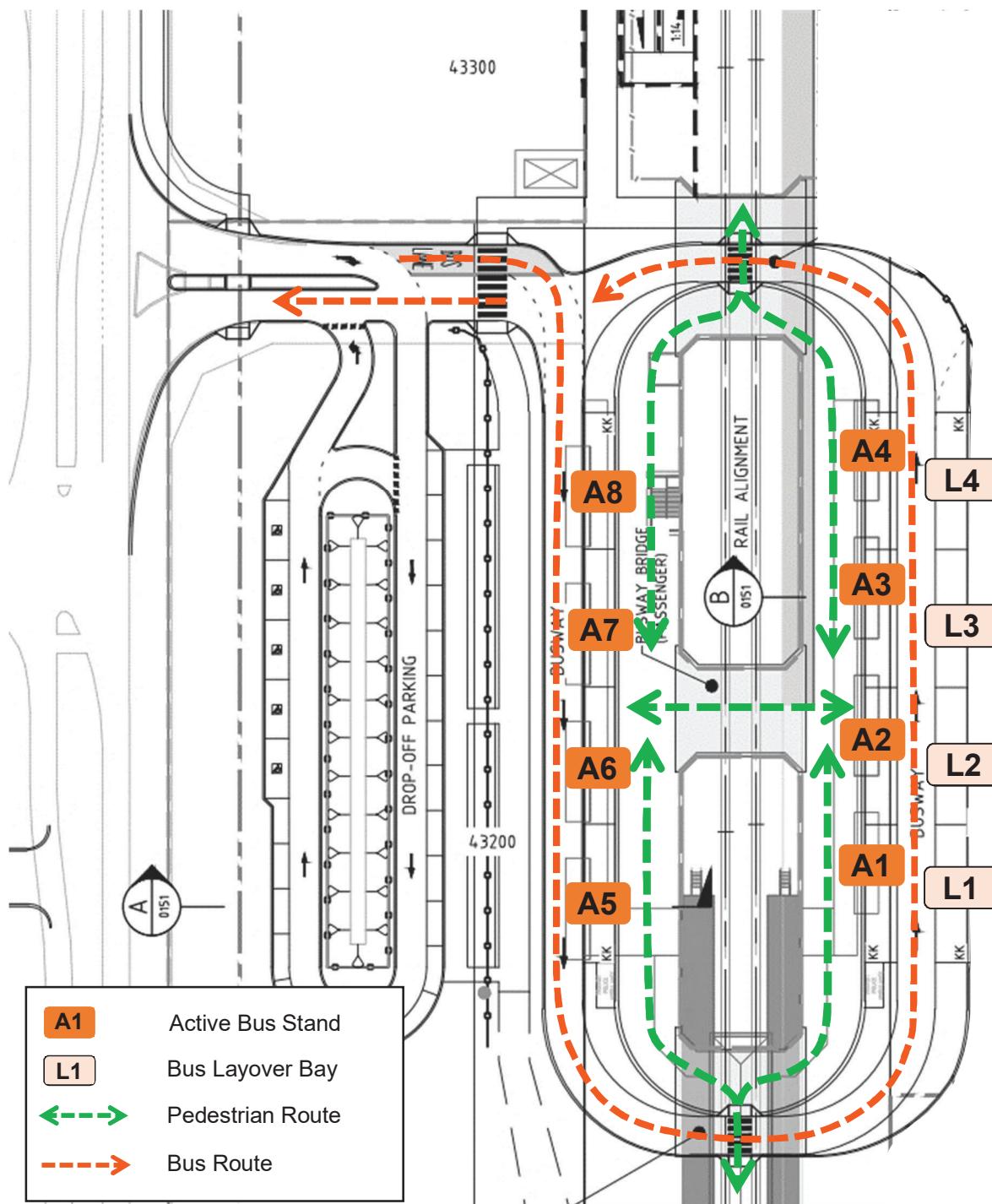
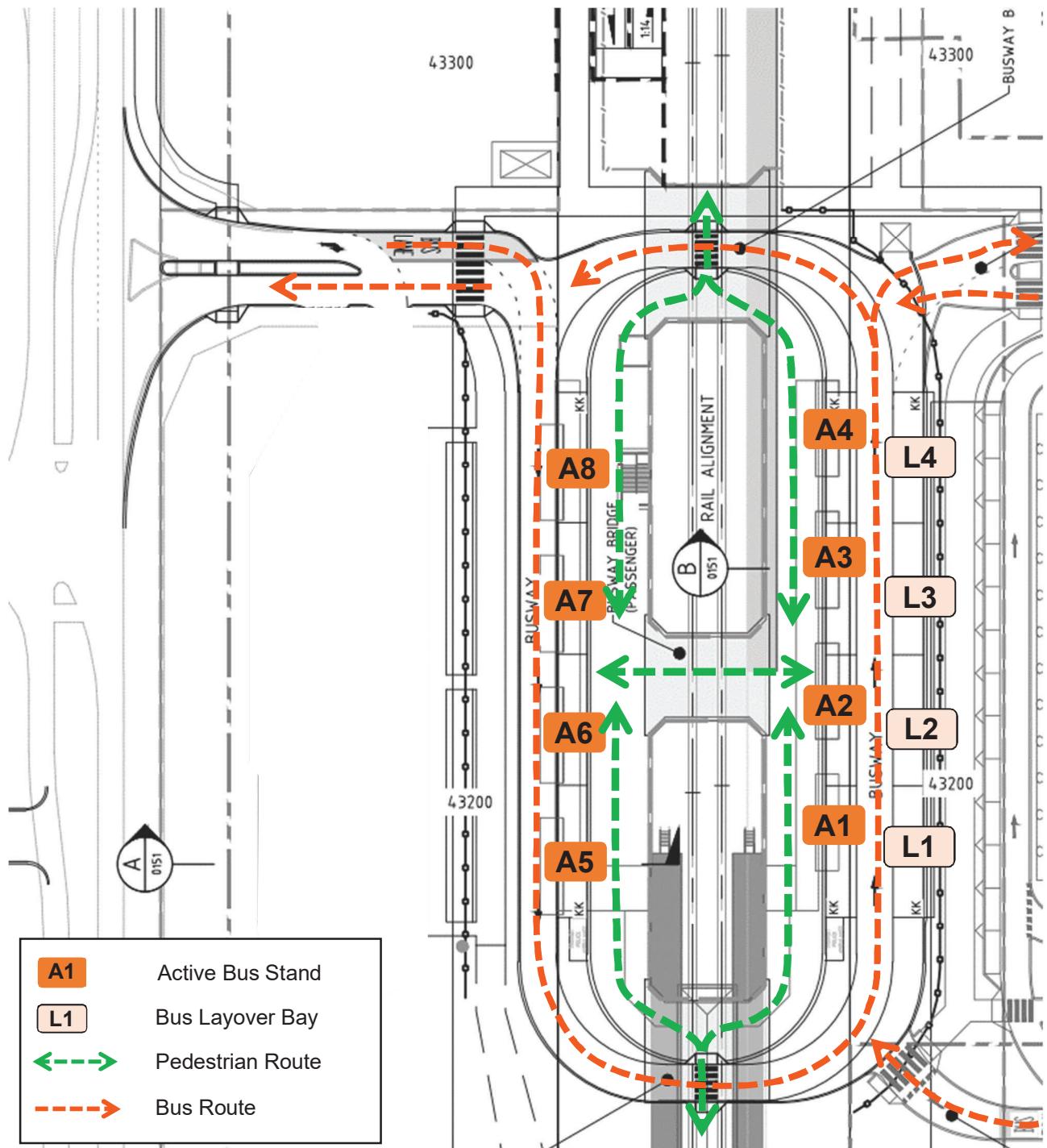


Figure 55. Alkimos Station – Bus Interchange Layout & Access (Future Year 2031)



## 3.6 PEDESTRIAN & CYCLE ACCESS

### 3.6.1 NORTH-SOUTH CONNECTIVITY

A major element of the METRONET YRE project is the provision of a new PSP corridor within the rail reserve that covers the full length of the project from Butler through to Yanchep. This infrastructure comprises a high-quality grade-separated PSP connection which follows the entire rail corridor. The proposed PSP includes a 4.0 metre wide shared path with 0.5 metre shoulders on either side (5.0 metre wide corridor in total) – as per current Department of Transport guidelines for PSP design. The path will be located on the western side of the rail corridor with bicycle parking facilities provided in close proximity to the station entry, and connections provided at key points along the network.

As per the current Alkimos Station concept design plans for the opening year scenario, the PSP will be provided to the west of the rail corridor with direct access to the station forecourt and bus interchange facilities. As the PSP approaches Alkimos City Centre from the south, it is expected that the PSP will ramp up from the rail corridor to the City Centre natural level, allowing access to the station building. Then, north of the station building and the bus interchange, the PSP will again ramp down to the rail corridor level to continue below the future Brindebella Parkway bridge. The PSP connectivity in the opening year scenario is illustrated in Figure 56.

In the future year scenario of 2031, with the relocation of the majority of station movements to the eastern side of the rail corridor, it is proposed to divert the PSP around the bus interchange on the eastern side of the rail corridor. The PSP is then proposed to pass between the bus interchange and the newly relocated drop-off area, before ultimately re-joining the ramped connection provided on the western side of the rail. The PSP connectivity in the 2031 future year scenario is illustrated in Figure 57.

Figure 56. Alkimos Station – PSP Access and Ramp Arrangement (Opening Year)

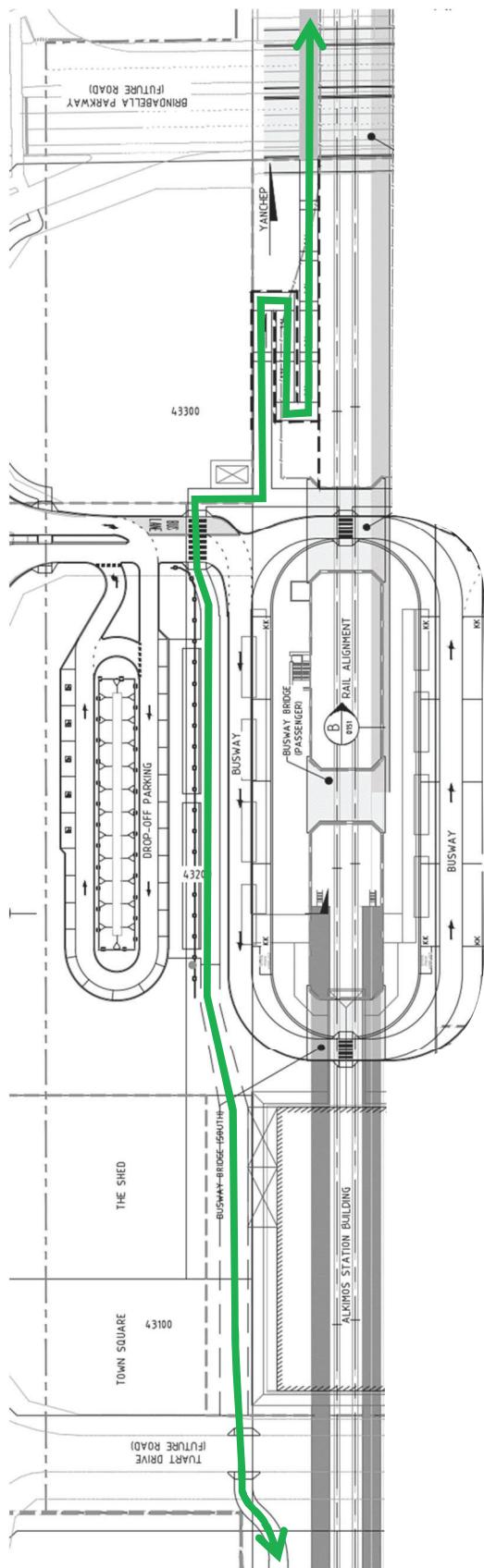
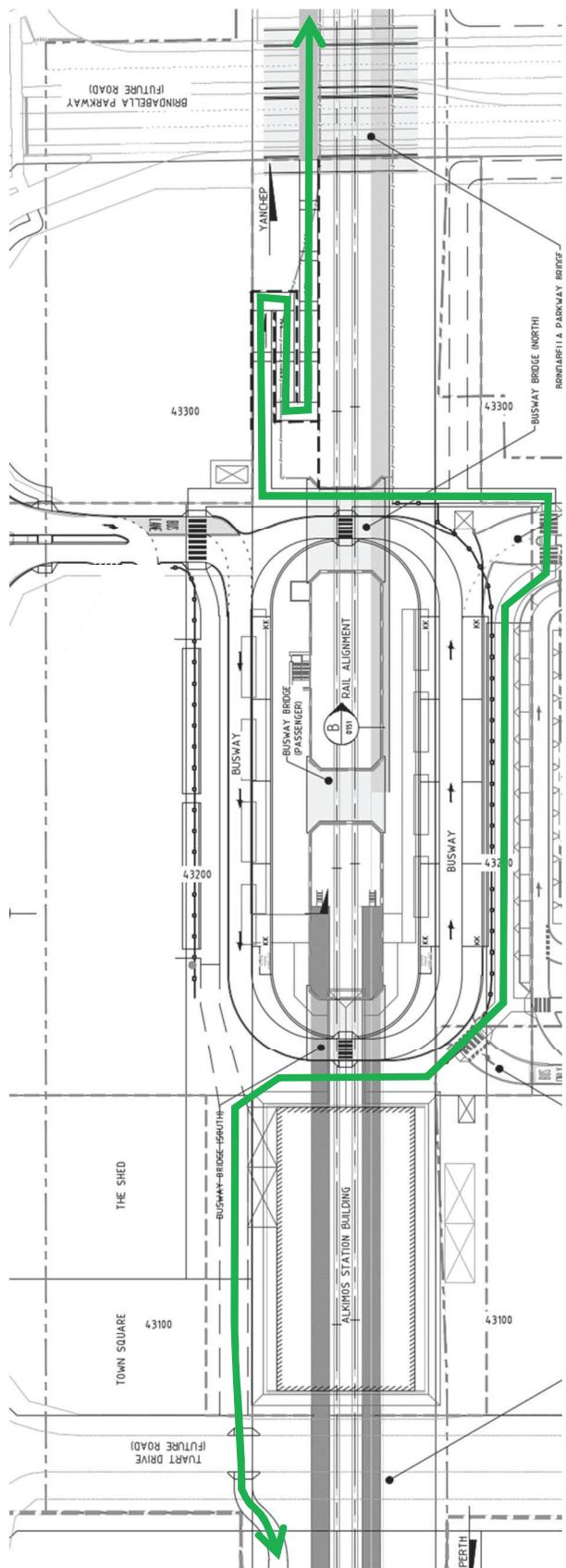


Figure 57. Alkimos Station – PSP Alignment and Ramp Arrangement (Future Year)



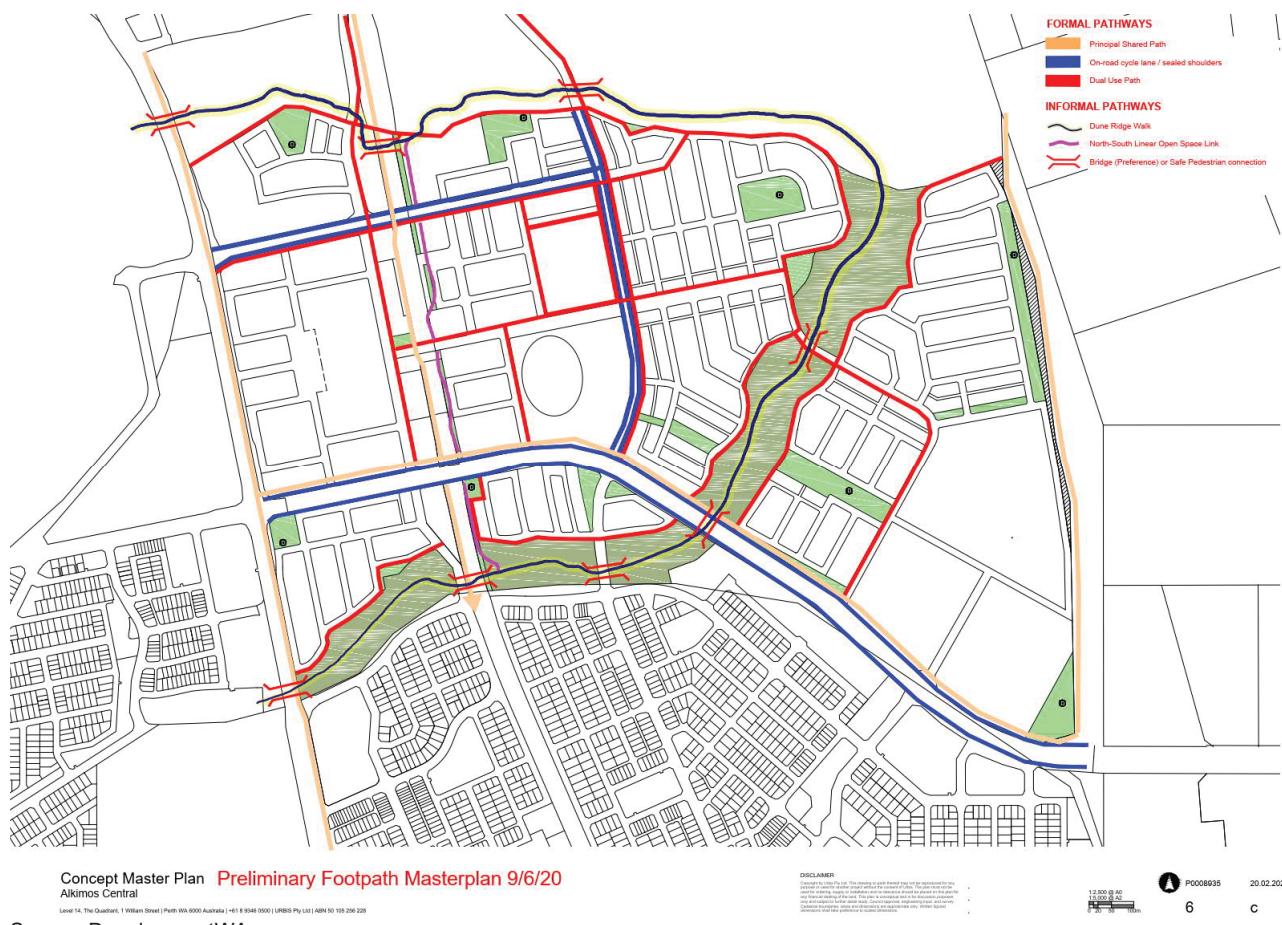
### 3.6.2 ADDITIONAL CONNECTIVITY

The Alkimos Station design primarily supports pedestrian and cycling connectivity via the new grade-separated PSP route integrated with the rail extension. Additional pedestrian connectivity throughout the station and the bus interchange is also provided.

In addition to this, multiple future pedestrian and cycling connections are included within the Alkimos City Centre area as part of the wider masterplan currently being progressed by DevelopmentWA. These future connections will ultimately seek to connect several of the existing and proposed residential areas in the surrounding region to the Alkimos City Centre and the Alkimos Station.

DevelopmentWA provided NEWest with a preliminary concept for the footpath Masterplan within the Alkimos City Centre area. The Preliminary Footpath Masterplan is shown in Figure 58.

*Figure 58. Alkimos City Centre – Preliminary Footpath Masterplan (DevelopmentWA)*



Source: DevelopmentWA

The Preliminary Masterplan shows that both Brindebella Parkway, NSR1 and Tuart Drive are anticipated to become key pedestrian and cycle connections that will service the station precinct and connect to the wider area, through to Marmion Avenue to the west, and the future Romeo Road connection to the south.

While many of these individual connections are unlikely to be available in the opening year scenario, it is expected that the wider pedestrian and cycle infrastructure will be developed over the medium-term timeframe between 2021 and 2031.

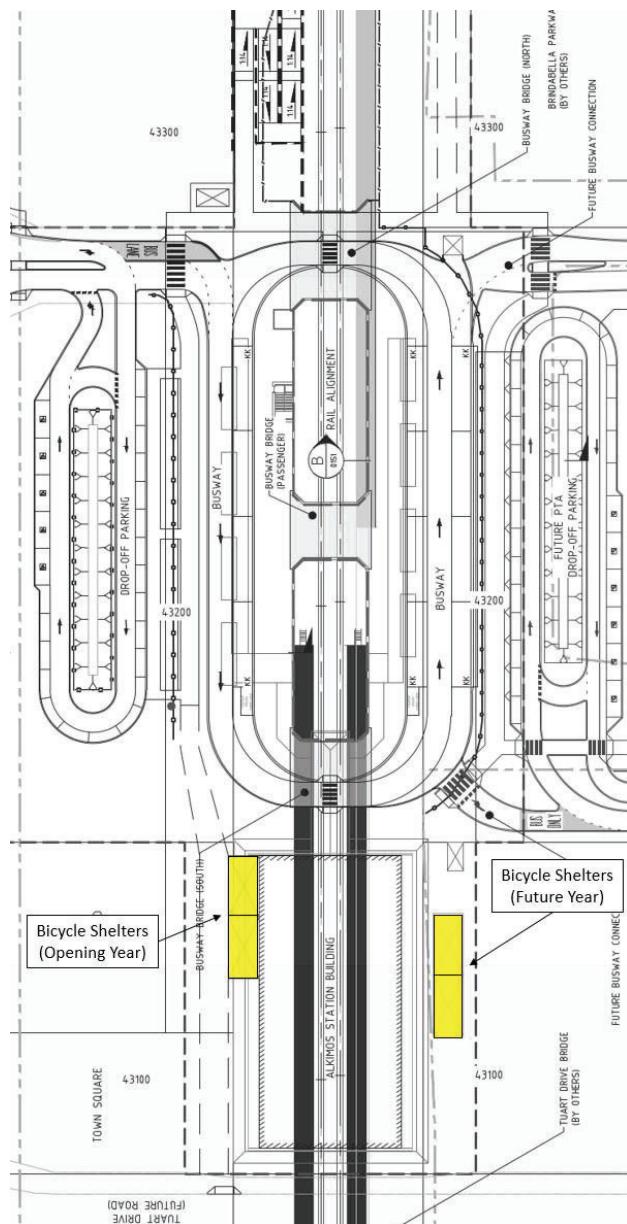
### **3.6.3 BICYCLE PARKING AND END OF TRIP FACILITIES**

As per the Schedule of Accommodation for Alkimos Station referenced in the Yanchep Rail Extension and Thornlie Cockburn Link Scope of Work and Technical Criteria document, the bicycle parking provision within the Alkimos Station concept design is summarised below:

- 10 bicycle U-rails.
  - 2x 96 bicycle capacity secure parking shelters (PTA standard 00-A-09-0159-TYPE B Module Arrangement).
  - Bicycle storage to accommodate a minimum of 2.6% of expected patronage (calculated up to 4 years in advance), with the proposed supply equivalent to 7% of the 2031 forecast patronage.

Note that no showers or change rooms are required to be provided as part of the Schedule of Accommodation for Alkimos Station. Similarly, secure locker facilities are not required to be provided. The proposed bike shelter location is highlighted in Figure 59.

*Figure 59. Alkimos Station – Bicycle Shelter Location*



### 3.7 VEHICLE PARKING

As per the Schedule of Accommodation for Alkimos Station referenced in the Yanchep Rail Extension and Thornlie Cockburn Link Scope of Work and Technical Criteria document, the vehicle parking provision within the Alkimos Station concept design is summarised in Table 10 and Table 11 for the opening and future year scenarios, respectively.

*Table 10. Alkimos Station Parking Provision (Opening Year 2021)*

Type	Provision	
Total car parking bays (minimum)	660	
Long Term Parking	Standard parking bays	638
	Accessible bays (ACROD)	20
	Motorcycle bays (over and above car parking bays)	20
	Electric car charging bays	2
Short Term Parking	Drop-off bays (Kiss & Ride)	20
	Accessible bays (ACROD)	5
	Taxi bays	2
	Taxi bay (ACROD)	1

*Table 11. Alkimos Station Parking Provision (Future Year 2031)*

Type	Provision	
Total car parking bays (minimum)	636	
Long Term Parking	Standard parking bays	614
	Accessible bays (ACROD)	20
	Motorcycle bays (over and above car parking bays)	20
	Electric car charging bays	2
Short Term Parking	Drop-off bays (Kiss & Ride)	22
	Accessible bays (ACROD)	6
	Taxi bays	2
	Taxi bay (ACROD)	1

In addition to the above parking supply, the following service bays are provided for use by PTA staff and other emergency services for the safe and ongoing operation of the station (in accordance with Schedule of Accommodation requirements).

- 2 emergency service bays (ambulance and state transit guards).
- 1 fire response vehicle bay (in accordance with DFES requirements).
- 4 PTA Staff parking bays.
- 2 PTA Servicing bays.
- 2 Kiosk tenant bays.

### **3.8 EMERGENCY VEHICLE ACCESS**

The Alkimos Station concept design will include allowance for one emergency fire response vehicle bay within close proximity to the main station building area. The location of the bay is also required to be within a suitable distance to the fire booster cabinet, to allow connection to the fire services infrastructure.

The proposed location of the Department of Fire and Emergency Services (DFES) hardstand area is currently being finalised through the development of the Alkimos Station Fire Engineering documentation, which will enable NEWest to enter consultation with DFES to confirm the requirements.

### **3.9 ROAD SAFETY**

A pre-opening road safety audit will be required as a final check to ensure that the new roads have been adequately designed to meet relevant local design standards and to identify any safety issues which may require additional modification prior to 100% design. It is expected that all new roads will be assessed in detail, along with any new connections to the existing road network (e.g. Marmion Avenue). At this stage it would be anticipated that any issues raised in the road safety audit can be rectified with minor modifications as part of the review process, however this will likely be dependent on the specifics of the audit process.

## 4.0 SUMMARY AND CONCLUSION

NEWest has prepared this Transport Impact Assessment in order to document the Station access elements and support the Development Application submission for the proposed Alkimos Station development, as part of the wider METRONET Yanchep Rail Extension project.

This study examines the function and operation of access to and from the new Alkimos Station site, for all modes of transport. As the Alkimos Station is expected to become one of the key features of the future Alkimos City Centre, robust and accessible routes for users to connect to the site are important for the long-term success of the station and the growth of the surrounding region.

The Alkimos Station includes a 660 total bay Park & Ride facility in the opening year (transitioning to a 636 total bay facility in the future year of 2031), allowing for long term parking for patrons when using nearby public transport. The total long term parking is spread across two separate parking areas, with roughly equal parking provision in each lot. In the opening year scenario of 2021, Car Park #1 (located west of the station) is proposed to be an interim parking facility ahead of the full development of the Alkimos City Centre. By the future year scenario of 2031, it is expected that Car Park #1 will relocate to the eastern side of the rail reserve. Meanwhile, Car Park #2 (located north of the station) will remain unchanged in the future year scenario.

In addition to the long term parking, a 20 bay drop-off parking facility (plus 5 accessible bays) is also included within the station design. In the opening year scenario of 2021, the drop-off parking will be located immediately west of the station and will be accessed via the NSR1 local road. This drop-off facility is also proposed to relocate to the eastern side of the rail reserve in the future year scenario of 2031. In doing so, access to the drop-off parking will be via the proposed Future Road connection which bounds the eastern edge of the station footprint. The total provision for drop-off parking is expected to increase to 22 bays (plus 6 accessible bays) in the future year.

To accommodate the vehicle traffic forecast to be generated by these elements of the station, vehicle trips to and from the station precinct will occur along a new internal road network to be constructed as part of the Alkimos City Centre structure plan. In the opening year scenario, this will primarily consist of the new Brindebella Parkway extension and the NSR1 local road. A new signalised intersection at Marmion Avenue / Brindebella Parkway will also be provided as part of these works. Note that these local infrastructure works are not to be delivered by NEWest / PTA as part of this scope of works, but instead this will be delivered by others as part of the wider Alkimos structure plan.

By the future year scenario of 2031, it is anticipated that much of the Alkimos City Centre plan will have progressed with multiple new local road connections constructed by others in line with the overall Structure Plan. This is assumed to include the construction of the proposed Brindebella Parkway and Tuart Drive bridges, which will allow access to the eastern side of the Alkimos City Centre – thereby facilitating the shift of Car Park #1 and the drop-off facility. It is also expected that the proposed ‘Future Road’ (to the east of the station site) is constructed as part of these works.

Demand forecast and traffic analysis has been conducted for both 2021 ('opening year' scenario) and 2031 ('future year' scenario) timeframes to assess the anticipated performance of the individual site access points around the station precinct. This analysis has been based on background traffic flow data provided to NEWest by GTA Consultants, who are currently preparing a mesoscopic traffic distribution model on behalf of DevelopmentWA. SIDRA Intersection analysis was undertaken for both morning and afternoon peak periods for the above scenarios, the results of which showed that each of the proposed site access arrangements are anticipated to operate at a satisfactory level of service with acceptable average movement delays, through to the forecast horizon of the year 2031.

The proposed Alkimos Station layout also provides for an integrated bus interchange within the station precinct, to be located immediately north of the main Alkimos Station building. The interchange provides for a total of 8 active bus bays and 4 layover bus bays. For the opening year scenario, it is expected that all buses will access the site via the west of the site along NSR1. The future year scenario layout includes two bus connections to the east of the site following the construction of the ‘Future Road’ connection. While the drop-off parking facility shifts to the east of the bus interchange, the access point to the west of the interchange along NSR1 is expected to remain as a bus exclusive access point in the future.

Accessibility for cycling and walking modes are also key aspects of the station design. A grade separated PSP connection is to be provided along the full length of the YRE rail corridor, extending from the current termination point at Butler Station through to the proposed new end of line station at Yanchep. The PSP is proposed to elevate from the level of the rail corridor to the natural level of the Alkimos City Centre ahead of the station building and bus interchange area, to allow for access to the station and bicycle parking facilities. The PSP route then transitions back down to rail level after the station precinct. Allowance for secure bicycle parking facilities are located on both the east and west of the main station building, to allow for bicycle parking access when the eastern side of the rail corridor is made accessible in the future.

The station forecourt layout also provides connectivity for future east-west cycling and walking connections along much of the internal Alkimos City Centre road infrastructure, primarily along Brindebella Parkway, NSR1 and Tuart Drive. These connections, in addition to other planned local connections, are anticipated to become key pedestrian and cycle pathways that will service the station precinct and connect to the wider area, particularly along Marmion Avenue to the west and the future Romeo Road connection to the south.

Overall, the proposed Alkimos Station development is found to satisfy the project requirements as set out by the METRONET Yanchep Rail Extension strategy. Vehicle (including bus) access to and from the station has been demonstrated to operate satisfactorily from the opening year scenario through to the future year scenario of 2031. The Alkimos Station design supports pedestrian and cycling connectivity via the new PSP and additional future east-west connections throughout the Alkimos City Centre. Pedestrian and cycling connectivity to the existing residential areas north-west and south-west of the station and future development within Alkimos Activity Centre are dependent on the east-west routes and new local roads being delivered by the relevant organisations as part of the implementation of the Alkimos City Centre structure plan. The station will then form a central part of this future activity centre and become a catalyst for the growth and development of the surrounding region and communities.

## Appendices

*Table 12: Appendix List*

Appendix Reference	Appendix Title
Appendix A	Alkimos City Centre Background Flow Modelling Information

## **Appendix A: Alkimos City Centre Background Flow Modelling Information**

Stage 1 - 2021 - AM



## Stage 1 - 2021 - PM



Stage 2 - 2031 - AM



## Stage 2 - 2031 - PM



## **APPENDIX K**

## **STATION ACOUSTIC ASSESSMENT**

# NEWest Alkimos Station Development Application Report - Acoustics

**METRONET: Yanchep Railway Extension and Thornlie-Cockburn Link**

## Document Approval

Rev	Date	Prepared by	Reviewed By	Approved by
A	13-Aug-2020	Rachel Foster/Laura Keen	Gayle Greer	Chris Deshon
Signature:				
Signature:				
Signature:				

## Document Details

PTA Project:	180093 – METRONET Stage 1 Initiatives: Yanchep Railway Extension and Thornlie-Cockburn Link
PTA Document number:	
NEWest Document number:	TCY-DJV-YSC-EN-RPT-0001
Revision date:	13-Aug-2020
Revision:	A



## DETAILS OF REVISION AMENDMENTS AND PLAN TERMINOLOGY

### Document Control

The Acoustic Engineer is responsible for updating this plan to reflect changes as required.

### Amendments

Any revisions or amendments must be approved by the Design Manager before being distributed or implemented.

### Revision Details

Revision	Details
A	Issued for Development Application

### Terms and Definitions

Term	Meaning
'A' Weighted	Frequency filter applied to measured noise levels to represent how humans hear sounds.
Ambient Sound	The all-encompassing sound at a point being a composite of sounds from near and far.
Background sound	The ambient sound in the absence of the sound under investigation.
dB	The decibel (dB) is a logarithmic unit of measurement that is commonly used to express sound pressure level. An increase of 3 dB corresponds to an approximate doubling of sound power. When applied to sound, an increase of 10dB corresponds approximately to a perceived doubling of loudness; typically 0 dB is the threshold of hearing and 120 dB is the threshold of pain.
dB(A)	'A' Weighted overall sound pressure level.
D <sub>w</sub>	Weighted Level Difference – Single number that represents the noise reduction in sound between two adjoining enclosed spaces. It is a field measurement that relates to the R <sub>w</sub> laboratory measurement, but also includes all building elements and flanking paths and acoustic absorption in the receiving room. The result includes the actual noise reduction for the installed partition and ceiling systems. The higher the D <sub>w</sub> , the greater the noise isolation between enclosed spaces.  D <sub>w</sub> has superseded NIC as the Australian Standard for acoustically rating room to room noise isolation. See NIC Below.



$D_{nC,w}/CAC$	Weighted Ceiling Noise Reduction Index/Ceiling Attenuation Class. This is the ability of a ceiling to prevent the transmission of sound. The $D_{nC,w}/CAC$ is a measure of sound reduction between rooms with a common ceiling plenum (or space).
$D_{nT,w}$	Weighted Standardised Field Level Difference: The $D_w$ rating normalised to a standard room volume and room absorption (or reverberation time). The higher the $D_{nT,w}$ rating, the better the insulation performance.
Flanking transmission	The transmission, between two rooms sharing a common partition, of sound generated in the air of one of them via all paths except that through the common partition.
Free field	A sound field in a medium of such extent that the effects of the boundaries are negligible throughout the region of interest.
Frequency (Hz)	The human ear responds to sound in the frequency range of 20 Hertz to 20,000 Hz. A combination of sound pressure and frequency determine perceived loudness. The centre frequency of an octave is double the frequency of the lower octave. Sound measurements are usually taken at 16 one-third octave bands between 50 and 5000 Hz.
Impact sound transmission level	In a given frequency band, between two rooms situated above the other: the average octave band sound pressure level, throughout the lower room, produced by impacts delivered by a standard tapping machine to the floor of the upper room.
Intermittent noise	A noise whose sound pressure level suddenly drops to the background level several times during the period of observation, the time during which the level remains at a constant value different from that of the background level being of the order of 1s or more.
$L_{nT,w}$	The single number quantity used to characterise the impact sound insulation of floors over a range of frequencies. See BS EN ISO 140-7:1998
$L_{10}$	Noise level exceeded for 10% of the measurement period. This represents the upper intrusive noise level and is often used to represent traffic/ music noise.
$L_{90}$	Noise level exceeded for 90% of the measurement period. This represents the background noise level excluding nearby sources. The $L_{90}$ level is commonly referred to as the background noise level.
$L_{eq}$	Energy averaged noise level over the measurement period. This measure is commonly used when comparing the criterion noise level under the Environmental Noise Regulations and for comparison with relevant standards for air conditioning noise.



## Abbreviations and Acronyms

Abbreviation/Acronym	Definition
AS/NZS	Australian/New Zealand Standard
NCC	National Construction Code
PA	Public Address systems
PTA	Public Transport Authority of Western Australia
SPP 5.4	State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning
SWTC	Scope of work and technical criteria
TCL	Thornlie Cockburn Link
WAEPNR	Western Australia Environmental Protection (Noise) Regulations 1997
YRE	Yanchep Rail Extension

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## 1. INTRODUCTION

The Alkimos Station is a proposed new train station to be located towards the southern end of the new Yanchep Rail Extension (YRE) passenger railway line, approximately 45 km north of Perth, as indicated in Figure 1.

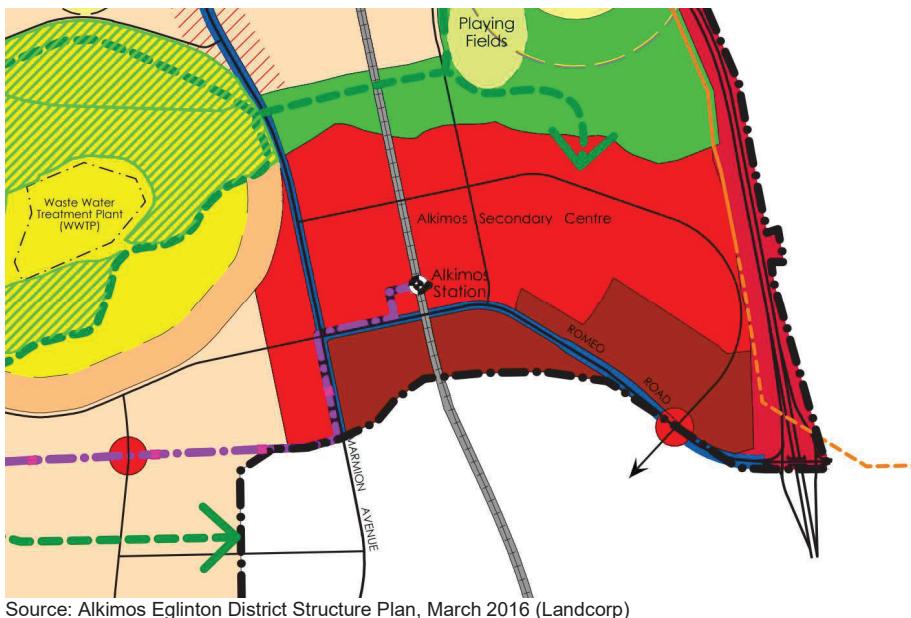


Figure 1: Proposed YRE Line

The proposed station site is to be located east of Marmion Avenue and north of the future Romeo Road alignment, approximately 400 m east of the existing intersection of Marmion Avenue and Brindabella Parkway. Wanneroo Road is also located approximately 2 km east of the station location, with road connectivity being provided by Romeo Road. Connectivity to a future Mitchell Freeway extension is also anticipated east of the station, also via Romeo Road

As per the Alkimos Eglinton District Structure Plan, the Alkimos Secondary Centre in relation to the proposed train station, is shown in Figure 2.

Alkimos Station will be the first of the new stations along the Yanchep Rail Extension line, extending north from the existing Butler train station. The Alkimos Station will allow for improved public transport access and connectivity from surrounding areas and reduce the distance required to be travelled for those living near Alkimos where Butler Station is currently their closest train station.



Source: Alkimos Eglinton District Structure Plan, March 2016 (Landcorp)

Figure 2. Alkimos Secondary Centre

The site of the station is currently undeveloped, as indicated in Figure 3, however future development in the vicinity of the station is expected to result as the station infrastructure is established and Alkimos grows in population (depicted in Figure 2).



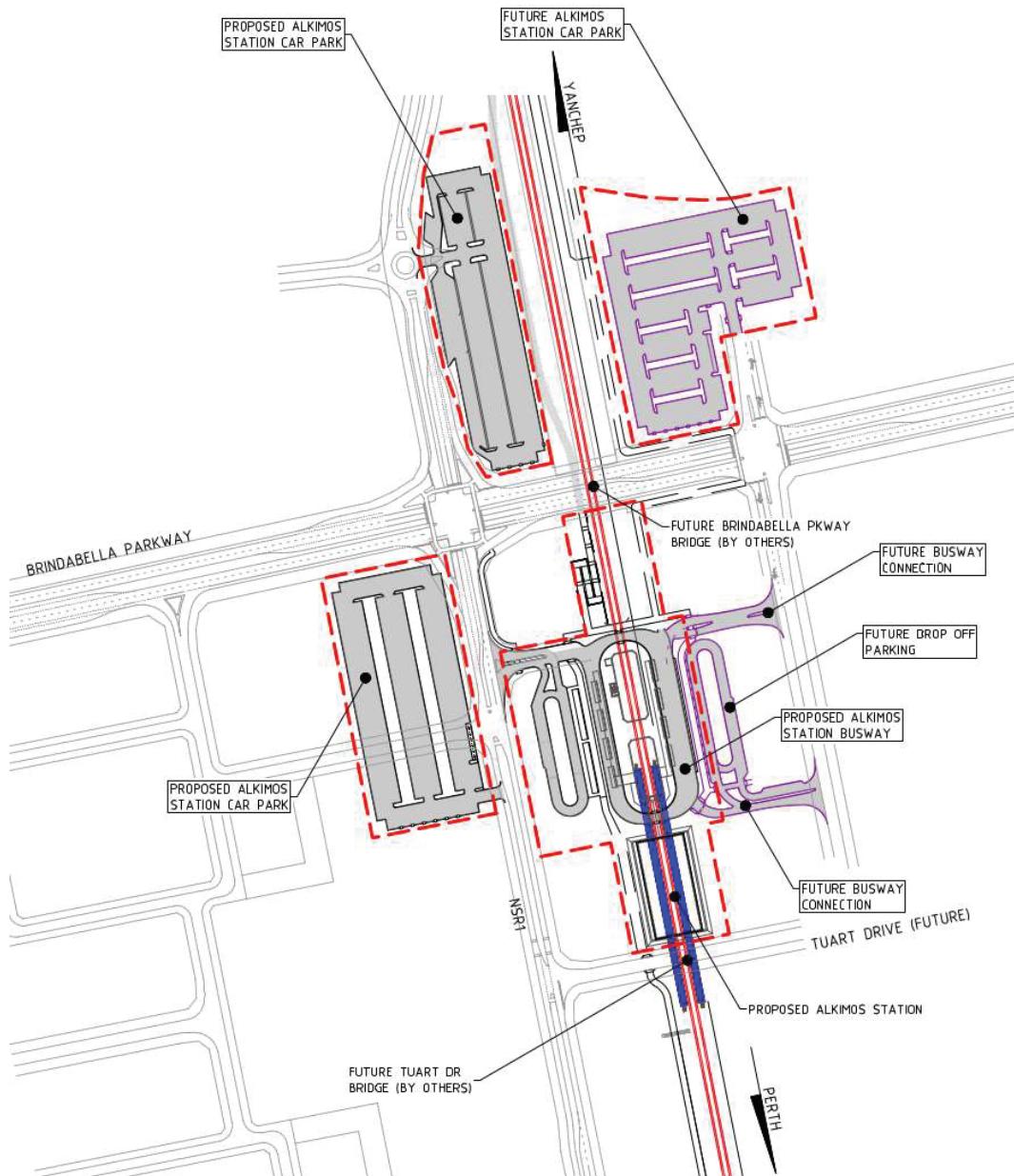
Figure 3. Proposed Alkimos Station Location

The Alkimos Station site is expected to be primarily accessed from a new connector road at the intersection with Marmion Avenue (via an extension of the existing Brindabella Parkway east of Marmion Avenue). This access is expected to be constructed by others, in coordination with NEWest. The new connector will form part of the new internal road network surrounding the station and the developing area within the Alkimos Secondary Centre.

Marmion Avenue is the nearest major road running adjacent to the site and will likely serve as the major north-south distributor road for vehicles seeking to access the proposed station.

The proposed Alkimos Station seeks to provide a two-platform train station along the Yanchep rail line, along with supporting infrastructure including a 657 bay minimum parking area, drop-off parking zone, and a bus interchange. The general site layout for the station precinct (including both Phase 1 and Phase 2 development) is illustrated in Figure 4.

Figure 4. Alkimos Station Overall Site Plan



## 2. ACOUSTIC ENGINEERING SCOPE

The MetroNet Design Joint Venture (DJV) is to include provision of acoustic services for the proposed Alkimos Station development. The acoustic design addresses the station, which will be comprised of a passenger platform with a concourse above, and the associated parking, connection into existing roads and bus interchange.

The key acoustic issues associated with the Alkimos Station project are:

- The control of noise intrusion into the buildings and the impacts of noise on platform areas from road traffic and mechanical plant
- The control of building services noise including mechanical plant
- Reverberation control within spaces
- Acoustic separation of dissimilar spaces
- The control of noise emission from mechanical plant to neighbouring sites
- Assessment and control of the noise from proposed car parking areas to the north of the station
- Assessment and control of the noise from the proposed bus movements.

This report sets out acoustic design criteria and the design requirements to achieve the recommended acoustic conditions associated with Development Assessment (DA) application. These are predominantly criteria for environmental noise emission from the station to adjacent noise-sensitive premises.

## 3. DESIGN CRITERIA

### 3.1 DESIGN STANDARDS AND CODES

In addition to the Yanchep Rail Extension and Thornlie Cockburn Link Scope of Work and Technical Criteria (SWTC) and the Public Transit Authority of Western Australia (PTA) specific requirements, other codes and standards required to develop the acoustic design for DA include the following:

- State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning (SPP 5.4)
- AS 2436-2010 *Guide to noise and vibration control on construction, maintenance and demolition sites*
- Western Australia Environmental Protection (Noise) Regulations 1997 (WAEPNR)
- PTA Technical & Operational standards, policies and procedures.

The above list is not exhaustive but is provided to note the key guides and standards to which the design shall align.

### 3.2 NOISE IMPACTS TO SURROUNDING SENSITIVE PREMISES

#### 3.2.1 BUILDING SERVICES, PA SYSTEM AND CAR PARK

The Yanchep Rail Extension and Thornlie Cockburn Link Scope of Work and Technical Criteria states the following:

*Stations and associated infrastructure (e.g. carparks, plant rooms etc) must be designed to comply with the requirements of the Environmental Protection (Noise) Regulations 1997 (WA)*

Noise criteria for both steady-state and discrete noise emission from the Alkimos Station project are nominated in this section. The setting of noise emission criteria is intended to protect the acoustical amenity of nearby sensitive receivers.

Environmental noise impacts resulting from the Alkimos Station project are addressed through the Environmental Protection Act 1986 with the prescribed standards detailed in the Western Australian Environmental Protection (Noise) Regulations 1997 (WAEPNR). The regulations are based on maximum allowable noise levels termed the 'assigned noise level'. The regulations require that:

*Noise emitted from any premises when received at other premises must not cause, or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind*

A noise emission is taken to 'significantly contribute to' a level of noise if the noise emission exceeds a value which is 5 dB below the assigned level at the point of reception.

*Table 1: Assigned levels by the Western Australian Environmental Protection (Noise) Regulation 1997*

Type of premises receiving noise	Time of Day	Environmental Emission Criterion Level dB(A)		
		L <sub>A,10</sub>	L <sub>A,1</sub>	L <sub>A,max</sub>
Nearest noise sensitive receiver: highly sensitive area	0700 to 1900 hours Monday to Saturday	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	35 + influencing factor	45 + influencing factor	55 + influencing factor
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial Premises	All hours	60	75	80
Industrial premises	All hours	65	80	90

The regulations also apply penalties on noise levels that contain annoying characteristics such as tonal components. Where these characteristics do exist and cannot be practicably removed, then the measured levels are adjusted according to the penalties as follows:

- Where tonality is present: +5 dB
- Where modulation is present: +5 dB
- Where impulsiveness is present: +10 dB.

The noise adjustments apply up to a maximum cumulative total of 15 dB.

The influencing factor is applied to account for higher noise areas as a result of nearby industrial and commercial areas and major roads. The influencing factor is determined by considering the land use within two circles having a radius of 100 m and 450 m from the noise sensitive premises of concern and proximity to major and minor roads as defined in the WAEPNR. The nearest noise sensitive receivers on each side of the Alkimos Station project have been identified as shown in Figure 5 and are summarised in Table 2 below.

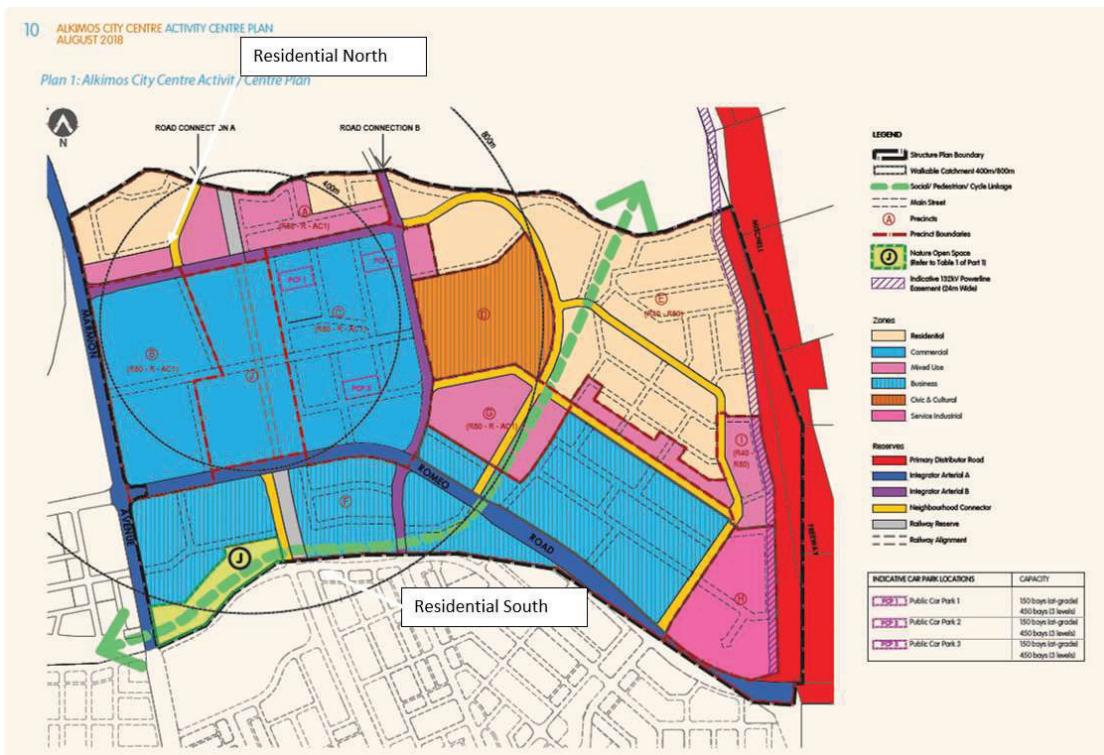


Figure 5: Nearest noise-sensitive receiver locations

Table 2: Nearest noise-sensitive receiver locations

Location	Noise Sensitive Receiver	Receptor Type
North	Future Development	Residential
South	Future Development	Residential

Note: Selection of noise sensitive premises is based on Schedule 1 – Part C of the WAEPNR

Transport factors of 6 dB(A) and 2 dB(A) are applied to noise sensitive receivers if major roads are located within 100 m and 450 m respectively. A transport factor of 2 dB(A) is applied to noise sensitive receivers if a secondary road is located within 100 m of a noise-sensitive receiver.

A major road is defined as having vehicle traffic flows in excess of 15,000 vehicles per day. A secondary road is defined as having traffic flows of 6,000 to 15,000 vehicles per day.

The major roads and secondary roads within 100 m and 450 m of the noise-sensitive receivers are identified in the NEWest traffic assessment report *NEWest Alkimos Station Transport Assessment 02-07-2020 Draft for Internal Review Rev A* shown in Figure 6 and given in Table 3 below.

Although traffic volumes are not known, it has been assumed that Marmion Avenue and the future Romeo Road extension can be classified as “major” (being district distributor “A” roads) and that Brindabella Parkway and the north-south internal future road can be classified as “secondary” (being district distributor “B” roads).

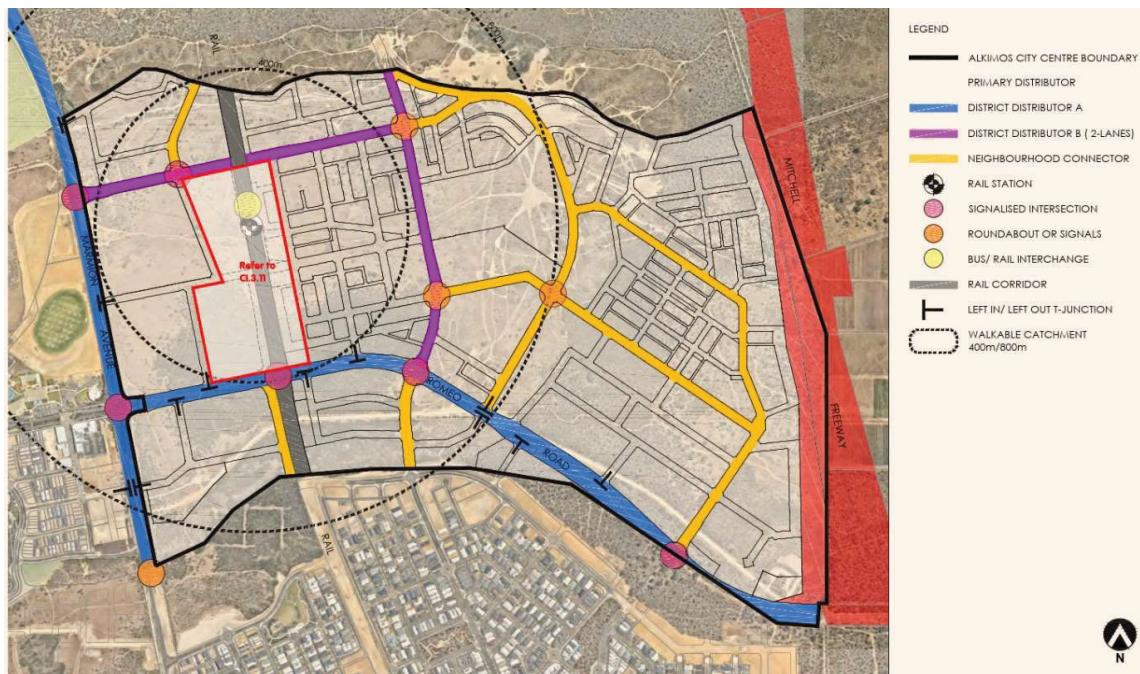


Figure 6: Future traffic volumes adjacent Alkimos Station

Table 3: Major/secondary roads adjacent to Alkimos Station

Location	Major road within 100 m	Secondary road within 100 m	Major road within 450 m
North – residential	-	Future Brindabella Parkway:	Marmion Avenue
South – residential	-	-	Marmion Avenue, future Romeo Road extension

The area surrounding the Alkimos Station is currently greenfield space. The zoning identified in Figure 5 and the zoning plan for the City of Wanneroo have been used to identify the future zoning around the station. To determine the influencing factor, existing/proposed future roads and future land uses have been utilised. The influencing factor at the nearest noise sensitive receivers is summarised below in Table 4.

*Table 4: Environmental Design Criteria – Influencing Factor*

Location	% Industrial Area Use		% Commercial Area Use		Transport Factor	Influencing Factor
	100 m	450 m	100 m	450 m		
North – residential	15%	23%	38%	34%	4 dB(A)	11 dB(A)
South – residential	25%	14%	29%	28%	2 dB(A)	9 dB(A)

The assigned levels are adjusted by the calculated influencing factors to result in the overall noise emission criteria for the area.

*Table 5: Environmental Design Criteria – Alkimos Station Assigned Noise Levels, dB(A)*

Type of premises receiving noise	Time of Day	Environmental Emission Criterion Level dB(A)		
		L <sub>A,10</sub>	L <sub>A,1</sub>	L <sub>A,max</sub>
North – residential	0700 to 1900 hours Monday to Saturday	56	66	76
	0900 to 1900 hours Sunday and public holidays	51	61	76
	1900 to 2200 hours all days	51	61	66
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	46	56	66
South – residential	0700 to 1900 hours Monday to Saturday	54	64	74
	0900 to 1900 hours Sunday and public holidays	49	59	74
	1900 to 2200 hours all days	49	59	64
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	44	54	64
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80

Commercial Premises	All hours	60	75	80
Industrial premises	All hours	65	80	90

Notes:

1. A noise emission from a premises is considered to not significantly contribute to the noise at a receiver if the noise emission is 5 dB below the overall noise emission criteria for the area.

It is noted that the WAEPNR does not specifically identify that the above environmental noise criteria are applicable to noise from rail passengers and patrons of the Alkimos Station; however, an assessment is made here to quantify the likely impacts of these sources to adjacent noise-sensitive receivers.

### 3.2.2 STATION ENTRY ROADS AND BUS MOVEMENTS

The Yanchep Rail Extension and Thornlie Cockburn Link Scope of Work and Technical Criteria states the following:

*The Alliance must design roads works and any associated noise mitigation controls to meet the requirements of Western Australia State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning.*

**Table 6: Environmental Design Criteria – New and Upgraded Public Roads and Bus Lanes**

Type of premises receiving noise	Time of Day	New Road	Upgraded Road
Noise-sensitive land use (existing and planned development)	Day (6 am–10 pm)	$L_{Aeq}$ (Day) = 55 dB(A)	$L_{Aeq}$ (Day) = 60 dB(A)
	Night (10 pm–6 am)	$L_{Aeq}$ (Night) = 50 dB(A)	$L_{Aeq}$ (Night) = 55 dB(A)

It is noted that the internal precinct roads such as Brindabella Road and the Romeo Road extension (amongst others), are outside of the MetroNet scope of works (albeit constructed by others, but in coordination with NEWest) and the potential impact from these to noise-sensitive receivers is to be assessed and managed by the developers of those roads, and is not covered by this assessment.

It is also noted that the assessment of rail noise to adjacent noise-sensitive receivers is being addressed separately for the MetroNet project, and does not form part of this scope.

### 3.3 CONSTRUCTION NOISE AND VIBRATION

The WAEPNR clarifies that the environmental noise criteria outlined in Table 5 are not applicable to noise emitted from a construction site where works are carried out between 0700 hours and 1900 hours on any day which is not a Sunday or public holiday if it is shown that the construction works are generally carried out in accordance with the control of Section 4 of AS 2436-2010 *Guide to noise and vibration control on construction, maintenance and demolition sites* and if construction work is carried out in accordance with an approved management plan.

It is noted that a specific construction noise and vibration management plan is being addressed separately for the MetroNet project, which will include relevant site clearing and construction works associated with the Alkimos Station, and does not form part of this scope.

## 4. ACOUSTIC DESIGN ELEMENTS

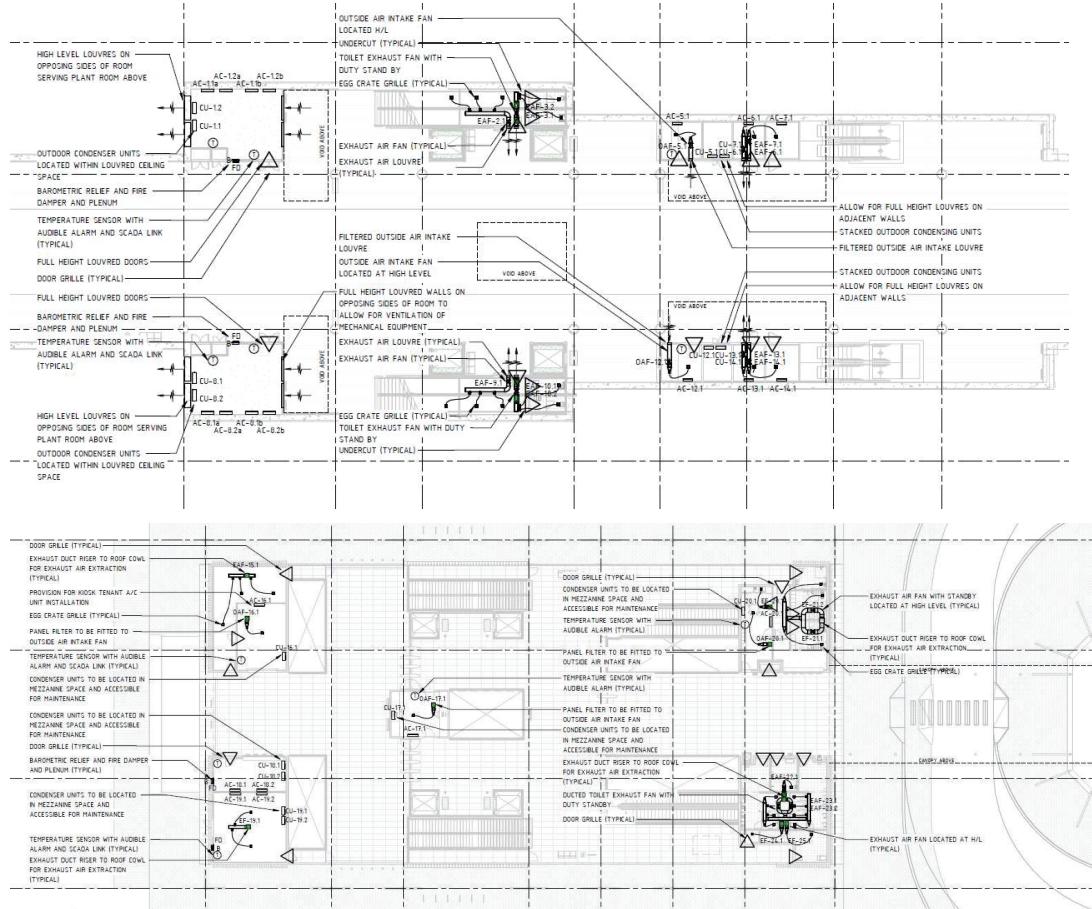
### 4.1 STATION IMPACTS TO SURROUNDING SENSITIVE PREMISES

#### 4.1.1 BUILDING SERVICES

Mechanical services plant selections for the Alkimos Station have not been determined at this stage, however, will likely comprise:

- Small exhaust fans to ablution facilities, cleaners' rooms and electrical plant spaces
- Small outside air intake fans to mechanical plant spaces
- Condensing units to serve split air conditioning
- Critical cooling to comms spaces
- Air conditioning to occupied spaces (crib room, staff offices, kiosk, station CSO booth) incorporating split systems with wall-mounted indoor units
- Two transformers as follows:
  - 1x 630 kVA precinct mains supply transformer – 66 dB(A) Sound Power Level
  - 1x 500 kVA station isolation transformer – 62 dB(A) Sound Power Level.

The anticipated equipment and locations are as shown in Figure 7.



It is expected that standard noise control measures will be sufficient to control mechanical services plant noise in order to meet the required environmental noise levels at adjacent noise-sensitive areas. Such measures include:

- Selection of quietest possible equipment
- Internal duct lining (where appropriate)
- Appropriate location of equipment away from adjoining noise-sensitive receivers (including taking advantage of shielding afforded by the station itself)
- Acoustic louvres where appropriate
- Enclosure of transformers

#### 4.1.2 PUBLIC ADDRESS SYSTEM

The design of the public address system design will be developed during the next stage of the design development to meet the environmental noise criteria outlined in Section 3.2.1.

Preliminary calculations suggest that a maximum combined sound power level of all PA speakers of approximately 101 dB(A) would achieve the environmental noise criteria at all noise-sensitive receivers.

#### 4.1.3 CAR PARK

The car parking associated with the Alkimos Station is proposed to have a maximum capacity of 660 bays. Assuming the car park is full during peak hours (morning and afternoon), Car Park 1 receives 170 trips and Car Park 2 receives 160 trips. The predicted noise levels from the car park alone at the nearest noise-sensitive receptors are as follows:

- |                       |          |
|-----------------------|----------|
| ▪ North - residential | 40 dB(A) |
| ▪ South - residential | 16 dB(A) |

It is noted that these estimated car park noise levels do not take into account any acoustic barriers which the developer may be required to construct as conditioned on the development of the land within the Alkimos precinct. It is unknown at the time of writing as to the location and/or extent and/or heights of any such barriers. The influence of these can be addressed when this is clarified.

Nevertheless, the environmental noise criteria identified in Table 5 are predicted to be achieved without any potential influence from any such barriers, and therefore noise from the Alkimos Station car park is not expected to cause disturbance to the nearby noise-sensitive receivers.

#### 4.1.4 PASSENGER NOISE

The station is anticipated to have around 2,700 passengers per day by 2031. The highest passenger volume is expected during the morning peak hour period, with approximately 890 boardings and alightings. For YRE, the peak 15-minute period has 36% of the peak one-hour demand i.e. 320 boardings and alightings, meaning around 320 passengers on the station platform for a 15-minute period.

On the basis that the gender split is 50%/50%, and that half the passengers would be speaking in normal voices at any one point in time, the predicted noise levels from passengers at the nearest noise-sensitive receptors are as follows:

- |                       |          |
|-----------------------|----------|
| ▪ North - residential | 33 dB(A) |
| ▪ South – residential | 28 dB(A) |

These predicted noise levels are well below the daytime environmental noise criteria at the identified receiver locations, and therefore noise from passengers on the Alkimos Station platform is not expected to cause disturbance to the nearby noise-sensitive receivers.

## 4.2 ROAD AND BUS MOVEMENT IMPACTS TO SURROUNDING SENSITIVE PREMISES

The new Alkimos Station is to be accessed via Brindabella Parkway and the new internal access road. The connection road between the proposed new car park and these roads, the associated car park vehicles and buses using these roads, as well as the bus movements along the internal station area, are required to be assessed against the road traffic requirements of the SPP 5.4.

The following inputs to the road and bus noise assessment have been taken from the transport planning report *NEWest Alkimos Station Transport Assessment 02-0702020 Draft for Internal Review Rev A*:

**NEWest Alliance**

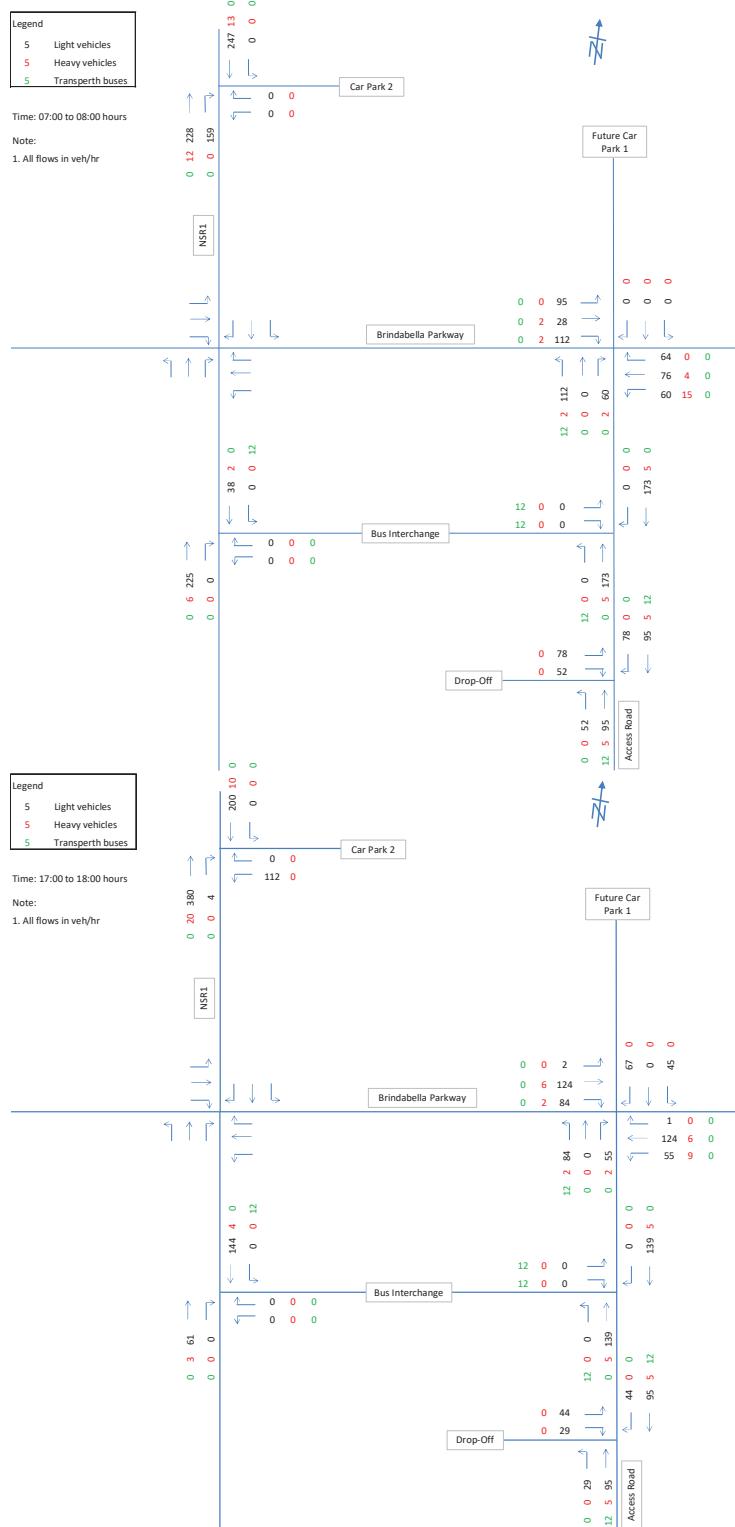


Figure 8: Proposed Alkimos Station a.m. and p.m. peak hour traffic movements

The following assumptions have been made:

- 5% heavy vehicles
- 96% of vehicle movements occurring during the daytime period.

On the basis of these movements, the predicted vehicle movement noise levels associated with the station precinct are as follows:

- North – residential       $L_{Aeq}(\text{Day})$  59 dB(A),  $L_{Aeq}(\text{Night})$  46 dB(A)
- South – residential       $L_{Aeq}(\text{Day})$  34 dB(A),  $L_{Aeq}(\text{Night})$  29 dB(A)

Therefore the road traffic noise criterion of  $L_{Aeq}(\text{Day})$  55 dB(A) is expected to be exceeded only at the nearest noise-sensitive receiver to the north of the Alkimos Station; station-only road and bus noise levels achieve the criteria for night time, and achieve both day and night criteria at the proposed residential areas to the south of the proposed station.

However, for this selected worst-case receiver location (refer Figure 5), it is noted that the following should also be taken into account:

- These traffic noise levels should be considered in the context of the likely traffic noise levels anticipated as a result of the complete traffic noise environment associated with the entire development precinct. With traffic volumes (as shown in Figure 6) of greater than 20,000 vpd on Marmion Avenue and 6,000 – 15,000 vpd anticipated on Brindabella Parkway (as an identified District Distributor B), traffic noise levels from the station vehicle movements alone is expected to be in the order of 3 dB lower than traffic noise levels from traffic on the wider road network. Therefore, traffic noise associated with the station would be indistinguishable from normal traffic noise in the area.
- The selected worst-case receiver location to the south of the Alkimos Station has been hypothetically set as being adjacent to the railway. It is likely that the development will require some form of offset for those residences nearest to the transport elements, and therefore the actual worst-case receiver location may be further from the road than as estimated here.
- It is also noted that modern building constructions (such as identified in Table 3 of the *SPP 5.4 Implementation Guidelines*) would enable an appropriate level of internal noise levels within occupied spaces of such a residence.
- The SWTC Book 3 Part A section 9.1.1.8 states the following:

- 
- 9.1.1.8 The Alliance must undertake the design and construction of the following structures:
- i. retaining walls;
  - ii. support structures for rail system infrastructure, including OLE, Traction Power, Signalling and Communications equipment;
  - iii. cable containment structures;
  - iv. structures for new services crossings and protection of existing services; and
  - v. noise wall structures: noise wall design and construction only required where development is already adjacent to the rail corridor.
- 

Therefore, as the land on which these worst-case receiver locations is located has not yet been developed, it is the onus of the developer to undertake mitigation measures to ensure appropriate noise levels within its development boundaries.

## **APPENDIX L**

## **BUSHFIRE ATTACK LEVEL ASSESSMENT**



NEWest Alliance  
Bushfire Attack Level (BAL) Contour Assessment  
Report

Alkimos Station

13 August 2020

59400/131,575 (Rev 0)

JBS&G Australia Pty Ltd T/A Strategen-JBS&G

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## Appendices

Appendix A	Development plan
Appendix B	Vegetation plot photos and description

## 1. Background

### 1.1 Purpose of report

This Bushfire Attack Level (BAL) contour assessment report has been prepared to determine the level of BAL impact applicable to the Alkimos Station site (hereon referred to as the project area) based on the current vegetation conditions observed during the site inspection and consideration of the proposed Alkimos Station development footprint (refer to Appendix A).

This report is not a Bushfire Management Plan (BMP), but rather serves to inform:

- the level of BAL exposure across the site
- whether any subsequent design modifications are required as part of proposed development to achieve compliant bushfire outcomes
- the level of bushfire reporting required to accompany the Development Application (DA) process.

The project area is designated as bushfire prone on the Map of Bush Fire Prone Areas (DFES 2020, see Plate 1). As such, bushfire risk considerations and BAL assessment at the planning (DA) stage are required to be formally addressed, unless the proposed development is exempt under relevant provisions of *Planning Bulletin 111/2016 Planning in Bushfire Prone Areas* (e.g. for non-habitable development).

### 1.2 Site/development summary

Table 1 provides a summary of the subject site and proposed development. For the purposes of producing a BAL contour map, the project area in this BAL contour assessment report is consistent with the external boundary of the DA footprint (see Figure 1).

**Table 1: Site/development summary**

Site details	
Address details	Lot 2570 Marmion Avenue Alkimos, WA 6038
Local government area	City of Wanneroo
Description of proposed works	Proposed Alkimos Station comprising: <ul style="list-style-type: none"><li>• station building (habitable building)</li><li>• canopy and platform</li><li>• busway (habitable building)</li><li>• roads</li><li>• rail track</li><li>• carparks.</li></ul>

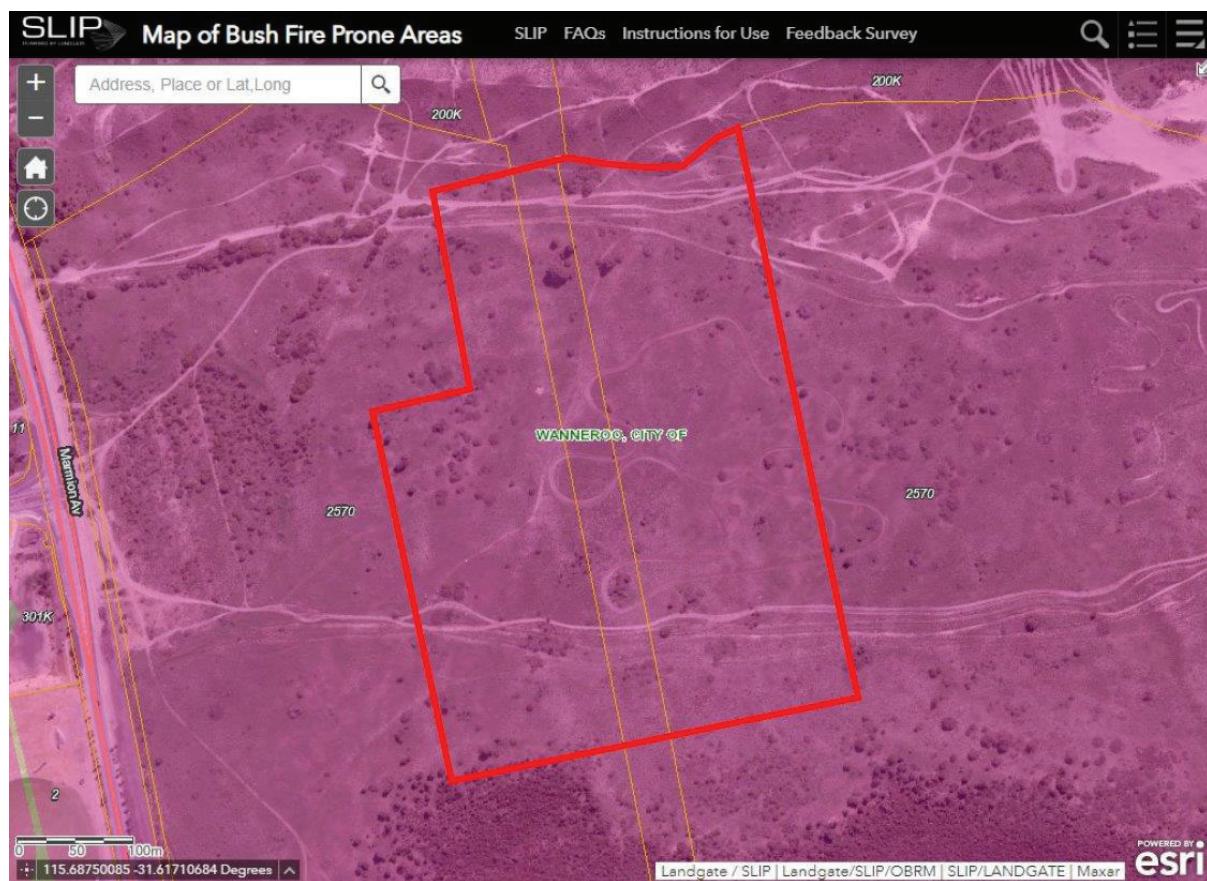


Plate 1: Map of Bush Fire Prone Areas (DFES 2020)

## 2. Bushfire assessment results

### 2.1 Assessment inputs

#### 2.1.1 Vegetation classification

Strategen-JBS&G assessed classified vegetation and exclusions within the 150 m assessment area through on-ground verification on 31 July 2020 in accordance with *AS 3959—2018 Construction of Buildings in Bushfire-Prone Areas* (AS 3959; SA 2018) and the *Visual Guide for Bushfire Risk Assessment in Western Australia* (DoP 2016). Georeferenced site photos and a description of the vegetation classifications and exclusions are contained in Appendix B and depicted in Figure 1.

Site observations indicate that classified vegetation within the 150 m assessment area predominantly consists of shrubland, scrub and grassland vegetation, with small pockets of woodland, including:

- Class B woodland to the northeast of the project area
- Class C shrubland to the north and southeast of the project area
- Class D scrub surrounding the project area in all directions
- Class G grassland to the west of the project area.

Existing areas excluded from classification within the 150 m assessment area include mineral earth tracks and large areas already cleared within portions of the project area and broader Yanchep Rail Extension envelope, excluded under Clause 2.2.3.2 (e).

The proposed development will require further modification (clearing) of all vegetation within the project area and Yanchep Rail Extension envelope and management to achieve exclusion under Clauses 2.2.3.2 (e) and (f). Broader development works to construct a new railway track within the Yanchep Rail Extension envelope (see Figure 1) will result in additional vegetation within the railway reserve either being removed or modified to a low threat state as per the following ongoing management regime:

- removal of all dead vegetation
- uplift of any trees
- brush cut/mow grass/weeds between fences and road verges
- removal of any vegetation inside the rail reserve that is a hazard or the potential to become one within 6 m of the closest rail
- maintenance of a 3 m wide firebreak, with an additional horizontal clearance of 0.5 m on both sides and a vertical clearance of 4 m established within the rail reserve against the reserve fencing.

On this basis, any vegetation within the rail reserve will be excluded under Clause 2.2.3.2 (f) and existing cleared areas will remain excluded under Clause 2.2.3.2. (e).

### 2.1.2 Effective slope

Strategen-JBS&G assessed effective slope under classified vegetation within the 150 m assessment area through on-ground verification on 31 July 2020 in accordance with AS 3959. Results were cross-referenced with DPIRD 2m contour data and are depicted in Figure 1.

Site observations indicate that the project area and surrounding 150 m of land are situated on undulating terrain, with variation in slope beneath classified vegetation ranging from flat/upslope to 10 degrees downslope in relation to the project area. On this basis, Strategen-JBS&G has assigned effective slopes accordingly, ranging from flat/upslope to downslope >5-10 degrees for the various classified vegetation plots.

### 2.1.3 Summary of inputs

Figure 1 illustrates the anticipated post-development vegetation classifications, effective slopes and exclusions following completion of development works. These inputs are summarised in Table 2.

**Table 2: Summary of vegetation classifications, exclusions and effective slope**

Vegetation plot	Vegetation classification	Effective slope	Comments
1	Class D Scrub	Flat/upslope (0°)	Scrub vegetation predominantly 2-6 m in height, dominated by acacia and banksia species.
2	Class C Shrubland	Flat/upslope (0°)	Shrubland vegetation dominated by acacia species less than 2 m in height with a continuous vertical fuel profile.
3	Class G Grassland	Downslope >0–5°	Unmanaged grassland vegetation greater than 10 cm in height with no legally enforceable mechanism requiring it to be managed.
4	Class D Scrub	Downslope >0–5°	Scrub vegetation predominantly 2-6 m in height, dominated by acacia and banksia species.
5	Class B Woodland	Flat/upslope (0°)	Woodland vegetation dominated by stands of eucalypts with a grassy understorey and no mid-storey shrubby layer.
6	Class C Shrubland	Flat/upslope (0°)	Shrubland vegetation dominated by acacia species less than 2 m in height with a continuous vertical fuel profile.
7	Class D Scrub	Flat/upslope (0°)	Scrub vegetation predominantly 2-6 m in height, dominated by acacia and banksia species.
8	Class C Shrubland	Downslope >5–10°	Shrubland vegetation dominated by acacia species less than 2 m in height with a continuous vertical fuel profile.
9	Class C Shrubland	Flat/upslope (0°)	
10	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Area to be modified to a low threat state.
11	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	Non-vegetated areas (i.e. mineral earth firebreaks, service tracks, existing cleared footprint).



#### Legend

- Project area
- 100m assessment area
- 150m assessment area
- Cadastral boundary
- YRE Development envelope
- Topographic contours (mAHM)
- Photo point and direction

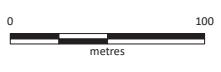
- Vegetation classification
  - Class B Woodland
  - Class C Shrubland
  - Class D Scrub
  - Class G Grassland
  - Excluded under Clauses 2.2.3.2 (e) & (f)
  - Area to be modified to a non-vegetated or low threat state



Job No: 59400

Client: NEWest Alliance

Drawn By: hsullivan



Scale 1:2,750 at A3

Coord. Sys. GDA 1994 MGA Zone 50

Checked By: CT

Version: A

Date: 12-Aug-2020

2570 Marmion Av, Alkimos,  
City of Wanneroo, WA

VEGETATION CLASSIFICATION AND  
EFFECTIVE SLOPE  
ALKIMOS STATION

FIGURE: 1

## 2.2 Assessment outputs

### 2.2.1 Bushfire Attack Level (BAL) contour assessment

Strategen-JBS&G has undertaken a BAL contour assessment in accordance with Method 1 of AS 3959 for the project area. The Method 1 procedure incorporates the following factors:

- state-adopted FDI 80 rating
- vegetation classification
- effective slope
- distance maintained between proposed development areas and the classified vegetation.

The BAL rating gives an indication of the level of bushfire attack (i.e. the radiant heat flux) that may be received by future development areas and subsequently informs the standard of building construction and/or setbacks required for any proposed habitable development to potentially withstand such impacts and/or comply with relevant bushfire planning requirements.

The indicative post-development BAL contours are based on the following assumptions:

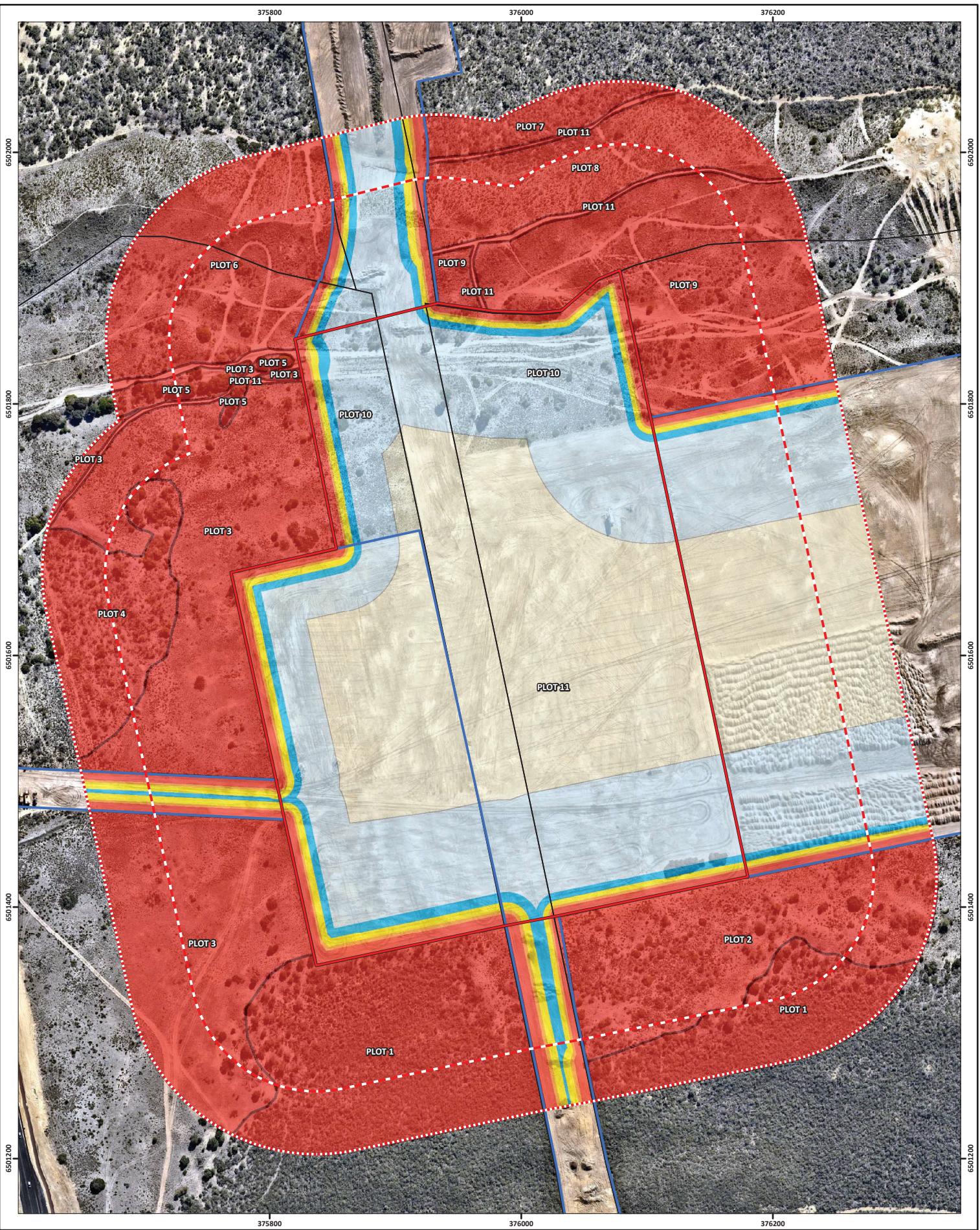
- the vegetation classifications and effective slope observed at the time of inspection
- the entire project area and broader Yanchep Rail Extension envelope being modified to a low threat state as part of proposed development and managed in a low threat state to maintain exclusion under Clauses 2.2.3.2 (e) and (f).

Results of the BAL contour assessment are detailed in Table 3 and illustrated in Figure 2.

The highest BAL applicable to the project area boundary is BAL-FZ.

**Table 3: BAL contour assessment results**

Method 1 BAL determination				
Vegetation plot	Vegetation classification	Effective slope	BAL contour width	Highest BAL to project area boundary
1	Class D Scrub	Flat/upslope (0°)	<10m	BAL-FZ
2	Class C Shrubland	Flat/upslope (0°)	<7m	BAL-FZ
3	Class G Grassland	Downslope >0–5°	<7m	BAL-FZ
4	Class D Scrub	Downslope >0–5°	31-<100m	BAL-12.5
5	Class B Woodland	Flat/upslope (0°)	<10m	BAL-FZ
6	Class C Shrubland	Flat/upslope (0°)	<7m	BAL-FZ
7	Class D Scrub	Flat/upslope (0°)	>100m	BAL-Low
8	Class C Shrubland	Downslope >5–10°	25-<100m	BAL-12.5
9	Class C Shrubland	Flat/upslope (0°)	<7m	BAL-FZ
10	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A
11	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])	N/A	N/A	N/A



Document Path: W:\Projects\1\Open\NEWest Alliance\59400 Yanchep Rail and Thornlie Link Bushfire Services\GIS\Maps\R04\_Rev\_A\59400\_02\_BALS.mxd

Image Reference: www.nearmap.com® - Imagery Date: 10. May 2020

### 3. Conclusion and recommendations

Assessment results are based on post-development site conditions, including establishment and ongoing maintenance of the entire project area and broader Yanchep Rail Extension envelope to a non-vegetated/low threat state.

The project area contains proposed habitable development located within a designated bush fire prone area that is subject to a BAL rating above BAL-Low. On this basis, Strategen-JBS&G considers that the proposed development is required to comply with the relevant requirements under *State Planning Policy 3.7 Planning in Bushfire Prone Areas* (WAPC 2015) and the associated *Guidelines for Planning in Bushfire Prone Areas* (WAPC 2017). Therefore, a BMP will be required to accompany the Alkimos Station DA to demonstrate the necessary bushfire compliance measures in accordance with the abovementioned policy and guidelines.

#### 4. References

Department of Fire and Emergency Services (DFES) 2020, *Map of Bush Fire Prone Areas, [Online]*, *Government of Western Australia*, available from:  
<https://maps.slip.wa.gov.au/landgate/bushfireprone/>, [11/08/2020].

Department of Planning (DoP) 2016, *Visual guide for bushfire risk assessment in Western Australia*, Department of Planning, Perth.

Standards Australia (SA) 2018, *Australian Standard AS 3959–2018 Construction of Buildings in Bushfire-prone Areas*, Standards Australia, Sydney.

Western Australian Planning Commission (WAPC) 2015, *State Planning Policy 3.7 Planning in Bushfire Prone Areas*, Western Australian Planning Commission, Perth.

Western Australian Planning Commission (WAPC) 2017, *Guidelines for Planning in Bushfire Prone Areas*, Version 1.3 August 2017, Western Australian Planning Commission, Perth.

## 5. Limitations

### Scope of services

This report ("the report") has been prepared by Strategen-JBS&G in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Strategen-JBS&G. In some circumstances, a range of factors such as time, budget, access and/or site disturbance constraints may have limited the scope of services. This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it.

### Reliance on data

In preparing the report, Strategen-JBS&G has relied upon data and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, Strategen-JBS&G has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. Strategen-JBS&G has also not attempted to determine whether any material matter has been omitted from the data. Strategen-JBS&G will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to Strategen-JBS&G. The making of any assumption does not imply that Strategen-JBS&G has made any enquiry to verify the correctness of that assumption.

The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. Strategen-JBS&G disclaims responsibility for any changes that may have occurred after this time. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

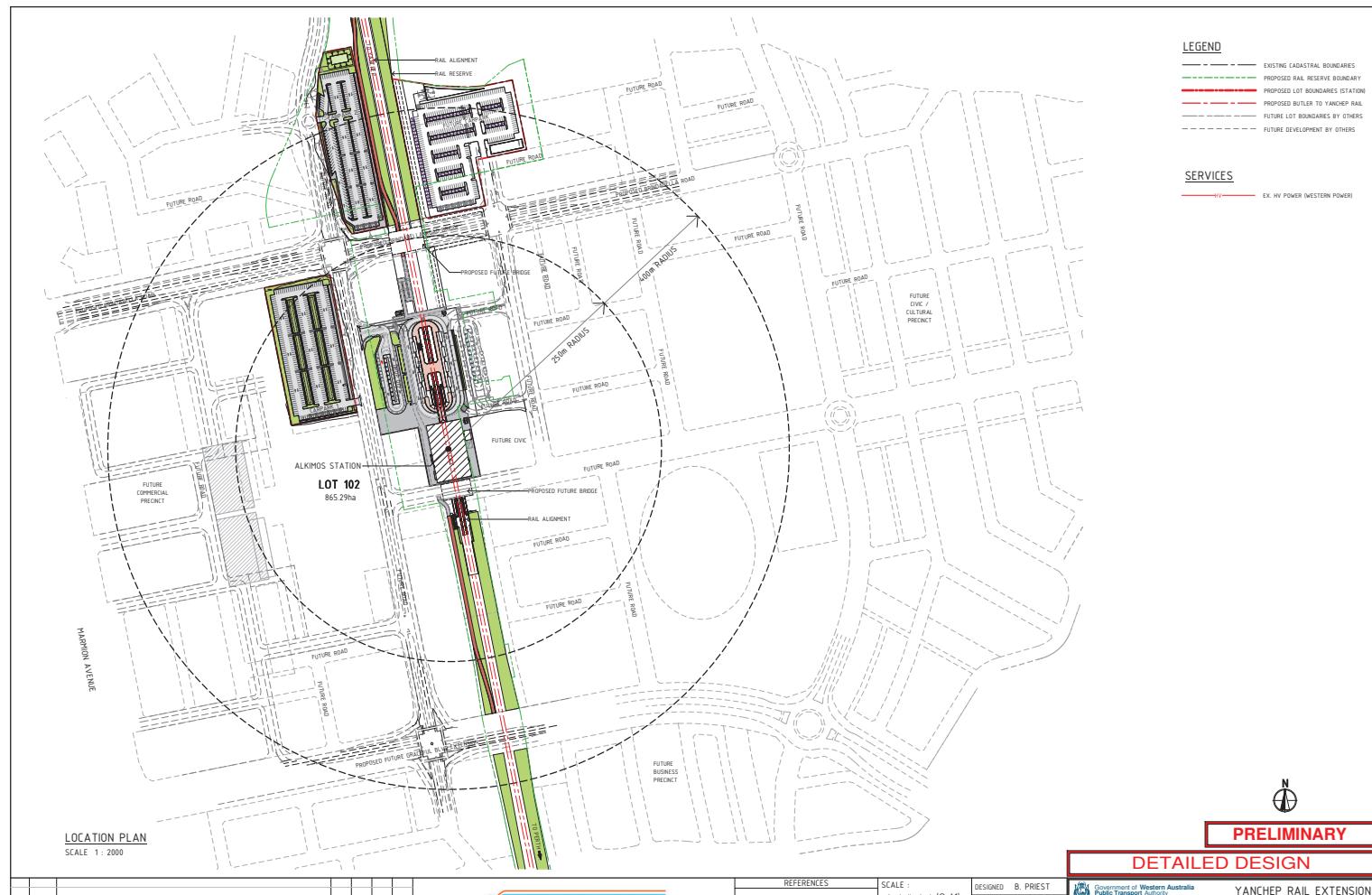
### Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

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## Appendix A Development plan



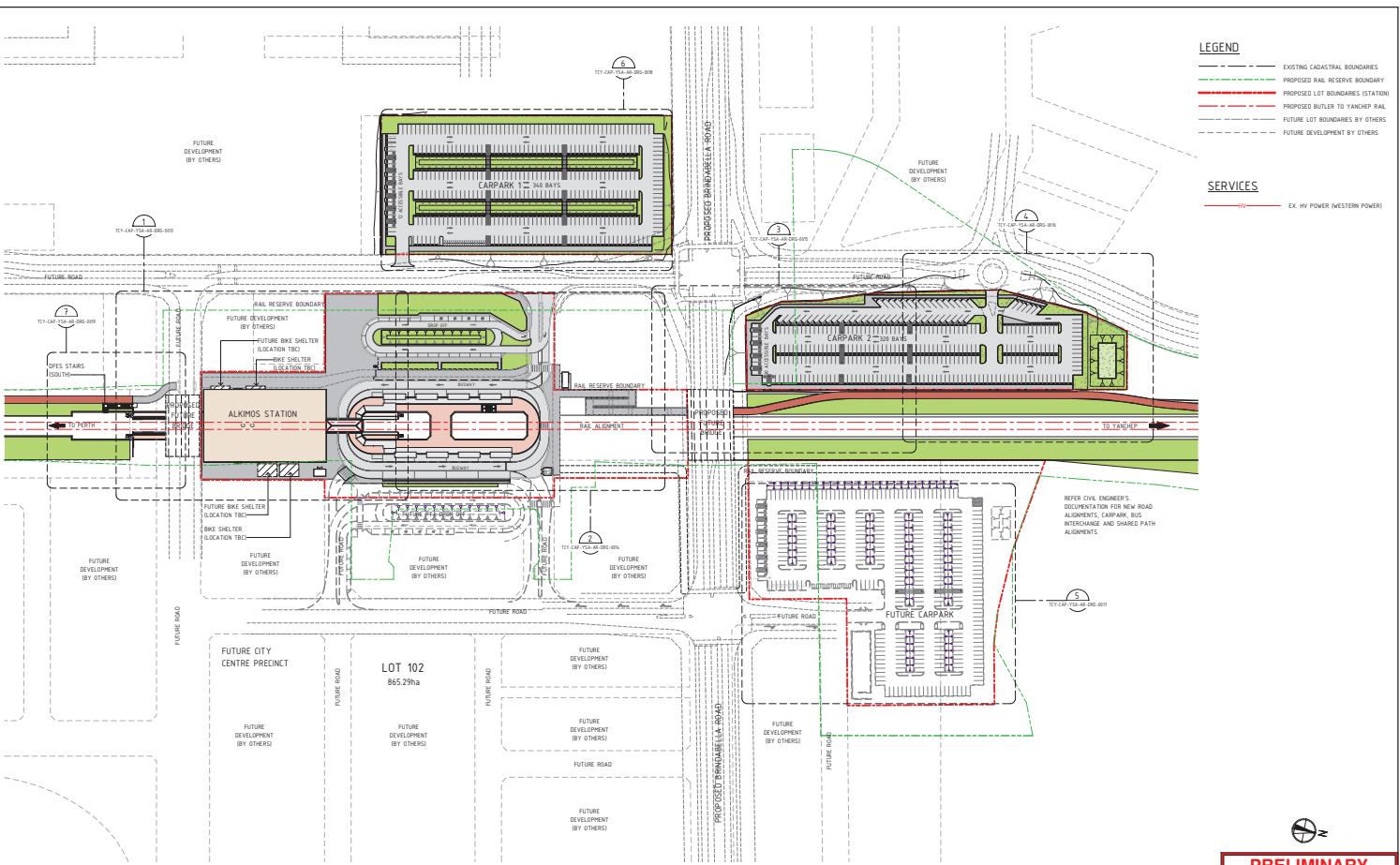
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A1	19.05.20	REFERENCE DESIGN ISSUE	BP	BL	AW
REV. DATE	AMENDMENT	DSN	DRN	OKD	APP
ORIG SIZE A1	6 12 20 30 50 100mm AT ORIGINAL PLOT SCALE	100mm	This document must be copied without PTA's written permission. It is the copyright of the PTA and is held by the PTA. It is a third party not be used for any unauthorised purpose.		

**NEWest Alliance**

Government of Western Australia  
Public Transport Authority  
**ALKIMOS STATION LOCATION PLAN**

PTA Drawing No:

REV: A



OVERALL SITE PLAN  
SCALE 1 : 1000

A.	ISSUED FOR PTA DESIGN	BP	BL	AW
A1	REFERENCE DESIGN ISSUE	BP	BL	AW
REV. DATE	AMENDMENT	DSN	DRN	OKD APP
ORIG SIZE	6 12 20 30 50 100mm	This document must not be copied without PTA's written permission. It is the copyright of the State of Western Australia. It is a third party not be used for any unauthorised purpose.		
A1	AT ORIGINAL PLOT SCALE	1000mm		

**NEWest Alliance**

TCY-CAP-YSA-AR-DRG-0011

REFERENCES		SCALE :	DESIGNED
As indicated (Ø A1)		DRAWN	B. PRIEST
DATUM :		CHECKED	B. LADYMAN
HORIZONTAL: PCG20		APPROVED FOR ISSUE	A. WHEELER
VERTICAL: AHD71			PTA DIRECTOR / Executive Director
PTA ACCEPTANCE STAMP	=		DATE

## PRELIMINARY DETAILED DESIGN

YANKEP RAIL EXTENSION

GOVERNMENT OF WESTERN AUSTRALIA

Geographic Technologies

ALKIMOS STATION

OVERALL SITE PLAN

PTA Drawing No:

REV: A

CAD DRAWING PATHNAME BM\_360//Metronet - TCY/CAP-YSA-AR-MOD-0001\_ALKIMOS STATION.rvt

## Appendix B Vegetation plot photos and description



**Photo ID:** 1a



**Photo ID:** 1b

<b>Plot number</b>	Plot 6
<b>Vegetation classification</b>	Class C Shrubland
<b>Description / justification</b>	Shrub vegetation less than 2 m high at maturity



**Photo ID:** 2a



**Photo ID:** 2b

Plot number	Plot 3
Vegetation classification	Class G Grassland
Description / justification	Grassland greater than 100 mm in height



**Photo ID:** 3a



**Photo ID:** 3b

<b>Plot number</b>	Plot 1
<b>Vegetation classification</b>	Class D Scrub
<b>Description / justification</b>	Vegetation with a continuous horizontal and vertical structure, greater than 2 m high at maturity

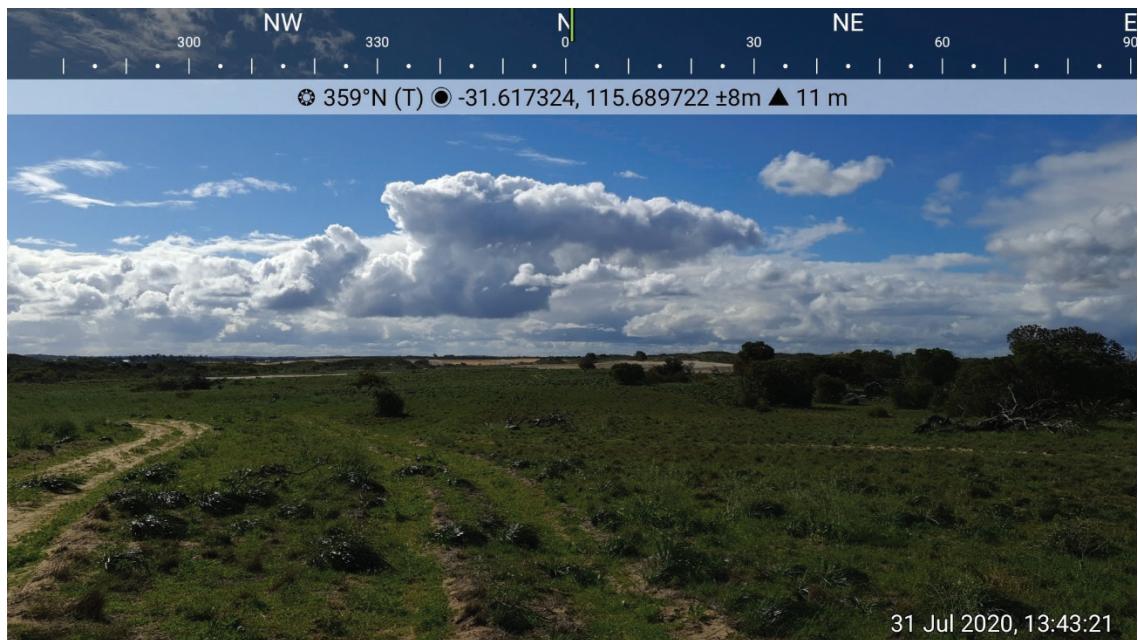


Photo ID: 4a

Plot number	Plot 3
Vegetation classification	Class G Grassland
Description / justification	Grassland greater than 100 mm in height



Photo ID: 5a

Plot number	Plot 11
Vegetation classification	Excluded – Non-vegetated and Low threat (Clause 2.2.3.2 [e] and [f])
Description / justification	Low threat cultivated gardens and maintained lawns within surrounding properties and non-vegetated areas including roads, footpaths, driveways and building footprints



Photo ID: 6a

Plot number	Plot 9
Vegetation classification	Class C Shrubland
Description / justification	Shrub vegetation less than 2 m high at maturity

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**Document Status**

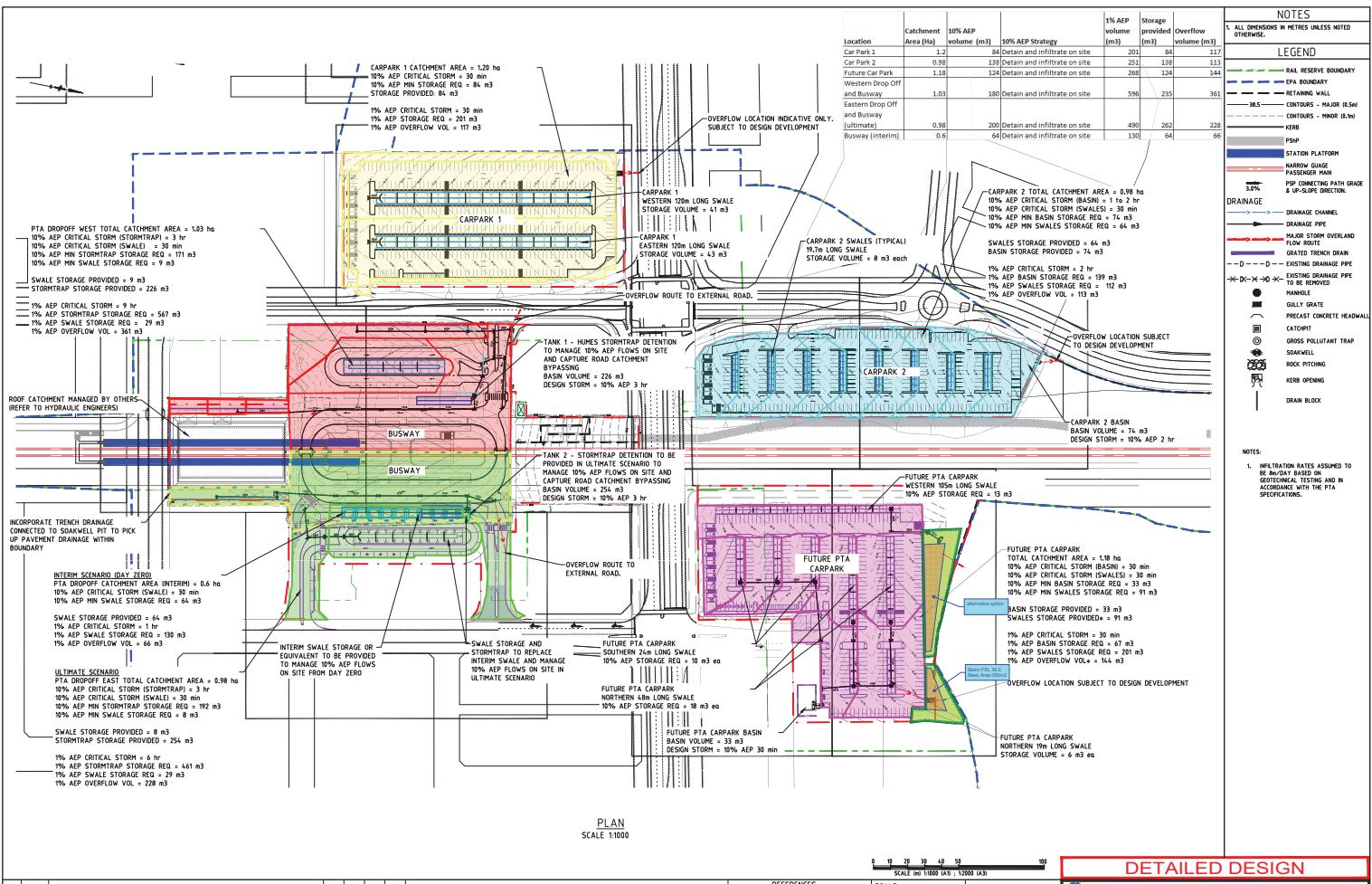
Report version	Rev No.	Purpose	Author	Reviewed and Approved for Issue	
				Name	Date
Final Report	Rev 0	Issued for use: to inform development design and confirm BMP requirements	Brodie Mastrangelo (BPAD 45985, Level 1)	Zac Cockerill (BPAD 37803, Level 2)	13 August 2020



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## **APPENDIX M**

## **PRELIMINARY STORMWATER DESIGN**



C	17.38.20	REISSUED FOR INFORMATION (85% DESIGN - WPI)	TB	CB	TB		
E	14.38.20	REISSUED FOR INFORMATION (85% DESIGN - WPI)	TB	CB	TB		
		REISSUED FOR INFORMATION (85% DESIGN - WPI)	TB	CB	TB		
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A1	AT ORIGINAL PLOT SIZE						

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## **APPENDIX N**

## **ENVIRONMENTAL MANAGEMENT STRATEGIES**

## YRE Environmental Strategies Summary Statement for DA Planning Reports

DRAFT 1.0, 12 Aug 20

The new YRE passenger rail line will travel through existing and planned developments, meaning that minimising environmental and community impacts during its construction is a key focus. While a new railway is itself a sustainability initiative, construction of such major public transport infrastructure is overseen by a raft of both environmental and public health requirements - governing hours of work, the management of noise, vibration and dust, and the need to work together with communities in developing measures that will minimise impacts.

### Flora and Fauna

As sections of the project footprint is located in greenfield sites, clearing will be required for the new passenger line. As outlined above, all vegetation clearing has received approval under the *Environmental Protection Act 1986*. The design has been optimised to limit the clearing to only that required to safely construct the permanent footprint.

The project footprint has been adjusted where possible to avoid significant ecological communities. Where this could not be achieved, significant areas of offset vegetation have been obtained offsite and funds allocated to manage those environmental offsets in perpetuity.

Prior to clearing, a trapping and relocation program will be undertaken by a qualified ecologist. Native animals will be relocated to nearby suitable habitat, as approved by the Department of Biodiversity, Conservation and Attractions.

To ensure animals free movement across the rail corridor, and to maintain the ecological link and habitat through these areas, the project will build one fauna underpass through the Alkimos Parks and Recreation Reserve. Three fauna bridges will also be constructed in the Ningana Bush Forever area, and will be 30m wide, span 22m, have nearly 1m of soil hosting vegetation similar to surrounding vegetation.

### Environmental Controls

There are numerous controls in place throughout different stages of the project to mitigate impact on both flora and fauna. A combination of legislative, planning and construction controls, and monitoring govern the project with the aim to protect the environment through all stages of delivery. These controls include:

- monitoring of dust, noise and vibration during construction
- marking the clearing boundary by surveyors prior to the start of clearing
- fauna trapping and relocation prior to clearing, and the presence of fauna spotters during clearing
- endeavouring to schedule noisy activities at less sensitive times
- barricading and signage to clearly outline 'no-go' areas
- engaging with local stakeholders and the community
- adhering to required regulatory legislative approvals and associated conditions
- environmental monitoring, inspections and audits to confirm compliance with approvals and legislation

- environmental training incorporated into induction for all personnel, subcontractors and visitors to site.

Controls will be inspected regularly throughout the project duration to ensure their ongoing suitability and effectiveness.

## Revegetation and Landscaping

All areas disturbed by the construction process that are not part of the permanent infrastructure will be revegetated as part of a landscape design produced by a landscape architect. The landscape design will provide quality landscape and urban design solutions which integrate the rail development and station precincts with the surrounding natural areas.

Revegetation and landscaping measures will include some or all of the following measures:

- reuse of topsoil from clearing during revegetation and landscaping
- maintenance of the required groundwater hydrology where needed to support existing vegetation and habitats in sensitive areas
- application of mulch to revegetated and landscaped areas to improve vegetation success
- stabilise the rail corridor walls with planting of locally species where possible
- retention of vegetation where not impacted by earthworks and not posing a safety risk.

## Managing Noise, Vibration and Light

The project is committed to minimising construction noise and vibration along the alignment as much as possible by utilising various controls including limiting noisy works outside of normal working hours, where practicable and using construction techniques and work practices that generate lower noise levels.

Where out of hours works are required, they will be undertaken in accordance with a Noise and Vibration Management Plan approved by the City of Wanneroo. This plan will outline additional controls and community notification requirements.

To minimise impacts on the proposed residential developments nearby, the majority of the YRE line will be built in a cutting, with developers required to have appropriate setbacks from the rail reserve (via road reserves or public open space) and homes in the ‘first row’ facing the route encouraged to implement ‘quiet house design’.

To manage vibration from passing trains, ballast matting (matting that sits in the rail formation) will be installed under the rail where it is located next to existing and future residential developments. This matting absorbs vibrations made by the train.

Noise walls will also be used in existing residential developments to assist with noise mitigation for residents living near to the trainline. The project team is currently confirming the height, materials and location of the noise walls along the alignment.

## **APPENDIX O**

## **SUMMARY OF YRE CONSTRUCTION PROGRAM**

## TCL Construction Program Summary Statement for DA Planning Reports

DRAFT 2.0, 12 Aug 20

### Construction Program and Management

#### Overview of Thornlie-Cockburn Link

The Thornlie-Cockburn Link (TCL) is the extension of Public Transport Authority (PTA's) passenger rail network. In conjunction with the state government's METRONET initiative, the 17.5 Kilometre distance spans from the entrance at Kenwick tunnel, through Thornlie station along the existing Arc freight rail corridor which accesses Kwinana Freeway via an existing portal and ending at Cockburn Central station. The existing Thornlie station will be significantly modified, and in addition, new stations will be constructed at Nicholson and Ranford Road whilst the existing platforms at Cockburn and Stadium Stations will undergo an extension.

TCL Stations are typically brownfield construction with challenges including:

- Ranford Road – contaminated waste to be removed below area of station entry building;
- Stadium and Ranford Road both contaminated landfill sites NWA will comply with requirements set out in the Site Management Plans to be prepared by PTA.
- Ranford Road, Nicholson Road and Thornlie Stations all have challenges with existing inground services and being adjacent to the existing Arc rail infrastructure;
- Thornlie Station is an existing live operational Station; and
- Stadium and Cockburn Stations are existing operational Stations with live rail lines flanking the works and situated adjacent to major road infrastructure.

#### Construction Management Planning

Each Station development site will be required to have a Construction Management Plan (CMP) endorsed prior to site mobilisation. The CMP will be supported by a range of other management plans (e.g. Traffic Management Plan), which will be prepared in consultation with the local government and other relevant agencies, based on the range of risks needing to be managed at each development site. Each CMP will provide the overarching framework and direction for all construction related works and activities on site during the station's construction phase. The CMP set outs the NEWest Alliance's construction methodology for this multi-disciplinary project and:

- complies with the PTA's Scope of Works and Technical Criteria (SWTC) and associated Project Specific Requirements (PSRs) and objectives;
- provides appropriate consideration to working in a constrained urban and existing rail environment;
- identifies, mitigates or effectively manages all interfaces and associated risks;
- ensures a respectful and considered approach to construction that minimises disruption to the existing PTA network, community and other stakeholders (e.g. road closures, working after hours, etc.);
- ensures delivery phase activities are undertaken in a clear, structured, methodical manner with 'no surprises';
- achieves desired functionality, safety, quality and program requirements in an environmentally and community sensitive manner; and

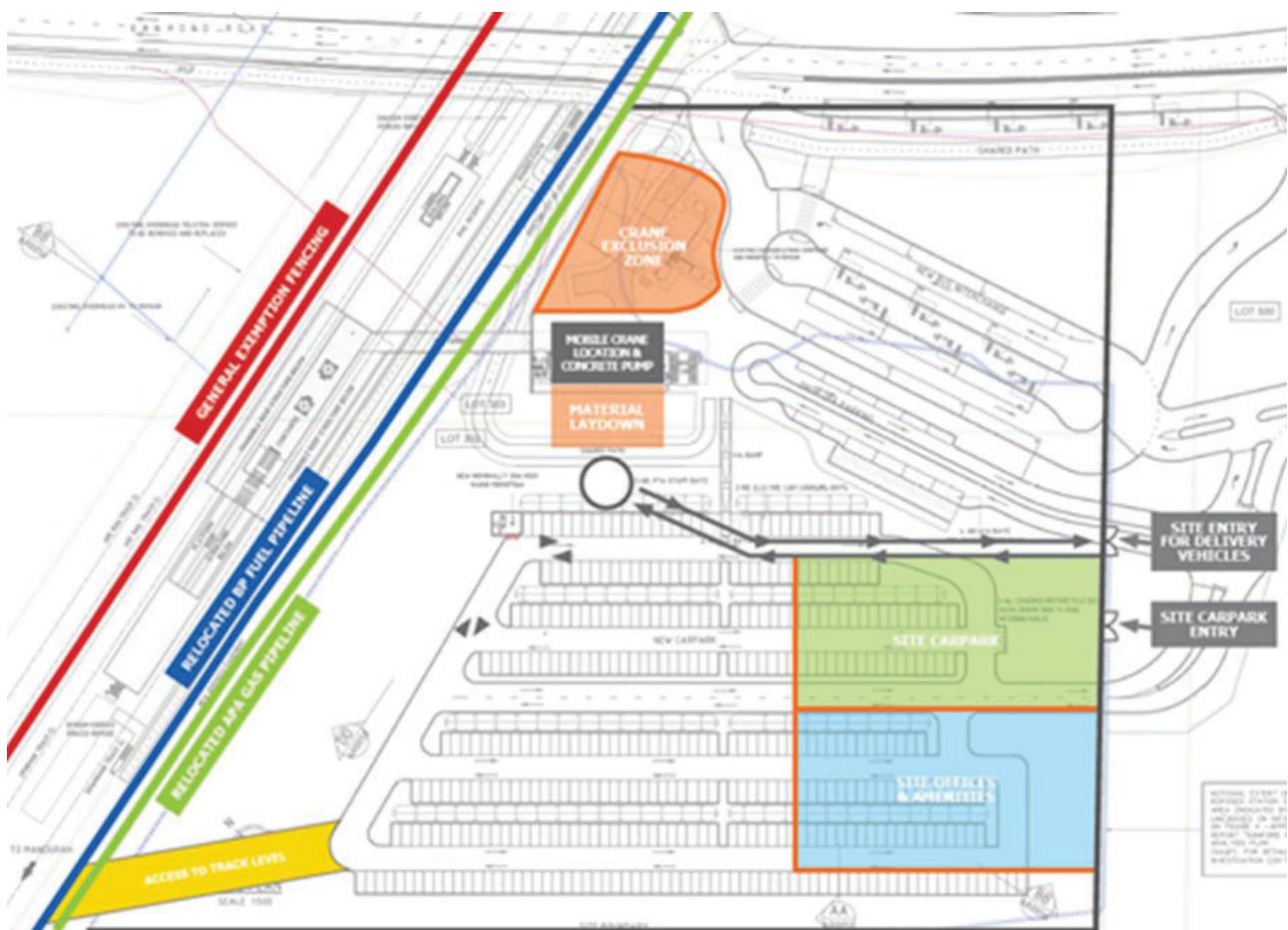
- details the management strategies and practices for construction at each site, excluding construction relating to rail and rail systems.

The preparation of each station development site CMP will be informed by the endorsed Construction Plan TCL document. This provides the overarching framework and direction for all construction-related activities and works during the delivery phase of the METRONET Stage 1 Initiatives: Thornlie-Cockburn Link.

## Station Construction Site Layout

The sketch shown in Figure ? demonstrates the planned approach for site set up at new stations and notes locations for the set-up of mobile cranes and concrete pumps.

**Figure ?: Typical construction site layout for a TCL station development project.**



## Timeframes for Construction and Day One Operations

The NEWest Alliance has taken a risk based approach on design to ensure accurate and efficient project delivery deadlines. The key construction milestones are as follows:

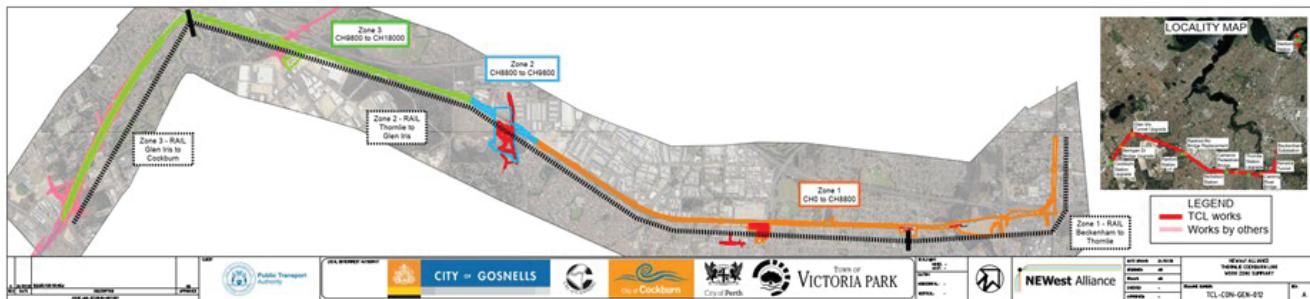
**Table ?: TCL wide key construction milestones.**

Milestone	Target Completion Date
Design Complete	5 August 2021

Milestone	Target Completion Date
Civil Works Complete	10 January 2023
Bridges Complete	17 August 2022
Stations Complete	30 November 2022
Final Commissioning and EIS	27 February 2023
Project Complete	26 May 2023
Operational Readiness and Drivers Training	26 May 2023

The TCL project has established three construction zones as shown in Figure ? below for effective and efficient management in terms of program, traffic staging and cost whilst minimising disruptions to stakeholders including train operations and the public.

**Figure ?: Project Zone Layout between Beckenham and Cockburn Station.**



The program of dates for commencing construction of each TCL station and their anticipated date for commencing the operation of a passenger train services is summarised in the table below.

Station Project	Date for Construction	Day One Operation Date
Perth Stadium	2 March 2021	Late 2022
Nicholson Road	29 November 2021	
Thornlie	8 December 2020	
Ranford Road	29 November 2021	
Cockburn Central	30 July 2021	

## **APPENDIX P**

## **RESPONSE TO OGA / SDRP COMMENTS**



## YANCHEP STATION – DESIGN REVIEW

### DRAFT COMMENTS

PRINCIPAL NO:	OGA COMMENTS (FEBRUARY 2020)	OGA RECOMMENDATIONS	CAMPS/NEWest RESPONSE	STATE DESIGN REVIEW PANEL REPORT COMMENTS (JUNE 2020)	CAMPS/NEWest RESPONSE
1. Context / character	Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.	<ol style="list-style-type: none"> <li>Consider a precinct and character study to ensure seamless integration of the Station and the greater Activity Centre Plan</li> <li>Seek design opportunities to strengthen unique Yanchep sense of place for the Station and related infrastructure.</li> </ol>	Line-wide character study completed. Context Plan completed. Yanchep sense of place further identified and being incorporated with the Station precinct and related infrastructure.	<ol style="list-style-type: none"> <li>Improve context responsiveness by emphasising bold form design, landscape, public art and public realm integration.</li> <li>Seek design opportunities to strengthen unique Yanchep sense of place for the Station and related infrastructure by referencing and incorporating more strongly the east-west green link into the public realm design.</li> </ol>	<ol style="list-style-type: none"> <li>Context-responsive design includes addition of site specific identity (caves, limestone and Banksia) and integration of these design themes with both architectural materials and finishes.</li> <li>East-west link is being further developed / refined by YBJV and Metronet/NEWest designers.</li> </ol>
a.	The Panel notes the intent to create a consistent design identity for Yanchep and 3 new METRONET Stations on the northern Line. There is merit in ensuring architectural consistency and coherency to successive Stations, however landscape and public art should be employed to bring a specific character and local identity to the individual Stations and their setting.	Consider Aboriginal Engagement Strategy, structure plan reports and area history. Prepare culture statement that design interpretation can be drawn from.	A cultural statement for design interpretation has been prepared referencing the Gnarlida Biddi and in liaison with the Noongar Reference Group.	The Panel broadly supports the intent to create a consistent design identity for the 3 new METRONET stations on the northern line. There is merit in ensuring a cohesive architectural approach to successive stations, however the Panel maintains that architectural treatments, landscape and public art should be better employed to bring a specific character and local identity to the individual stations and their setting.	Potential Public Art location have been selected. <ul style="list-style-type: none"> <li>Shade structures at the southern entrance. Lazar cut panels to underside of canopy.</li> <li>Tiled walls to the platforms</li> <li>Sculpture within busway</li> </ul>
b.	Whilst this project was initiated prior to METRONET's use of precinct plans and the introduction of Design WA and SPP7.0, there are still expectations for a contextually appropriate design response. A simple character study could be helpful to better understand the unique Yanchep sense of place.	PTA to consider Character Study	PTA to consider Character Study	The Town Centre will take time to develop. As one of the first deliverables, the Station is an opportunity to establish an intermodal transport node that demonstrates high quality landscape, public realm and well-designed station architecture, thereby making a significant civic contribution to a new Strategic Regional Centre.	Agreed. The further development and refinement of the design of Station and precinct and the ties with the town centre is in progress with further liaison ongoing between YBJV and Metronet/NEWest designers.
c.	The train Station is well placed to establish the public realm benchmark for the greater Regional Centre. To successfully catalyse the new precinct, the Station should contribute to place activation in addition to supporting its transport function. Continued engagement with the landowner / developer in relation to their Activity Centre Plan will help ensure an integrated transport hub, with connected green links and a mixed use public realm.	PTA to develop Station Precinct integration within Structure plan through Landowners and NEWest Team engagement.	PTA to develop Station Precinct integration within Structure plan through Landowners and NEWest Team engagement.	Use of a floral motif as the differentiation for the three stations (Melaleuca, Grevillea and Banksia) may have merit but appears somewhat tokenistic at this stage. Consider how this would work with specific Yanchep references, or relevant Indigenous cultural references.	Station identity and the design interpretation adopted for Yanchep Station responds to, <ul style="list-style-type: none"> <li>Simplicity</li> <li>Identity</li> <li>Sustainability</li> <li>Amenity</li> <li>Functional planning fulfilling operational requirements</li> <li>Public art, colour, landscape.</li> </ul>
d..	Establish and capitalise on the arrival / departure experience that Yanchep Station should offer to residents, visitors and tourists.	Exploit visual connections through voids within Station. Develop entry design.	Exploit visual connections through voids within Station. Develop entry design.	The 'simple elegant box' approach to the Station architecture is a valid whole-of-line strategy as discussed in DR1, however it would have greater impact if a more distinctive transit environment was created for each station, responding to its respective setting, enhancing local character and providing a stronger sense of place.	Alkinmos Station facia and facade approach has been considered. It is distinct, identifying, and different to Yanchep and Eglington. The Yanchep design interpretation will be developed providing individuality to Yanchep station.
e.	Consider Yanchep Station as a gateway to nearby northern beaches and related destinations by providing efficient and well-integrated transit connections and clearly identifiable linkages and references to nearby tourist destinations.	Wayfinding strategy and signage to be further developed to enable legible directions for patrons and tourists.	Develop wayfinding, digital display integration and promotion opportunities within Station and Precinct.	The east-west green spine running to the south of the Station and in which the Bus Port is integrated, could be more visible within the design of the main public realm space which connects the Station to the Bus Port to deliver a unique point of differentiation for this Station. Currently the lack of	Shade structures with the forecourt are a PTA structure that can assist the activation of the forecourt by others. Liaison between stakeholders including the City of Wanneroo and YBJV is ongoing to provide an enhanced space able to be activated and

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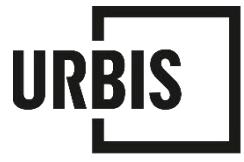


## NEWest Alliance

<p><b>f.</b> Consider the long-term context and plan for a compact higher density Regional Centre, which should include a well-positioned multi-level carpark.</p> <p><b>2.Landscape quality</b> Good design recognises that together landscape and buildings operate as an integrated and substantive system, within a broader ecological context.</p>				<p>PTA to consider with Landowners</p> <ol style="list-style-type: none"> <li>Engage a landscape architect as part of the Station design team as soon as possible.</li> <li>Use a strong landscaping design to mitigate site conditions for Station, public realm and related infrastructure and deliver a unique Yanchep sense of identity.</li> <li>Re-configure the Kiss and Ride.</li> </ol>	<p>activation and unresolved design of the Forecourt, means the benefit of the expensive capping of the rail line is not yet being realised.</p> <p>Establish and capitalise on the arrival/departure experience that Yanchep Station could offer to residents, visitors and tourists as a main point of arrival to nearby regional destinations, including the mid north-west.</p> <p>1. Ensure a holistic and integrated landscape design for the Town Centre, which includes all public realm spaces between Bus Port, Kiss and Ride and Station. Demonstrate how the spaces will be used.</p> <p>2. Optimise the opportunity to better reference Yanchep character in the built form, landscaping and public realm.</p> <p>3. Integrate WSUD strategies into landscape and urban design</p> <p>4. Ensure phasing-out of irrigation will still deliver a high-quality public realm over the long term</p>	<p>programmed; shade; raised planters and seating, power and water supply and other facilities are being investigated for installation within the space.</p> <p>Development of interior spaces colour, public art and material texture of the design interpretation is supported by signage, furniture and movement to establish arrival and departure. Should PTA adopt promotional material within the station it would further support this.</p> <p>The landscape architects continue to present and work closely with Developer. Strengthening of the landscape design and its references to the place's site and cultural qualities is ongoing through the detailed design phase of the project.</p> <p>WSUD strategies are under development with the civil engineer.</p> <p>Irrigation demand is being minimised while balancing the requirements to maintain green, healthy plants.</p> <p>Temporary landscape zones are being rationalised/minimised</p>
a.	Prepare a landscape design proposal. Appropriate landscape character around the Station would benefit this project to ensure public realm within the METRONET remit contributes to a unique setting for the emerging Regional Centre.			The landscape design proposal is being developed that responds to the local setting and that helps to integrate the station with the emerging Regional Centre including elements of place and pedestrian activation, shelter, lighting, flexibility, greening and public safety.	The appointment of the Landscape Architect is welcomed. The Panel acknowledges Landscape design is at 5% design stage.	Noted. The design has now progressed to a "15% Design Stage" development.
b.	Provide a district level drawing that clearly places the Station within the Activity Centre Plan so that greater green links can be understood and emphasised. The fundamentals are already strong with the placement of the bus port perpendicular to the Station within a proposed green link. Supplement with a strong landscape plan that gives the bus-port / new open space a high level of amenity and legibility.			The district level drawing including green links is being prepared as part of the landscape design proposal.	Whilst the Banksia menziesii has the potential to be a useful landscape motif, the powerful topography of the Yanchep locale, adequately referenced in landscape and urban design is not yet visible and should be made more evident	The landscape architects and architects have refined and strengthened the landscape and architectural place themes adopted for the project at each station. These themes will continue to influence and strengthen the landscape design as it matures through the detailed design phase.
c.	Develop a landscape design approach for the Station, entry approaches, urban realm, car parking and bus port that celebrates the unique character of Yanchep. To undertake this work, the Panel recommends engaging a landscape architect as a priority. A well-integrated engaging Station that contributes to identity and streetscape character will be valuable in establishing the Strategic Regional Centre.			A landscape architect has been engaged to design the approach for the Station, entry approaches, urban realm, car parking and bus port that celebrates the unique character of Yanchep.	Further consideration of the microclimate of the Station Forecourt is needed. How can a tree canopy be provided to improve amenity of this large space? The type, scale and intent of tree planting will need to be considered given the 'planting on structure' condition. The location and further detail of selected tree species is required for the next review.	Agreed and the landscape design strives to implement this.
d.	Interpret, incorporate and communicate the local Indigenous heritage and sensitive ecology to capitalise on the thematic opportunities for the Station / public realm based on local elements.			The landscape plan will pursue design themes drawn from the local place including consideration of the interconnected nature of Perth's historic Noongar network and the current rail network. This aligns with the Gnarlal Biidji (pathways) Strategy or the way that people travel and connect to places, linked to a shared understanding of Aboriginal history and culture.	The large Forecourt south of the Station will require purpose and programming. Connectivity will be a key objective for that large space. Diagramming and investigation into how this space is to be used, is needed.	ALKIMOS SORP REVIEW DRAFT RESPONSE 07/07/2020 Uncontrolled Document when Printed Page 2 of 11



e.	Consider design and landscape innovation for the rail culvert north and south of the Station to deliver a point of differentiation and contribute to stronger greening of rail infrastructure, which can assist with habitats for flora and fauna.	The landscape plan will provide guidance to restore and revegetate the slopes of the permanent way and include provision of shade trees along the Principal Shared Path.	Continue work on the landscape corridors between the carpark and Bus Port; this will provide amenity and shelter as support of a wayfinding strategy.	Agreed, however the area between the carpark and the busport is being undertaken by the Developer. The Design team have sought to co-ordinate the station landscaping works with the Developers plans for these areas.
f.	Incorporate new trees around the Station and utilise deep root zones wherever possible to provide a strong future urban canopy for this Centre.	The landscape architect will collaborate with the civil engineer to incorporate new trees around the station and comply with SWTC requirements providing for adequate soil root zones.	With the main public space being positioned on the rail capping area, this new urban centre could be dominated by large areas of paving and hardstand. Consider enhancing linkages with nearby proposed east-west green spaces, with the aim of including and restoring lost and damaged ecosystems.	Agreed, the east-west green linkages are outside the PTA development and are part of the overall precinct works undertaken by the Developer. The Design team have sought to co-ordinate the station works with the Developers plans for these areas providing a key linkage East to West across the rail.
g.	Better consider the climate conditions (sun, wind, rain) that will impact the landscape and public realm design.	The landscape architect will collaborate with the civil engineer to incorporate new trees around the station and landscape buffer zones to improve or mitigate pavements' exposure to uncomfortable climate conditions (sun, wind, rain).	Utilise the large 1000 bay carpark to create a tree canopy to the north-east quadrant of the urban centre, and to compensate for the limited scope for large trees and deep root zones within the main public space between Bus Port and Station.	The carpark has been further developed to integrate large trees both within the carpark and along the carpark perimeter.
h.	Reconsider the on-grade carpark design to deliver a more uniquely Yanchep response, working with existing vegetation and trees to deliver a more organic, responsive and appropriate design, which also enables staging. Include a greater number of trees.	The project design team will collaborate to (where practical) retain vegetation including trees within the car park zone and consider staging that maximises tree retention and landscape buffer retention over the stages of the development cycle.	Incorporate an innovative approach to drainage (consider a system of swales) to maximise the tree canopy within carpark area. What is the timing of these carparks to ensure the landscape investment is not sacrificial over the medium term?	The carparks are to be constructed for Day 1. The
i.	The Kiss and Ride green triangle zone in the forecourt is currently locked by roads. Could this be redesigned to provide a green space that is accessible?	Yes. This will be reconsidered.	An integrated landscape proposal to the rail corridor north and south of the decked Station will be important for long term urban tree canopy provision.	Agreed and the landscape design strives to implement this.
j.			Phasing out irrigation beyond initial establishment is understandable from a sustainability perspective, however the Panel questions the impact this move might have on the delivery of a high-quality urban realm. The next layer of detail in WSUD strategies is also encouraged.	Irrigation demand is being minimised while balancing the requirements to maintain green, healthy plants. WSUD will be utilised where this can provide sustainable benefits to the place. Design Enquiry is ongoing through the design development phase.
3 Built form and scale	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.	<ol style="list-style-type: none"> <li>1. The planning of the south end of the Station needs reconsideration to retain the power of the simple form and ensure more successfully active edges. Clearly signal entry points and create an overall stronger civic sense to the building.</li> <li>2. Confirm, design and compose essential Station paraphernalia as part of Station design.</li> </ol>	<ol style="list-style-type: none"> <li>1. Provide additional information with respect to Kiss and Ride, where a ring road circumnavigates the future development site.</li> <li>2. Further refine the Station architecture. Better integration of the awnings, canopies and other features is required.</li> <li>3. Eliminate blank walls to the Station building where possible and introduce transparency and texture / patterning where appropriate.</li> <li>4. Prioritise southern elevation of the Station building to strongly and positively address the Forecourt.</li> </ol>	
a.	In pursuing the 'simple elegant box' approach as the architectural concept for the Station design, extraneous additions and projections to the form should be avoided. Service and other elements at the southern end of the Station should be accommodated within the rectangular plan to maintain the clarity of the formal language.	Develop Station concourse design to achieve a 'simple elegant box' form. Develop Station entry design response to support the Station language. Integrate essential Station paraphernalia within the Design solution.	The Panel strongly supports the sunken rail-line and the location of the Bus Port as part of the linear east-west park. Effectively connecting the Bus Port to the Station will require a well-designed Urban Forecourt that provides sun and wind protection.	Noted. The architectural design of the canopies is being further developed in this area.
b.	Realistically incorporate the various components that are essential to Station	Coordinate the Landscape within the Station Precinct to manage peripheral functional	The Panel would welcome more information on the proposed 'umbrella' canopies components within	The combination of 3 large shade structures is scale of the forecourt. The design has been



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