

Appendix K – Transport Impact Assessment Report prepared by ALUA

Gosnells Transport Impact Assessment

Victoria Park-Canning Level Crossing Removal Program

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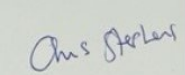
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1. Introduction

1.1 Purpose of this report

Armadale Line Upgrade Alliance (ALUA) has been commissioned by Office of Major Transport Infrastructure Delivery (OMTID) to prepare a detailed Transport Impact Assessment (TIA) for the proposed Victoria Park to Canning Level Crossing Removal (VPCLXR) project within the City of Gosnells (the City). This assessment has been prepared in accordance with the Western Australian Planning Commission (WAPC) Transport Assessment Guidelines for Developments Volume 4 – Individual Developments. The key objectives of the TIA as per the WAPC guidelines are as follows:

- Assess the proposed access arrangements for all modes, that is, vehicle, public transport, pedestrian and cyclist;
- Assess the level of transport integration between the development and the surrounding land uses;
- Determine the impacts of the traffic generated by the development on the surrounding land uses; and
- Determine the impacts of the traffic generated by the development on the surrounding transport networks.

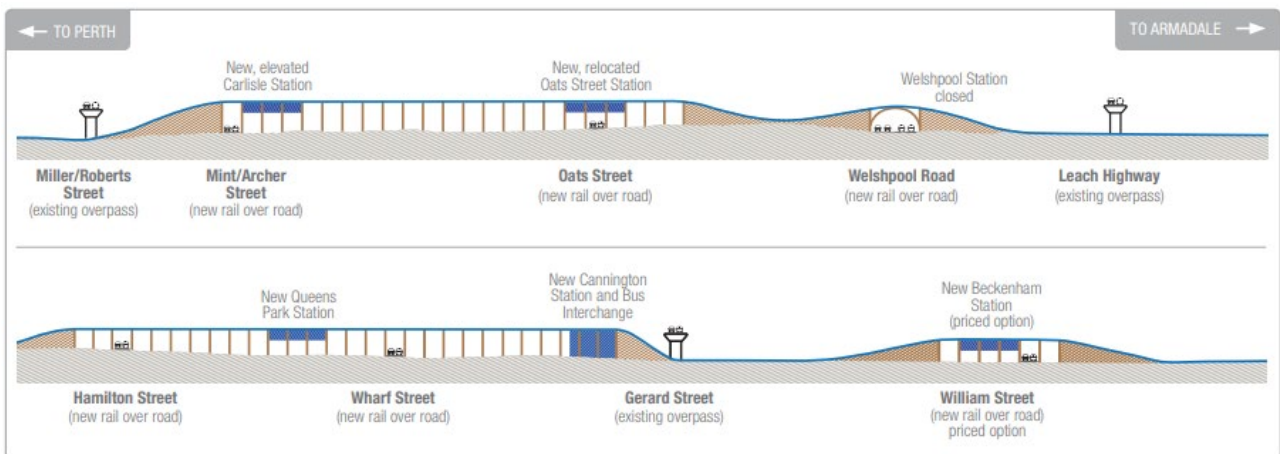
2. Proposed development

2.1 Project description

The proposed VPCLXR project is Perth's first major elevated rail line that will improve public transport safety, reduce traffic congestion and create new publicly accessible spaces for ongoing use by the community within the existing rail corridor. The VPCLXR project includes the following key components:

- Three sections of new elevated rail line, or viaduct, comprising piers, pier headstock and 'U trough/s'.
- The removal of six (6) existing level crossings at Mint Street, Oats Street, Welshpool Road, Hamilton Street, Wharf Street and William Street.
- The development of five (5) new, modern elevated train stations at Carlisle, Oats Street, Queens Park, Cannington and Beckenham.
- The removal of the existing Welshpool Train Station.
- New station precincts at ground plane level around each of the new train stations including bus facilities at Oats Street and Cannington Stations, passenger parking and landscaping.
- New ground level public realm works between station precincts incorporating public spaces and facilities.

FIGURE 2.1 VPCLXR PROJECT SCOPE OVERVIEW



Source: METRONET (accessed September 2023)

The scope of this TIA is the extent of the development within the City of Gosnells. Within this scope, the project includes:

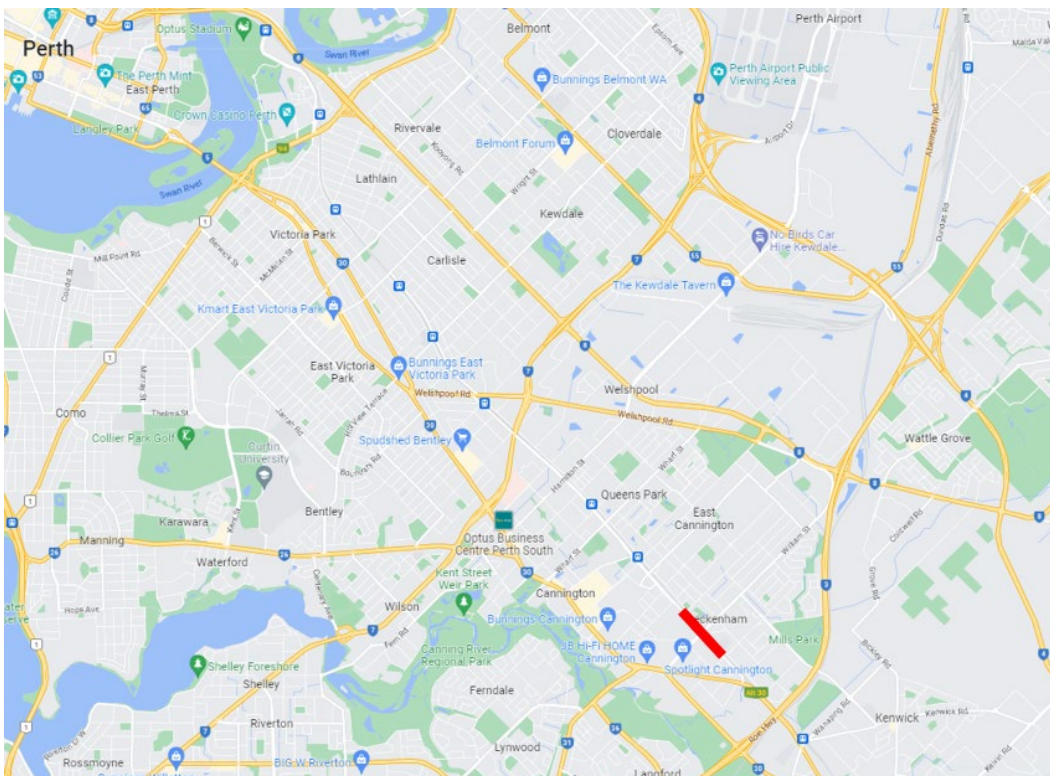
- Removal of the level crossing at William Street.
- Elevated station at Beckenham, with the station building located to the north side of William Street.
- Local road works and intersection modifications.

- Signalised traffic intersection and Principal Shared Path (PSP) crossing at William Street and Sevenoaks Street.
- PSP which maintains its alignment on the east side of the station and transitions into the station precinct. Signalised traffic intersection and PSP crossing of William Street on the west side of the station, with the PSP alignment traversing back along the eastern side of the corridor, connecting residents with the station and regional destinations.
- Development of high-amenity public open space and community amenities, including a proposed community hub and parks adjacent to the new station.

2.2 Regional context

The proposed development follows the existing Armadale Train Line with a regional context provided in Figure 2.2. The extent of the project area within the City of Gosnells is shown in Figure 2.3, between Lacey Street and Dulwich Street.

FIGURE 2.2 REGIONAL CONTEXT OF SITE



Source: Google Maps (accessed July 2023)

FIGURE 2.3 LOCAL CONTEXT OF SITE



Source: Nearmap (accessed July 2023)

2.3 Major attractors / generators

Key attractions surrounding the site are shown in Figure 2.4.

FIGURE 2.4 MAJOR ATTRACTORS/ GENERATORS



Source: Armadale Line Upgrade Alliance, Line-wide Landscape Design Report, June 2023

Beckenham Station is a suburban Transperth railway station that provides access to:

- Medium to low density residential dwellings.
- Adjacent business land uses such as:
 - Oaks Business Centre (see 'Industrial Land Use' label in Figure 2.4)
 - Bulkyplex Cannington (see 'Big Box Retail' label in Figure 2.4)
- A primary school (Beckenham Primary School) located approximately 300 metres away from the station.
- Local shops on Sevenoaks Street, Railway Parade and William Street.

3. Existing situation

3.1 Existing site

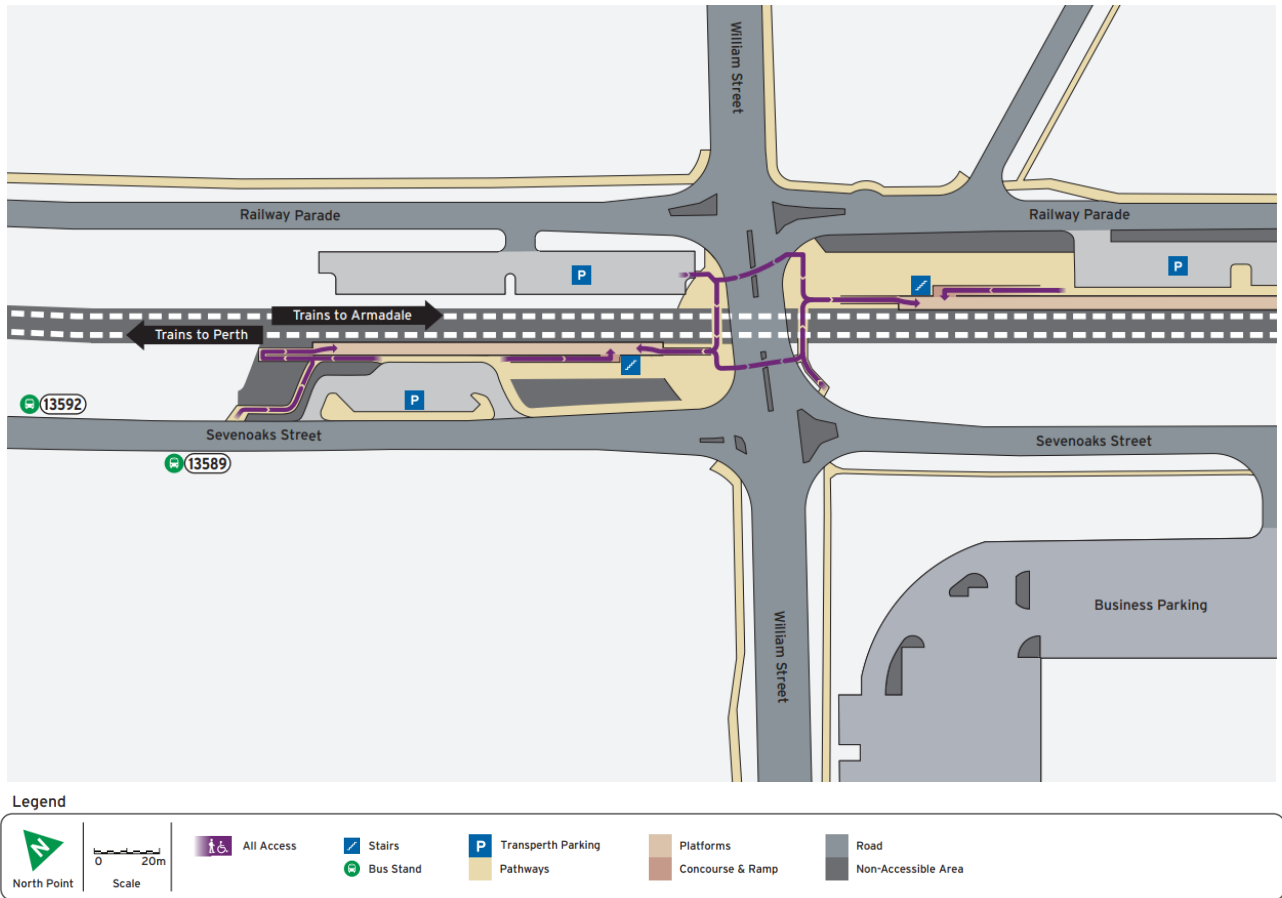
The existing site is Beckenham Station, upon the Armadale Rail Line. The site includes at-grade railway tracks, associated signalling infrastructure, a train station, car parking and shared paths. There is one existing level crossing on William Street.

The existing station layout for Beckenham Station is shown in Figure 3.1. Features of the existing station facilities include:

TABLE 3.1 EXISTING STATION FACILITIES

STATION PROVISION	BECKENHAM STATION
PLATFORM TYPE	Marginal platforms - One to the north-west and one to the south-east of William Street
BUS INTERCHANGE	No bus interchange - One bus stop on either side of Sevenoaks Street, north of the William Street level crossing, for rail replacement services
CAR PARKING	67 parking bays, including 5 ACROD bays, provided in three Park 'n' Ride locations
KISS 'N' RIDE	No formal Kiss 'n' Ride
BICYCLE PARKING	<ul style="list-style-type: none"> — Bicycle shelter (18x bicycle spaces) — Bicycle lockers (4x) — U-rails (8x)

FIGURE 3.1 BECKENHAM STATION EXISTING LAYOUT



Source: PTA (accessed July 2023)

Existing car parking demand at stations

Existing car parking facilities and access is discussed in Section 4.1, presented in a discussion of existing station facilities. Parking occupancy for Beckenham Station is shown in the table below, with Park ‘n’ Ride occupancy consistently reaching close to capacity. There is also a level of demand for informal commuter parking at Beckenham Station.

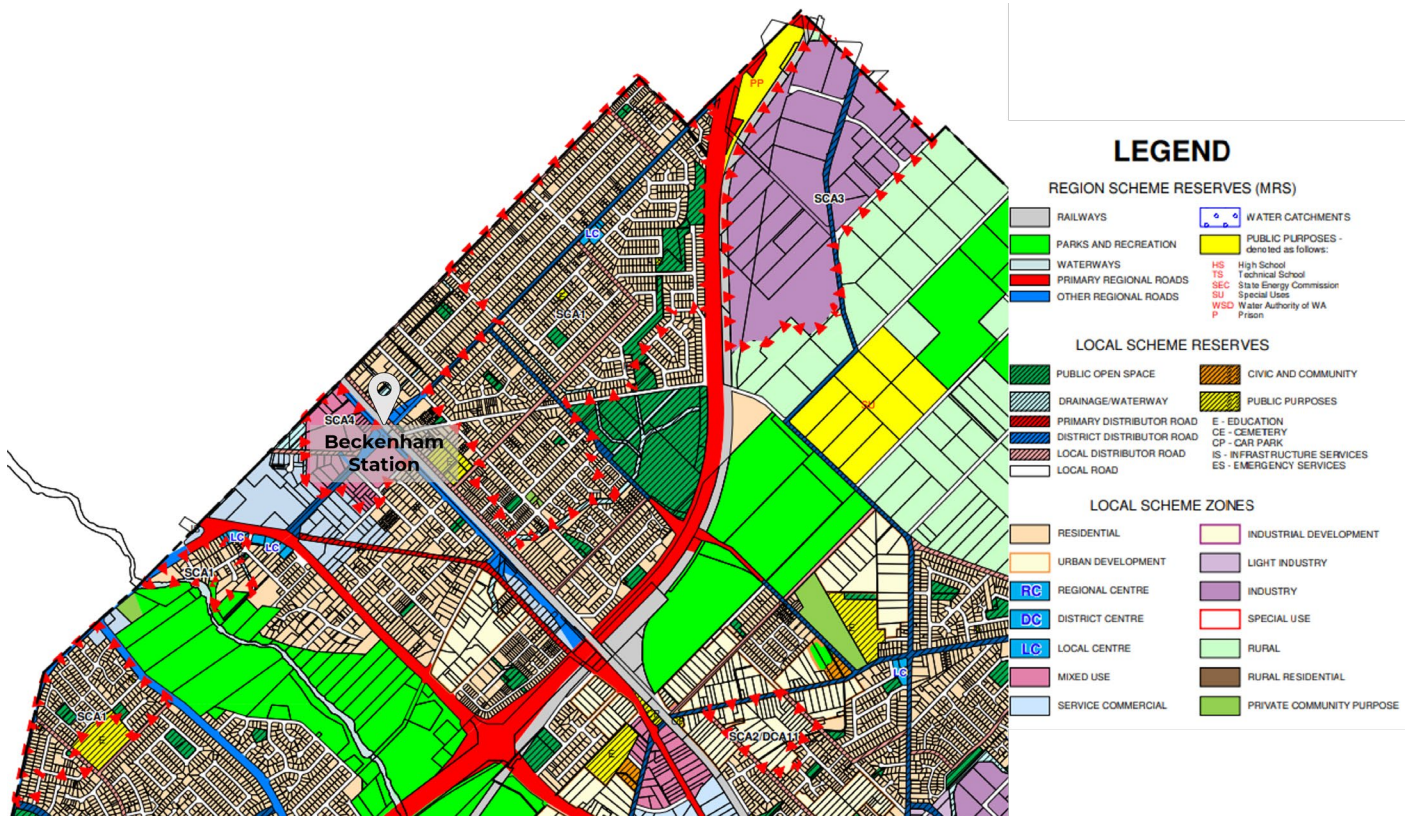
TABLE 3.2 CAR PARKING OCCUPANCY (AVERAGE WEEKDAY USAGE BETWEEN 13TH – 17TH MARCH 2019)

STATION	OCCUPANCY	YEAR
Beckenham	90%	2019

3.2 Existing land use

The City of Gosnells Local Planning Scheme No. 24 is shown in Figure 3.2 . The site is shown as Railway under the Metropolitan Region Scheme (MRS) Reserves.

FIGURE 3.2 CITY OF GOSNELLS LOCAL PLANNING SCHEME NO. 24



Source: City of Gosnells (accessed July 2023)

3.3 Existing public transport

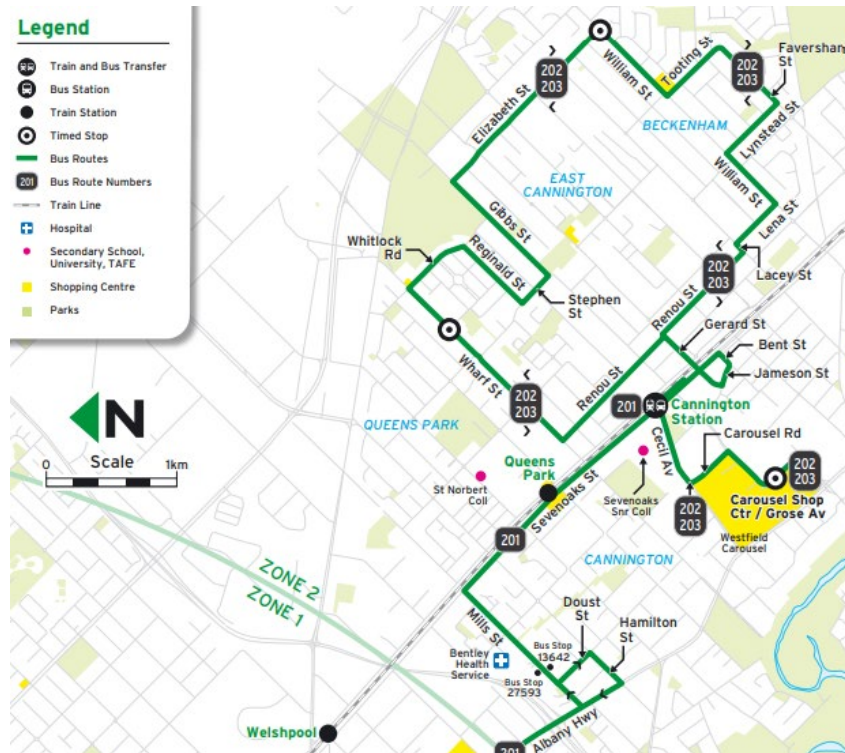
The existing public transport network within the plan area includes Beckenham Station, as well as the broader Armadale Rail Line. As shown in Figure 3.3, Beckenham Station is located within Zone 2. While there are no bus routes directly serving Beckenham Station, with the exception of rail replacement services, the bus routes proximate to the development area and surrounds are shown in Figure 3.4 to Figure 3.6.

FIGURE 3.3 PERTH FARE ZONE MAP



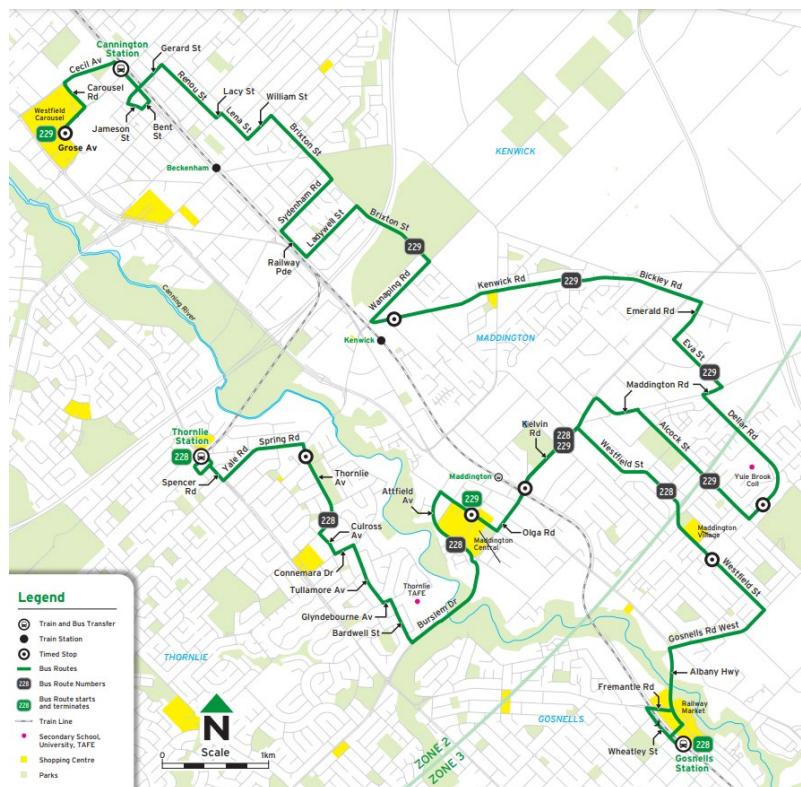
Source: PTA (accessed July 2023)

FIGURE 3.4 EXISTING BUS NETWORK (ROUTES 202 AND 203) NEAR BECKENHAM STATION



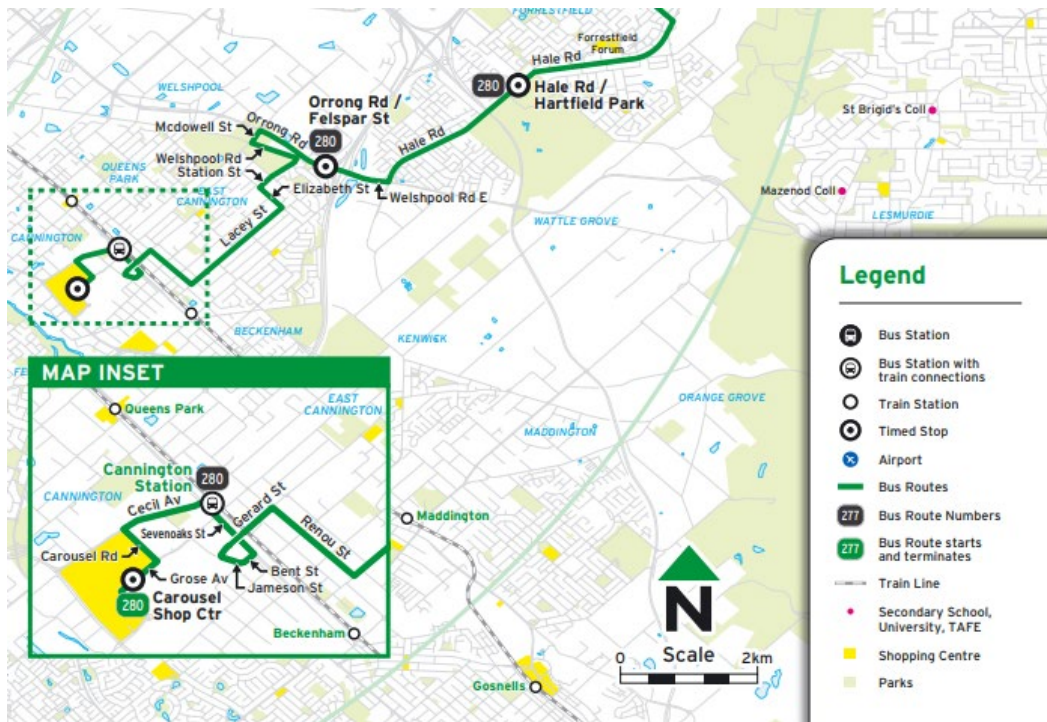
Source: PTA Bus Timetable 14 (accessed July 2023)

FIGURE 3.5 EXISTING BUS NETWORK (ROUTE 229) NEAR BECKENHAM STATION



Source: PTA Bus Timetable 5 (accessed July 2023)

FIGURE 3.6 EXISTING BUS NETWORK (ROUTE 280) NEAR BECKENHAM STATION



Source: PTA Bus Timetable 110 (accessed July 2023)

There is no direct access to Beckenham Station by bus. The closest bus stops serviced by the local bus network are Route 202, Route 203, Route 229 and Route 280 as depicted in Figure 3.4, Figure 3.5 and Figure 3.6. These stops are located approximately 670 metre walk (from Beckenham Station) on Renou Street, near Lacey Street.

Services patterns on weekdays (during morning and afternoon peak periods) are approximately every 30 minutes for the routes.

3.4 Existing walking and cycling network

The City of Gosnells has an expansive path network to support walking and cycling, with annual funds allocated for the construction and maintenance of paths. The City’s walking and cycling network immediately surrounding Beckenham Station includes local bike friendly routes, high quality shared paths, other shared paths and bicycle lanes or sealed shoulders, as shown in Figure 3.7.

FIGURE 3.7 CITY OF GOSNELLS EXISTING CYCLING AND WALKING NETWORK

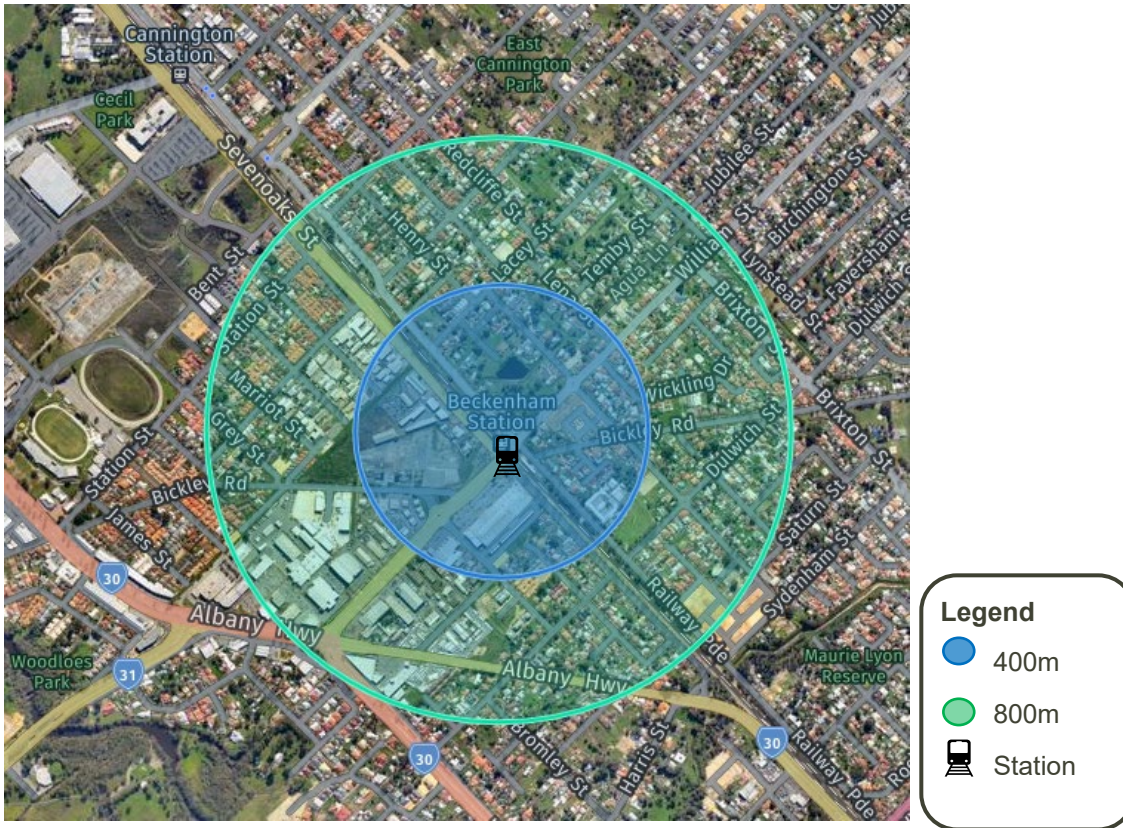


Source: DoT Your Move (accessed July 2023)

The walking catchment for Beckenham Station is shown in Figure 3.8. The cycling catchment (2.5km or approximately 10-minutes riding time) for Beckenham Station is shown in Figure 3.9 . The station walking and riding catchments generally benefit from grid road, supporting legible access to the station and surrounding destinations. Currently, people using the path network cross the rail line at-grade via mazes, which require people on bikes to dismount.

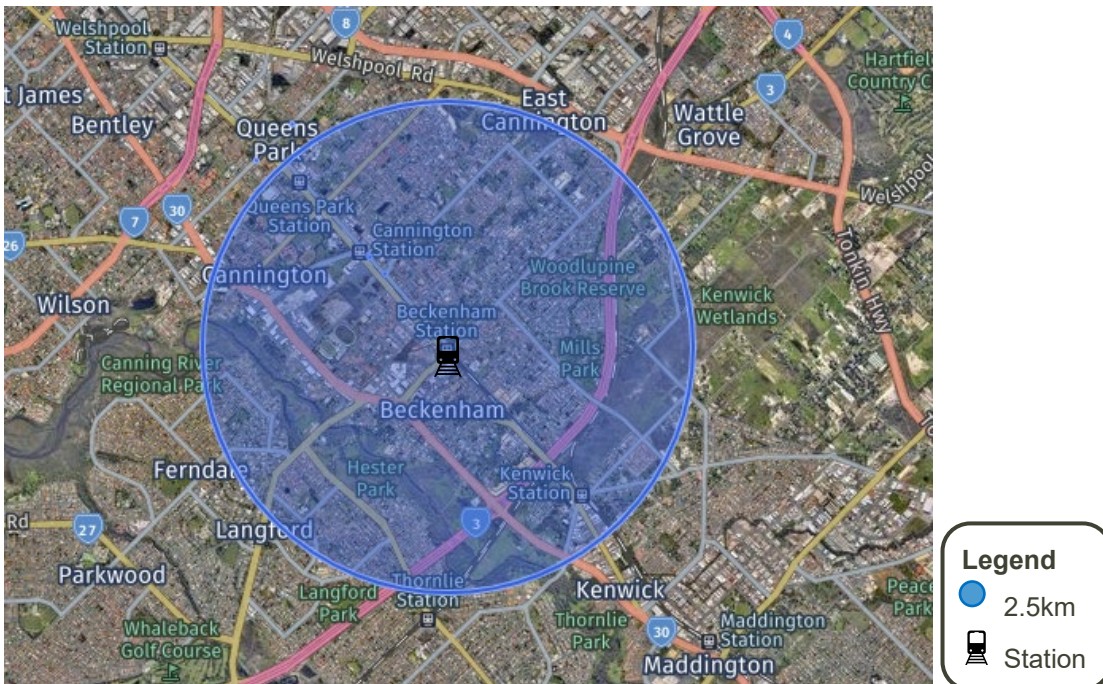
Beckenham Station sees significant patronage accessing the station via walking. Smaller, local streets do not always have paths provided while main connectors typically have paths on at least one side of the street. There is a PSP that currently runs along the rail corridor.

FIGURE 3.8 BECKENHAM STATION WALKING CATCHMENT



Source: Nearmap (accessed July 2023)

FIGURE 3.9 BECKENHAM STATION CYCLING CATCHMENT

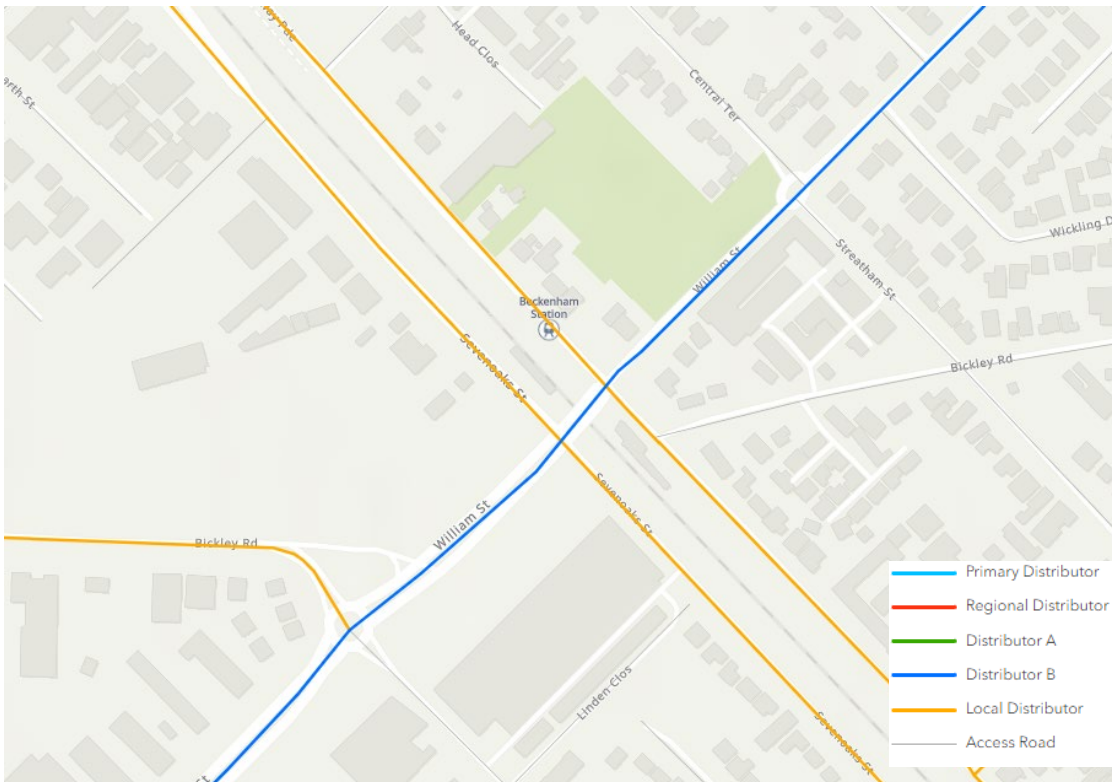


Source: Nearmap (accessed July 2023)

3.5 Existing road network

The existing road network hierarchy surrounding the site is shown in Figure 3.10. The road network surrounding the site is classified as Local Distributor (Railway Parade and Sevenoaks Street) as well as Distributor B (William Street). Note that Sevenoaks Street north of William Street is also classified as an Other Regional Road.

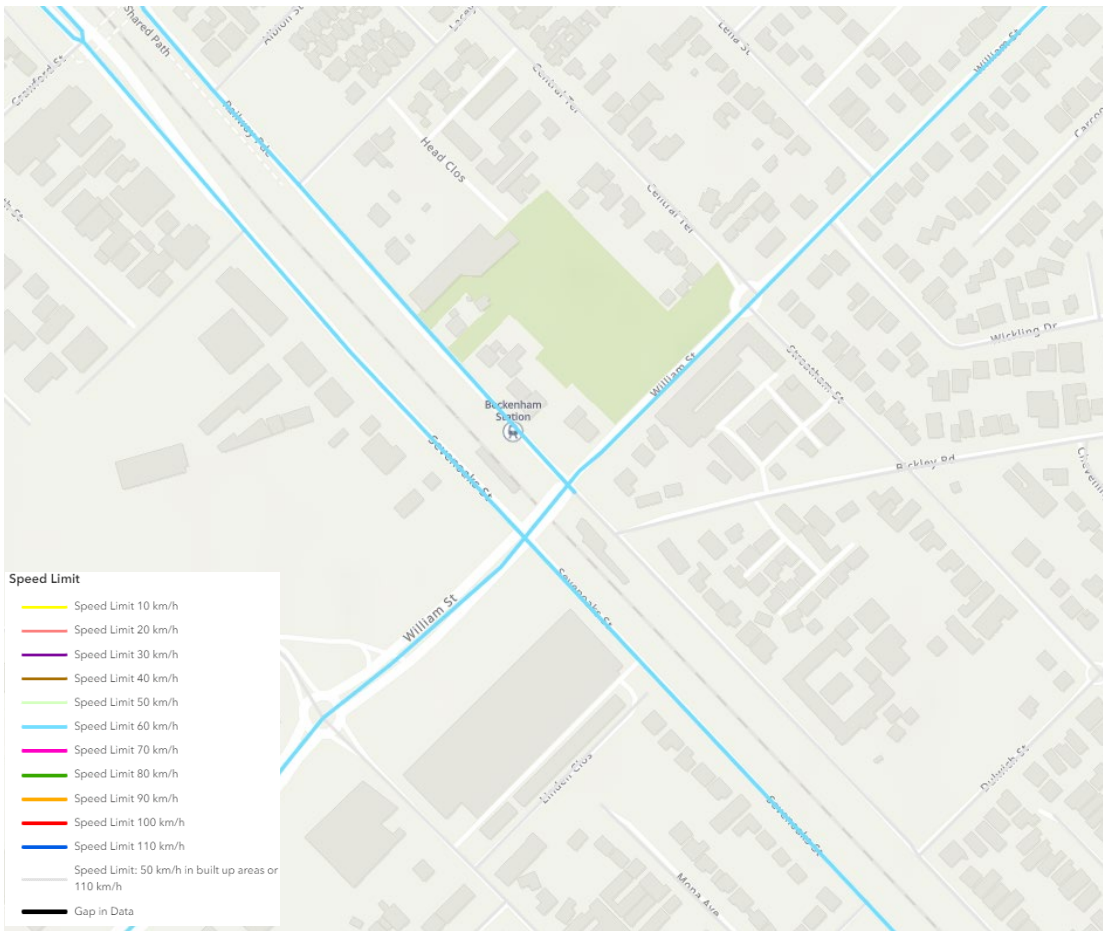
FIGURE 3.10 EXISTING ROAD NETWORK HIERARCHY



Source: Main Roads WA, Road Information Mapping System (accessed July 2023)

The existing speed limits on the road network surrounding the site are shown in Figure 3.11. The streets classified as Local Distributor (Railway Parade and Sevenoaks Street) as well as Distributor B (William Street) have speed limits of 60 km/hr. The site is surrounded by a network of local streets with a 50 km/hr speed limit, such as Bickley Road and the portion of Railway Parade to the south-east of Beckenham Station.

FIGURE 3.11 EXISTING SPEED ZONES



Source: Main Roads WA, Road Information Mapping System (accessed July 2023)

3.6 Existing traffic volumes

The existing traffic volumes for the site are detailed in Table 3.3.

TABLE 3.3 EXISTING TRAFFIC VOLUMES FOR WILLIAM STREET / SEVENOAKS STREET

ROAD	DIRECTION	LOCATION	YEAR	DAILY (VPD)	HV CONTENT	AM PEAK (VPH)	PM PEAK (VPH)
William Street	Westbound	West of Sevenoaks St	2020/21	9,854	8.2%	684	897
William Street	Eastbound	West of Sevenoaks St	2020/21	11,323	8.1%	786	888
William Street	Westbound	East of Sevenoaks St	2018/19	4,782	9.2%	288	544
William Street	Eastbound	East of Sevenoaks St	2018/19	4,645	8.2%	396	349
Sevenoaks Street	Northbound	North of William St	2020/21	1,256	2.7%	103	171
Sevenoaks Street	Southbound	North of William St	2020/21	289	8.0%	30	29
Sevenoaks Street	Northbound	South of William St	2020/21	3,350	5.0%	203	381
Sevenoaks Street	Southbound	South of William St	2020/21	3,307	9.3%	417	241
Railway Parade	Northbound	North of William St	2020/21	2,321	5.0%	188	207
Railway Parade	Southbound	North of William St	2020/21	1,357	5.2%	88	150

Existing intersection performance

Extensive queuing is observed for current intersection performance. This typically results when boom gates are lowered for an extensive period. Boom gates have been observed to be commonly lowered in excess of 80 seconds, particularly during the AM peak. This has a significant negative impact on level of service.

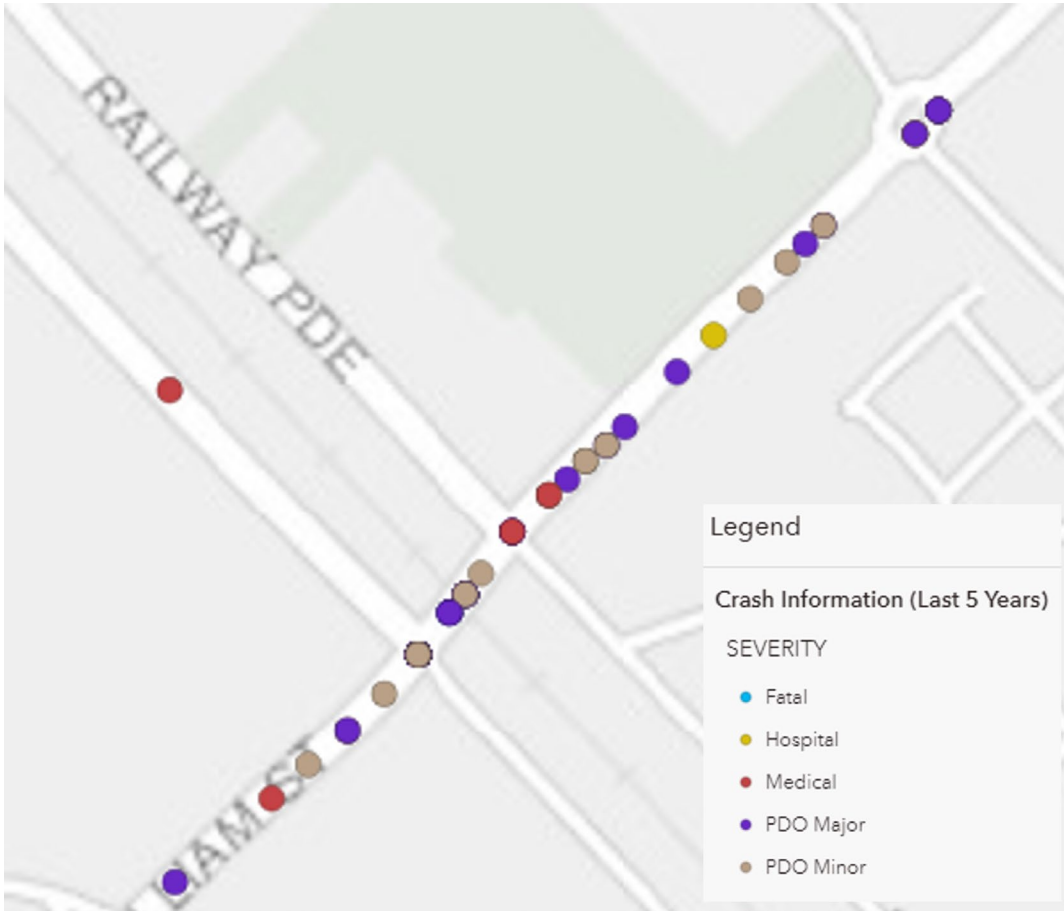
In the PM peak, queuing of over 25 vehicles has been observed on Sevenoaks Street (north) due to traffic not being able to exit due to the traffic volumes on William Street. The right turning traffic from Sevenoaks Street (north) is observed to exit when the boom gates are down as this results in no conflicting westbound traffic on William Street and the queuing eastbound traffic leaving the intersection clear to allow the right turning traffic out of Sevenoaks Street.

3.7 Crash data

The crash data surrounding the site is shown in Figure 3.12. The crash data for William Street, Sevenoaks Street and Railway Parade including type of crash, crash severity and frequency

between 2018 - 2022, including intersection and mid-block crashes is summarised in Table 3.4. There have been three crashes reported on the level crossing. No fatalities have been recorded.

FIGURE 3.12 CRASH DATA MAP (2018 – 2022)



Source: Main Roads WA, Open Data, Apps & Maps – Road Safety (accessed July 2023)

TABLE 3.4 WILLIAM STREET / SEVENOAKS STREET/ RAILWAY PARADE CRASH DATA 2018- 2022

CRASH TYPE	CRASH SEVERITY				
	PROPERTY DAMAGE (MINOR)	PROPERTY DAMAGE (MAJOR)	MEDICAL ATTENTION	HOSPITAL	FATAL
HIT PEDESTRIAN	-	-	2	-	-
HIT OBJECT	-	1	-	-	-
REAR END	4	4	1	1	-
RIGHT ANGLE	-	3	1	-	-
RIGHT TURN THROUGH	1	-	-	-	-
SIDESWIPE (SAME DIRECTION)	5	-	-	-	-
OTHER	-	1	-	-	-
TOTAL	10	9	4	1	-

This LXR project is intended to improve safety for all by reducing the risk of conflicts between a variety of road users. Whilst the crash history does not include any crashes involving trains collision between train and vehicle or pedestrian, however this inherent risk is removed by the LXR.

4. Proposed internal transport network

This section focuses on direct access to Beckenham Station via walking and riding, public transport, and from Park 'n' Ride facilities.

A Station Access Strategy has been developed by the PTA for Beckenham Station. The strategy considers how passengers currently travel to stations and suggests key improvements to station access infrastructure that can improve journeys by the relevant access modes.

Central to the strategies is a mode hierarchy which prioritises station access in the following order: people walking, cycling / riding, bus, Kiss 'n' Ride / on-demand transport services and Park 'n' Ride.

Within the new station envelope, the upgraded station will have a concourse level providing access to elevated platforms. The project provides for universal accessibility, including 4x lifts to access the platform, 2x Park 'n' Ride and 2x Kiss 'n' Ride ACROD bays.

4.1 Public transport

Station facilities

The upgraded station facilities proposed by the development for Beckenham Station is summarised in Table 4.1.

TABLE 4.1 BECKENHAM STATION PROPOSED FACILITIES

	EXISTING FACILITIES	PROPOSED FACILITIES
PLATFORM TYPE	Marginal platforms - One to the north-west (3x access points) and one to the south-east (2x access points)	Marginal platforms – Each platform is accessed via one set of stairs and two lifts (i.e., 2x staircases and 4x lifts in total)
BUS INTERCHANGE	No bus interchange - One bus stop on either side of Sevenoaks Street, north of the William Street level crossing, for train replacement services	Train replacement bus embayment on the west side of the station, north of William Street
CAR PARKING (PARK 'N' RIDE & KISS 'N' RIDE)	Refer to parking section	Refer to parking section
BICYCLE PARKING	<ul style="list-style-type: none"> — Bicycle shelter (18x bicycle spaces) — Bicycle lockers (4x) — U-rails (8x) 	72 bicycle parking spaces (in accordance with the Station Access Strategy Update 2021)

4.2 Walking and cycling

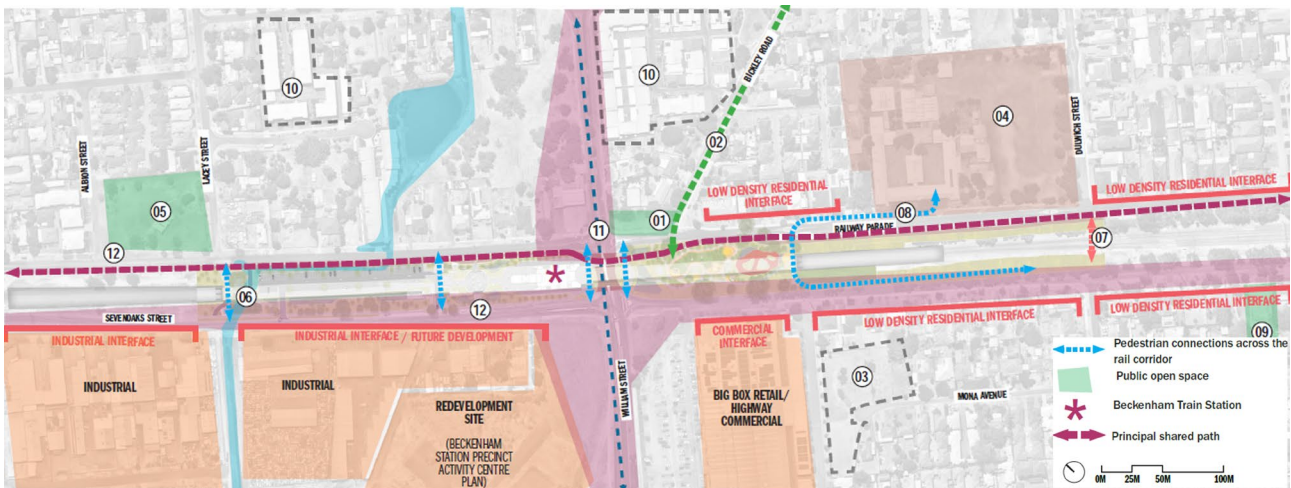
The development will improve walking and riding access at the concourse and to the station platforms.

While parking plays a role for station access, the majority of people currently access the station by walking and the expected increase in patronage will be driven by walking and cycling to access the station.

The key pedestrian desire lines and access points to Beckenham Station are shown in Figure 4.1. These figures show connections to the local path network, which connects to nearby destinations.

The project will also deliver high quality public realm outcomes, including community facilities and parklands located within the rail reserve. These amenities will be accessed vis a series of interconnecting pathways, which also support cross-corridor connectivity.

FIGURE 4.1 BECKENHAM STATION PEDESTRIAN CONNECTIONS TO THE STATION / ACROSS THE RAIL CORRIDOR



Source: Armadale Line Upgrade Alliance, Linewide Landscape Design Report, June 2023 (work-in-progress)

Note that the PSP will cross William Street at the traffic signals adjacent to Sevenoaks Street.

Bicycle parking

Bicycle parking is proposed in two locations as per Figure 4.2, including:

- Integrated within the station building, located on the west side, while the PSP is located to the east side of the building.
- West of the station Park ‘n’ Ride, next to the car park entry.

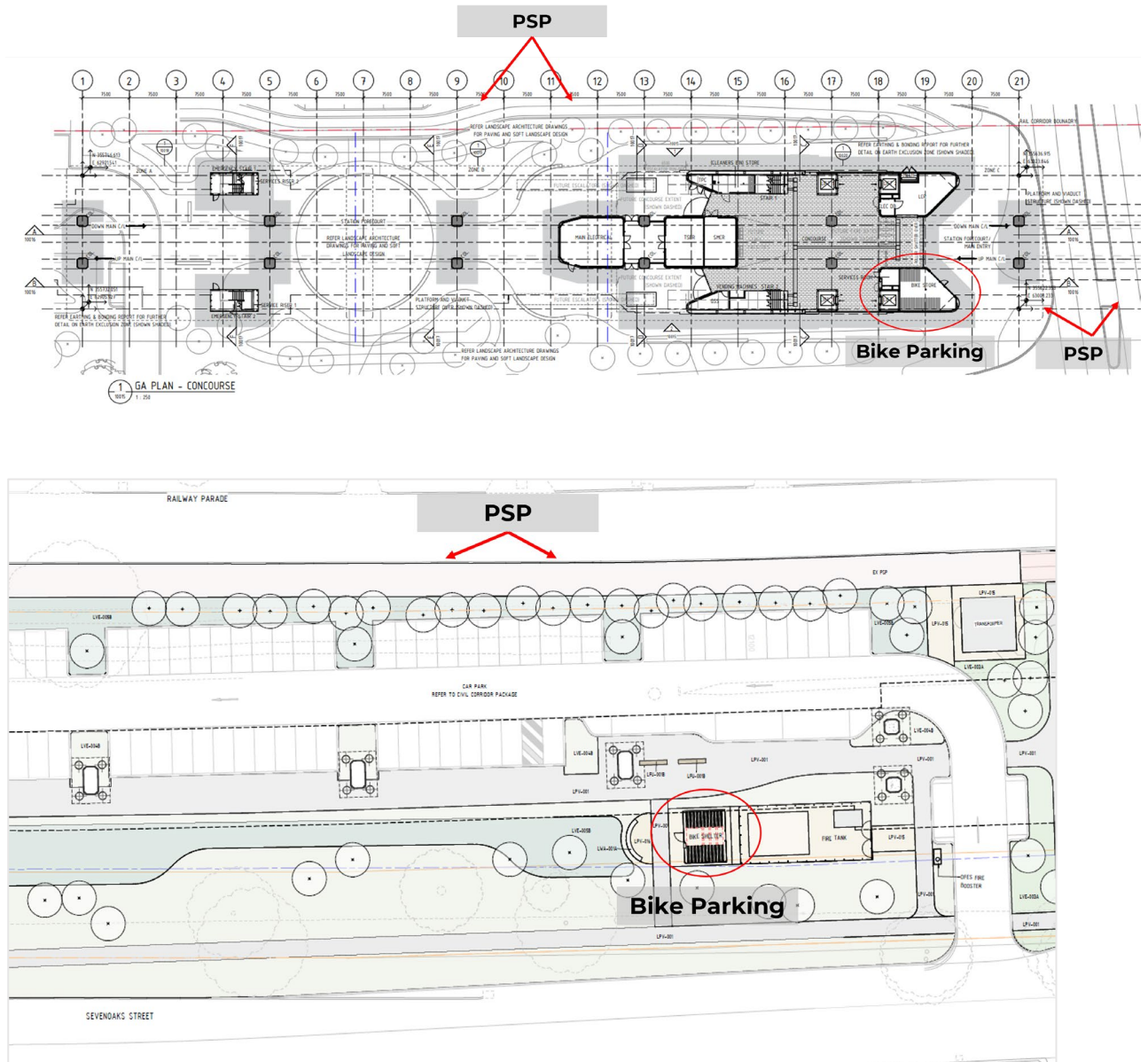


FIGURE 4.2 BECKENHAM STATION BICYCLE PARKING

Source: Top: Extracted from Armadale Line Upgrade Alliance, Architectural General Arrangement 2023 (PTA Drawing No: 04-A-74-AR10012, Rev: A1); Bottom: Source: Extracted from Armadale Line Upgrade Alliance, Urban Design & Landscape General Arrangement 2023 (PTA Drawing No: N/A, Rev: A1.01)

4.3 Parking

The development will not significantly increase the quantity of parking supplied at the station. Existing and proposed parking information, including quantum, type and access is summarised in Table 4.2. Car parks are designed to be compliant with requirements from AS/NZS 2890.1, PTA Specification and AS2890.6 for the provision of ACROD parking spaces. The total number of car parking available for the proposed development is considered to be sufficient.

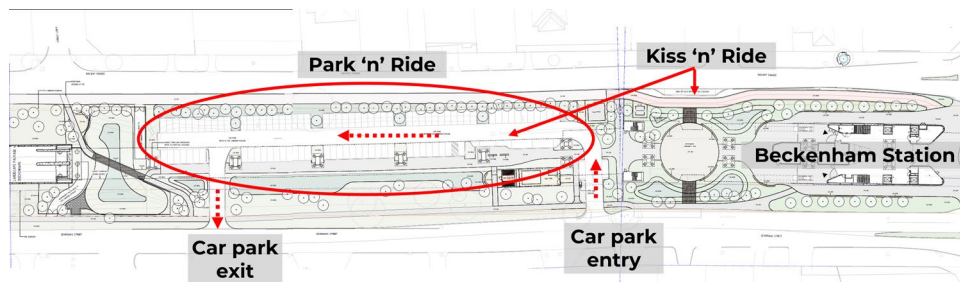
TABLE 4.2 BECKENHAM STATION EXISTING AND PROPOSED PARKING

	EXISTING PARKING	PROPOSED PARKING
PARK 'N' RIDE	67 car parking bays across 3 separate car parks	90 car parking bays (inclusive of 2 Park 'n' Ride ACROD bays)
ACROD	5 ACROD bays	4 ACROD bays (inclusive of 2 Kiss 'n' Ride bays)
KISS 'N' RIDE	No Kiss 'n' Ride bays	7 Kiss 'n' Ride bays (inclusive of 2 ACROD bays)
ACCESS	1 entry and 1 exit point from Sevenoaks Street with one way traffic movement 1 entry/exit point from Railway Parade (north of William Street) with bidirectional movement 1 entry/exit point from Railway Parade (south of William Street) with bidirectional movement	1 joint entry point from Sevenoaks Street serving both long term and short-term parking lots. 1 exit point onto Sevenoaks Street. One way traffic movement within car park.

Parking access

The below figure shows car parking access and layout for Beckenham Station.

FIGURE 4.3 BECKENHAM STATION PARK N RIDE & KISS N RIDE CAR PARKING LOCATION AND ACCESS ARRANGEMENT



Source: Extracted from Armadale Line Upgrade Alliance, Urban Design & Landscape General Arrangement 2023 (PTA Drawing No: N/A, Rev: A1.01)

Access into Beckenham Station is from Sevenoaks Street. This is similar to existing conditions, with the same access arrangement provided to one of the three existing car parks (north-western car park), however, the proposed design introduces greater movement network efficiency by consolidating parking provisions in a single location.

Parking demand

Parking at stations is provided to support a limited degree of Park ‘n’ Ride in line with the Station Access Strategy.

As noted in Section 4.2 and Section 4.3, while parking plays a role for station access, the majority of people currently access the station by walking and the expected increase in patronage will be driven by walking and cycling to access the station. The Station Access Strategies determine that the number of bays is sufficient to support car parking demand.

Travel demand management

Parking is provided as a fixed constraint, which will help to induce mode shift away from driving and parking to access the station. To support access by riding and walking, a Movement Strategy has been developed for the project.

The Movement Strategy deals with circulation and access around the site for active modes, including aligning the PSP on the eastern corridor and vehicle movements (car park entry / exit and bus access) on the western side of the corridor, as well as the development of a recreational path network throughout the site. The PSP Crossing Strategy seeks to reduce pedestrian and cyclist conflicts by allowing faster cyclists a safe, direct path along the edge of the transport corridor and slower, recreational cyclists and pedestrians using the path network within the corridor centre.

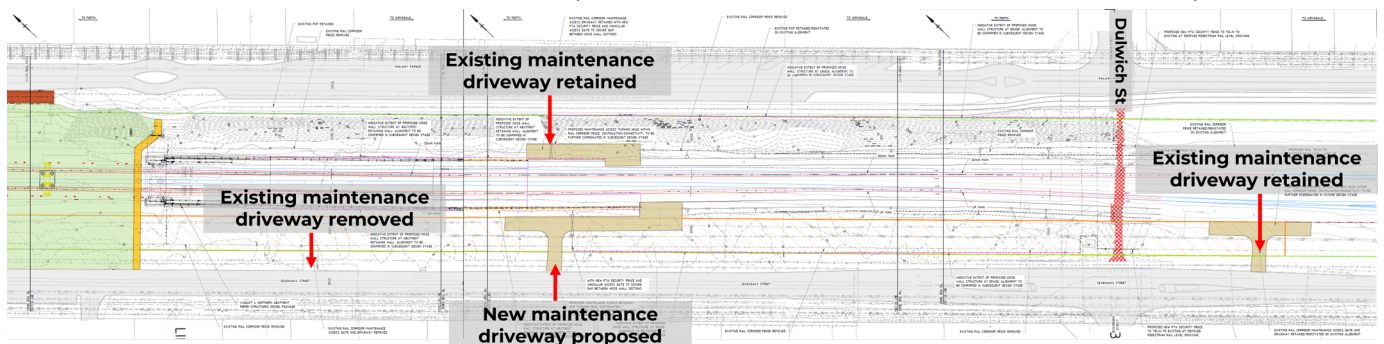
A PTA Station Access Strategy has been developed for Beckenham Station. The strategy considers how passengers currently travel to stations and suggest key improvements to station access infrastructure that can improve journeys by riding, walking and bus.

4.4 Provision for services vehicles

Maintenance track access for PTA vehicles are depicted in Figure 4.4 and entails the removal of one existing maintenance vehicle driveway / access point to the south of William Street, on the west side of the rail corridor, and relocating it further south. While maintenance track access to the basin is provided to the north of William Street as shown in Figure 4.5.

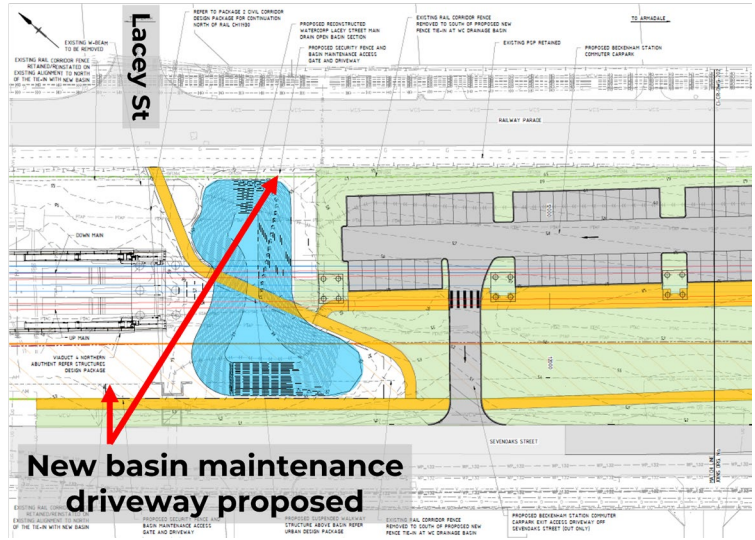
Service vehicle access is available to the rail corridor via concrete paths and hardstand areas. It may also be appropriate for service vehicles to park in short stay parking / designated loading zones for access to the station forecourt.

FIGURE 4.4 MAINTENANCE TRACK ACCESS (PTA VEHICLE ACCESS - SOUTH OF WILLIAM STREET)



Source: Extracted from Armadale Line Upgrade Alliance, Civil Corridor General Arrangement 2023 (PTA Drawing No: N/A, Rev: A1.01)

FIGURE 4.5 MAINTENANCE TRACK ACCESS (BASIN ACCESS – NORTH OF WILLIAM STREET)



Source: Extracted from Armadale Line Upgrade Alliance, Civil Corridor General Arrangement 2023 (PTA Drawing No: N/A, Rev: A1.01)

5. Changes to external transport network

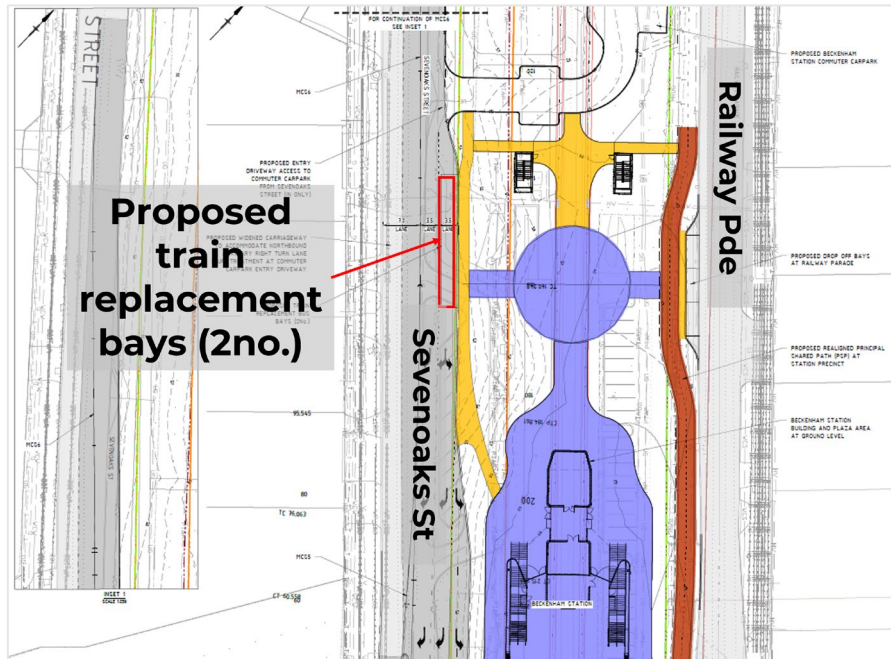
This section focuses on changes affecting access to the station concourse, as well as a brief overview of related projects in the external realm that are likely to affect the development area.

5.1 Public transport

Beckenham Station is not directly served by regular Transperth bus services, only train replacement services provide direct access, which will remain unchanged.

The two existing train replacement stops (refer to Table 3.1 and Table 4.1 for more information) will be consolidated and located on the west side of the station, north of William Street, as per Figure 5.1.

FIGURE 5.1 TRAIN REPLACEMENT BAYS



Source: Extracted from Armadale Line Upgrade Alliance, Civil Corridor General Arrangement 2023 (PTA Drawing No: N/A, Rev: A1.01)

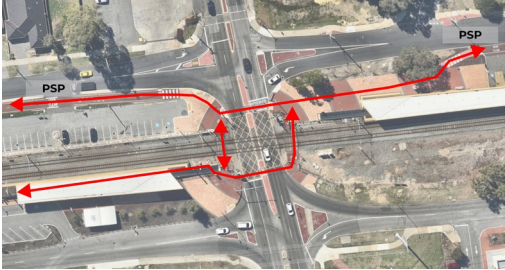


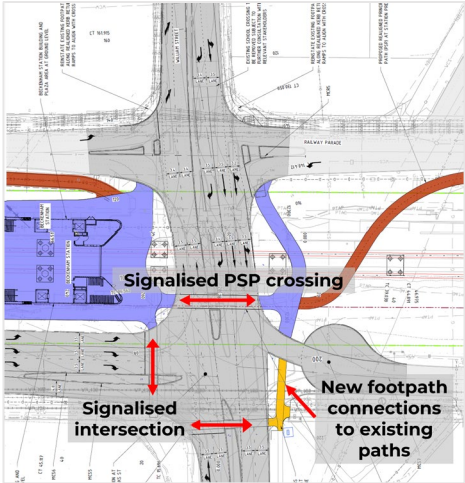
5.2 Walking and cycling network

Conditions for walking and cycling across the existing at-grade level crossings will be improved by the development. In addition to the elevated rail removing trains from the at-grade context, the relationship between vehicles and people walking and riding at key intersections will be improved.

A key element of the design is priority crossing of the PSP at the William Street road crossing, where the PSP will cross William Street at the traffic signals adjacent to Sevenoaks Street. This will be achieved through the installation of pedestrian signals and traffic signal phasing to supporting connected, continuous and comfortable access to the station as well as for regional cycling trips through the area.

The existing situation at these intersections and proposed improvements are summarised in Table 5.1.

TABLE 5.1 INTERSECTION IMPROVEMENTS FOR WALKING AND CYCLING

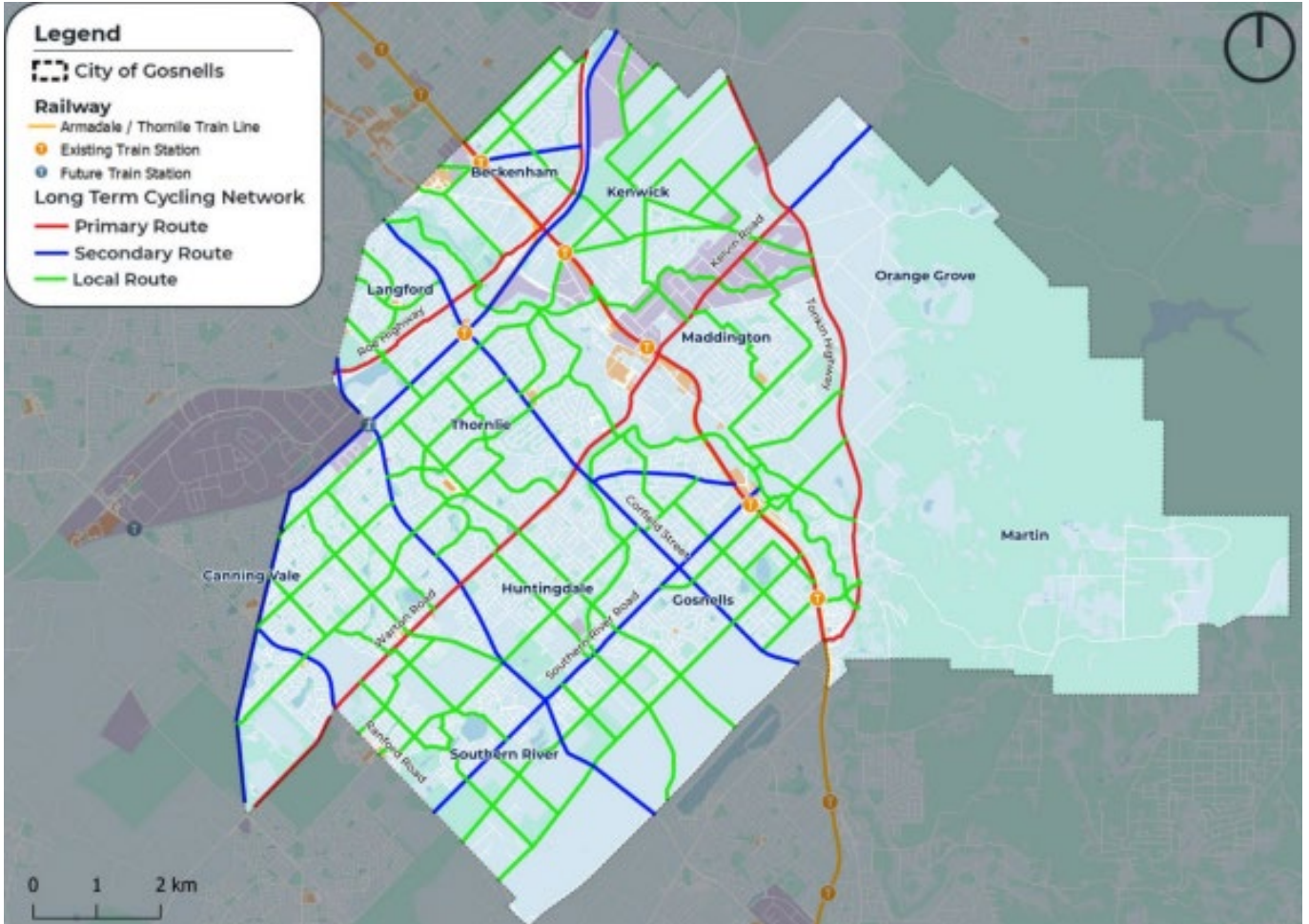
INTERSECTION	EXISTING TREATMENT	PROPOSED TREATMENT
<p>WILLIAM ST / SEVENOAKS ST / RAILWAY PDE</p>	<p>The existing PSP crossing of William Street at Railway Parade, and the path crossing of William Street and Sevenoaks Street, do not provide priority for people walking and riding.</p> <p>The alignment of both crossings is shown below (see red lines on the image).</p>  <p>Pedestrian and cyclist crossing of William Street / Sevenoaks Street:</p>  <p>Pedestrian and cyclist crossing of William Street / Railway Parade:</p> 	<p>A signalised PSP crossing at William Street and Sevenoaks Street will be introduced to provide people walking and riding with protected crossing facilities along the PSP, across William Street, and other surrounding desire lines (see red lines on the image).</p> 

Department of Transport (DoT) has partnered with 32 local governments in the Perth and Peel regions to establish the Long-Term Cycle Network (LTCN) for Perth and Peel. The LTCN classifies routes according to their function rather than their built form. The network surrounding the stations is shown in Figure 5.2. The completion of the LTCN (outside the scope of this level crossing removal project) will create a dense, permeable network to the stations and support local and regional connections to the stations and surrounding destinations. Local governments and DoT have committed to delivering this network in the long term.

As part of this project, removal of the level crossing at William Street (Local Route), where it intersects with Railway Parade (Primary Route) and Sevenoaks Street (Local Route), will support permeability across the rail line. The project will also improve the Primary Route along the rail line (the PSP), particularly at the road crossing.

Additionally, line marking, signage and other suitable treatments will be installed to alert people to the presence of potential conflict zones leading up to and through the station precinct, as identified through the PSP Crossing Strategy (see Figure 5.3).

FIGURE 5.2 LONG TERM CYCLE NETWORK FOR THE CITY OF GOSNELLS



Source: City of Gosnells Bicycle Plan 2023 – 2033 (draft) (accessed July 2023)

FIGURE 5.3 EXCERPTS FROM THE PSP CROSSING STRATEGY



Surfaces:

<p>① Plaza Paving</p> <p>Unit paving to denote low pedestrian priority environment (10km/hr Cycle)</p>	<p>② Feature Surface</p> <p>100m feature surface to slow traffic (40 to 20km/hr)</p> <p>10m Transition treatment at plaza entrance (20km/hr to 10km/hr)</p>	<p>③ Asphalt PSP</p> <p>Existing or Proposed PSP (40km/hr)</p>	<p>④ Road Crossing</p> <p>Treatments vary: Signalised Wombat Paved</p>	<p>⑤ Applied Finish</p> <p>Painted finish applied to existing or proposed asphalt</p>	<p>⑥ Road Crossing - Wombat</p>
			<p>⑦ Road Crossing - Signalised</p>	<p>⑧ Applied Finish</p>	

Final material selections subject to change via coordination with stakeholders - MRWA, LGAs, PTA. Design intent to be retained - safety, mitigation of conflicts between various site users (cyclists, pedestrians, vehicles), wayfinding and legibility, appropriately high level of design aesthetics.

Source: Armadale Line Upgrade Alliance, Linewide Landscape Design Report, June 2023 (work-in-progress)

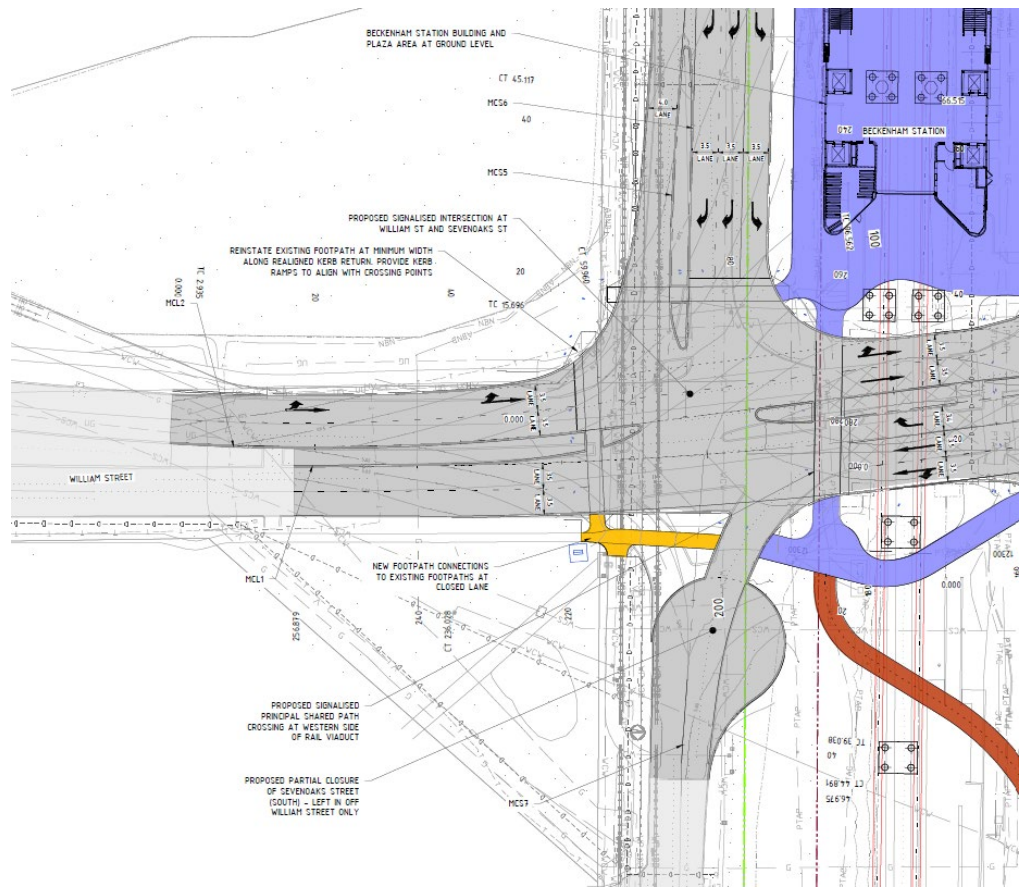
5.3 Roads / intersections

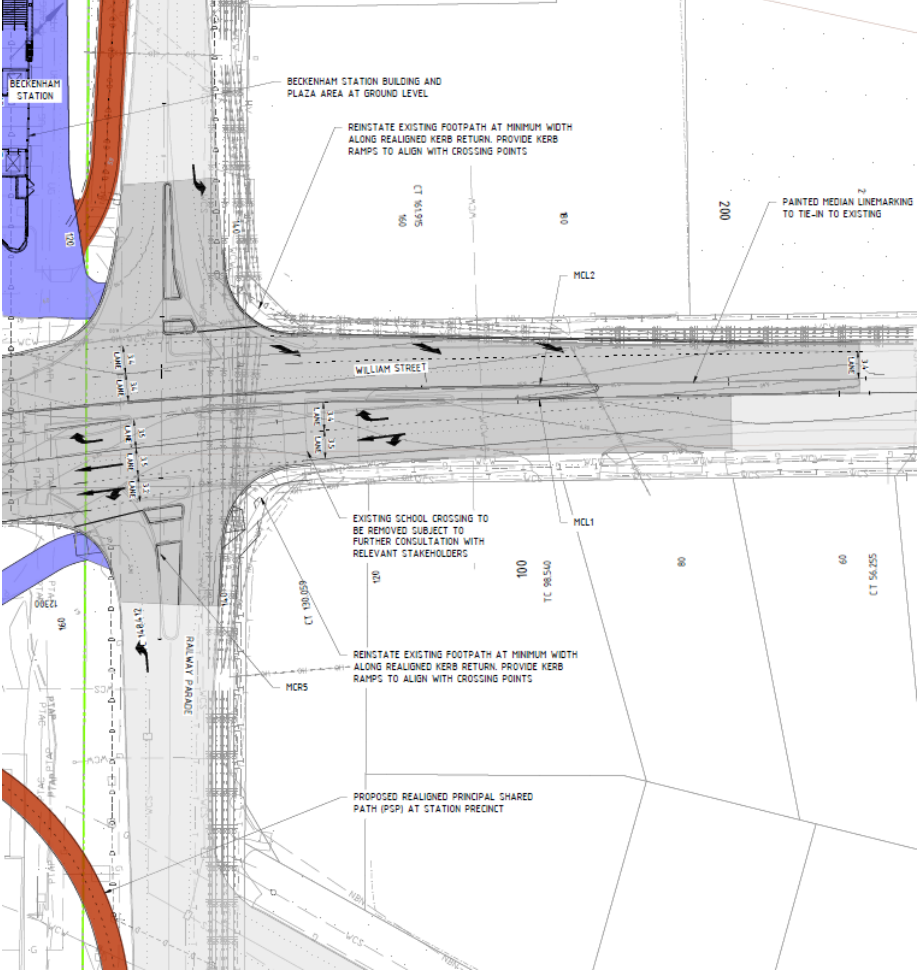
The proposed changes to roads and intersections are summarised in Table 5.2 below.

TABLE 5.2 SUMMARY OF CHANGES TO INTERSECTIONS

INTERSECTION	PROPOSED CHANGES
WILLIAM ST / SEVENOAKS ST	<p>Key elements of the project include:</p> <ul style="list-style-type: none"> — Introduction of a signalised intersection at William Street and Sevenoaks Street.

- Signalised PSP crossing at the eastern leg of the intersection (located on the west side of the station), with east and westbound traffic lanes separated by a median island.
- Median island at the northern leg (separating the north and southbound traffic lanes), with a pedestrian cut through for east-west pedestrian movements at the traffic signals.
- Median island at the western leg (separating the east and west bound traffic lanes), with a pedestrian cut through for north-south pedestrian movements at the traffic signals.
- At the southern leg, partial closure of Sevenoaks Street (left in off William Street only).



<p>WILLIAM ST / RAILWAY PDE</p>	<p>Key elements of the project include:</p> <ul style="list-style-type: none"> — Left in and left out at both the northern and southern legs of the intersection, with a median island and pedestrian cut through for east-west pedestrian movements between the station precinct and local path network. — As per above, signalised PSP crossing at the western side of the station, with east and westbound traffic lanes separated by a median island. 
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As noted in Section 3, the intersection performance currently suffer from issues associated with boom gates, particularly during peak times. The proposed changes will improve intersection performance from the existing state.

Road safety

A road safety audit will be completed, and comments will be addressed as part of detailed design development.

William Street / Sevenoaks Street is identified as a black spot. With the signalisation of the intersection and the removal of the level crossings will lead to improving the safety due to removing the conflict between the trains and people travelling in cars, by bike or walking.

The project further supports safety for people riding and walking by reducing the interaction between active transport and vehicles. This is achieved through maintaining the key bicycle

commuter route (the PSP) on the eastern edge of the corridor and locating vehicle access points to the site (entry / exit to the car park) on the western edge of the corridor.

6. Integration with surrounding area

6.1 Trip attractors / generators

The station patronage for Beckenham Station is forecasted to double by 2031 in based on the Strategic Transport Evaluation Model (STEM) modelling. With some change to car parking, growth will predominantly be driven by walking and cycling to access the station.

Key traffic generators are outlined in Section 2.3 and include Beckenham Primary School, the Oaks Business Centre, Bulkyplex Cannington and local retail. Peak traffic movements for these traffic generators have the potential to coincide with peak periods for access to the station, noting that these major traffic generators are existing and contribute to the background traffic being considered as part of the development.

6.2 Connections to surrounding areas

The key network links between the stations and the external path network are shown in the desire line figures in Section 4. This figure shows the integration of the development with the surrounding walking and cycling network.

The surrounding road network is not expected to have significant modifications other than the removal of the level crossings and the introduction of a signalised intersection at William Street and Sevenoaks Street.

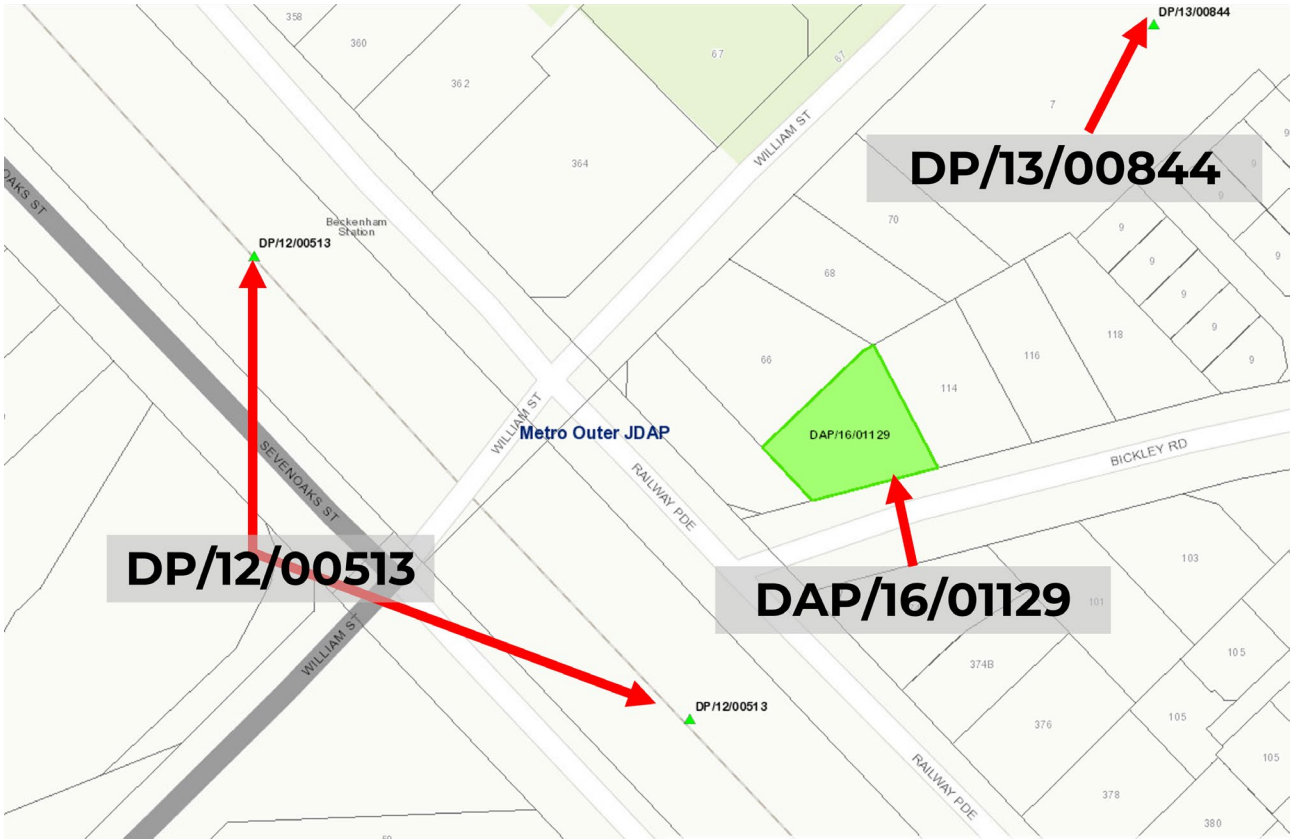
6.3 Committed developments

A search of current Development Assessment Panel (DAP) applications was undertaken. Within the City of Gosnells, three DAP approved applications were located in proximity to the subject site, including DP/12/00513 for Beckham Station upgrade as per Table 6.1 and Figure 6.1.

TABLE 6.1 DAP APPLICATIONS IN PROXIMITY TO THE SUBJECT SITE

DAP APPLICATION REFERENCE	DESCRIPTION	LOCATION
DP/12/00513	Beckenham Station upgrade	Lots 66 & 67 Sevenoaks Street, Beckenham
DAP/16/01129	13 multiple dwellings	Lot 5 (112) Bickley Road, Beckenham
DP/13/00844	66 multiple dwellings and associated car parking	Lot 901 (7) Streatham Street., Beckenham

FIGURE 6.1 DAP APPLICATIONS IN PROXIMITY TO THE SUBJECT SITE



Source: DPLH PlanWA (accessed July 2023)

6.4 Land use

The development does not actively involve changes to land uses in the surrounding areas.

METRONET’s Station Precincts are the area within a one kilometre walk from the station (approximately a 10 to 15-minute walk from the station). These precincts are ideal locations for future developments of housing, jobs and community services as they make the best use of the State Government’s investment in transport infrastructure. Beckenham Station is defined as a ‘Neighbourhood Centre’. Full build-out of the station precinct is expected to be achieved in the long term (30+ years).

Although Beckenham Station is not identified as an Activity Centre under the State framework the City of Gosnells has implemented the Beckenham Station Precinct Activity Centre Plan (BSPACP) to guide the land use and development throughout the area adjacent to the Beckenham Station, zoned ‘Special Use’ (see Figure 6.2). The vision for Beckenham Station under the BSPACP is for it to become a mixed-use transit-oriented development by providing high density residential land uses combined with a mix of supporting land uses with an active, safe and pedestrianised, amenity rich precinct

The development of the station precinct is not within the scope of the level crossing removal project, however, does not preclude future surrounding development from occurring.

FIGURE 6.2 BECKENHAM STATION PRECINCT ACTIVITY CENTRE PLAN



Source: City of Gosnells (accessed July 2023)

7. Analysis of external transport networks

7.1 SIDRA Analysis

Analysis of the William Street/ Sevenoaks Street was carried out using the computer software SIDRA 9 under the 2026 Opening and 2031 opening + 5 scenario. The induced demand of removing the level crossing is covered by the + 5 year scenario.

SIDRA is a commonly used intersection modelling tool for signalised intersections in the field of traffic engineering for obtaining Traffic Signal Approval. Outputs for four standard measures of operation performance can be obtained, being Degree of Saturation (DoS), Average Delay, Queue Length, and Level of Service (LoS).

- **Degree of Saturation (DoS)** Degree of saturation (DoS) is defined as the ratio of demand flow to the maximum flow which can be passed through the intersection from a particular lane. It is used as the primary performance indicator for determining the suitability of proposals for Main Roads projects.
- **Average delay** is the average delay for each vehicle on the movement averaged over the modelled time period.
- **Average Back of Queue Length** The average queue within a typical cycle averaged over all the cycles within the modelled time period.

Assumptions

The following assumptions have been applied to the SIDRA modelling:

- This analysis assumes the existing peak hour will remain consistent in the future.
- Traffic growth is based on ROM data which have been further calibrated using existing traffic data with the Main Roads WA Urban Road Planning (URP) Method.

William Street / Sevenoaks Street

The intersection performance for the William Street/ Sevenoaks Street intersection is outlined in Table 7.1 for the AM peak and in Table 7.2 for the PM peak.

TABLE 7.1 AM PEAK INTERSECTION PERFORMANCE FOR WILLIAM STREET/ SEVENOAKS STREET

Year	2026 – Opening	2031 – 5 years after opening
Intersection LoS	C	C
Intersection DoS	70.3%	75.6%
Average delay (s)	21.6	24.3
Worst average back of queue (vehicles)	11.5	16.2
Worst average back of queue (m)	87.7	124.0

TABLE 7.2 PM PEAK INTERSECTION PERFORMANCE FOR WILLIAM STREET/ SEVENOAKS STREET

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	C	D
Intersection DoS	73.0%	83.1%
Average delay (s)	33.0	37.5
Worst average back of queue (vehicles)	24.2	25.8
Worst average back of queue (m)	183.2	195.7

William Street/ Railway Parade

The intersection performance for the William Street/ Railway Parade intersection is outlined in Table 7.3 for the AM peak and in Table 7.4 for the PM peak.

TABLE 7.3 AM PEAK INTERSECTION PERFORMANCE FOR WILLIAM STREET/ RAILWAY PARADE

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	A	A
Intersection DoS	30.6%	34.6%
Average delay (s)	1.1	1.1
Worst average back of queue (vehicles)	4.4	6.1
Worst average back of queue (m)	33.9	47.8

TABLE 7.4 PM PEAK INTERSECTION PERFORMANCE FOR WILLIAM STREET/ RAILWAY PARADE

Year	2026 -Opening	2031 – 5 years after opening
Intersection LoS	A	A
Intersection DoS	45.3%	36.0%
Average delay (s)	0.9	1.1
Worst average back of queue (vehicles)	7.6	9.0
Worst average back of queue (m)	57.7	69.2

8. Conclusions

A detailed TIA of the proposed level crossing removal project concluded the following:

- The proposed development provides increased permeability for people accessing the station by walking, riding or by vehicle.
- The development will create a high-quality, direct, safe and high-amenity cycling route with limited interruptions by vehicles. This is done by maintaining the PSP on the eastern side of the rail corridor and providing traffic access on the western side of the corridor, noting that it transitions into the station precinct and continues on the west side of the station for a portion, across William Street to align with the traffic signals.
- The PSP will have priority at William Street road crossing with the installation of pedestrian signals and traffic signal phasing to supporting connected, continuous and comfortable access to stations as well as for regional cycling trips through the area.
- The proposed development enhances the public realm for people walking and cycling to the stations as well as people riding and walking in their local neighbourhoods. The path network is based on connection to existing and proposed paths as well as connection to local destinations.
- Removing the level crossing of rail at William Street provides an opportunity to build a public realm supporting people walking and riding to have a more comfortable journey.
- The proposed development provides for universal access to each platform.
- Intersections with existing level crossings (William Street / Sevenoaks Street / Railway Parade) provide a poor level of service to people travelling via these streets (all modes), which will be improved by the removal of the level crossings and elevation of the rail.
- Traffic modelling indicates that intersections will perform within capacity during both AM and PM peaks at opening and 5 years after opening. Given the current performance of intersections, this is considered to be appropriate.

