Prepared for
Hames Sharley
Co No.: 42 009 073 563

AECOM

Transport Impact Assessment

McMahon Estate Structure Plan

03-Jun-2025
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Art by
Hayley Thompson Farmer

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Prepared by

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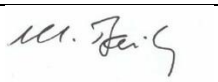
C	03-June-2025	Final	Melissa Bailey Technical Director - Infrastructure Advisory	

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Executive Summary

AECOM was commissioned by Hames Sharley on behalf of the Shire of Broome to prepare a Transport Impact Assessment (TIA) to support the proposed McMahon Estate Structure Plan (MESP). The objective of the TIA is to provide an assessment of the transport impacts of the MESP in accordance with the *Transport Impact Assessment Guidelines* (Western Australian Department of Planning and Western Australia Planning Commission, August 2016).

McMahon Estate is a 10-hectare parcel of land located centrally within the south Cable Beach locality within the Shire of Broome, in the Kimberley Region of Western Australia. The structure plan is a proposed redevelopment of vacant State owned land, located adjacent to the local centre and Cable Beach Primary School. The site is roughly bounded by Reid Road to the west, Cable Beach Primary School to the south and residential areas to the northeast.

The Shire of Broome Local Planning Strategy (2023) set out a vision for how land use change and development will occur within the Shire, in response to the Strategic Community Plan 2021-2031. The vision of the Strategy is: **"Broome – a future for everyone"**. This includes four supporting aspirations, aligned with the Shire's core pillars– people, place, prosperity and performance. One of the actions listed in the Strategy was to prepare a structure plan for McMahon Estate to consider:

- Provision of affordable housing and active open space;
- Improved connectivity with a focus on safety and legibility; and
- Integration of drainage through water sensitive urban design principles.

Local Planning Scheme No. 7 then changed the zoning of the site from a mixture of individual Residential (R40) and 'Parks, Recreation and Drainage' zones, to a single consolidated 'Urban Development' zone. This change was to allow for this proposed McMahon Estate Structure Plan, to deliver an improved urban layout, including making provision for public open space and drainage and to allocate appropriate residential densities.

The west of the site is bordered by a local distributor road, Reid Road, which provides a 60km/h vehicle link to the wider Cable Beach area. Reid Road intersects other local distributor roads Port Drive and Cable Beach Road East to connect to the wider Broome area and its amenities, including Broome Highway, a Primary Distributor Road that runs along the coast to the west of the site. All other roads in the immediate surrounds of the site are local access roads.

Traffic counts taken in 2024 show that the peak traffic volumes occur on Reid Road northbound between Manggala Drive and Banu Avenue, which is 242 vehicles in the PM peak hour (4pm – 5pm).

The McMahon Estate site is within a short walking/cycling distance to a number of key Broome amenities and destinations:

- TAFE, Broome Recreation & Aquatic Centre (BRAC) are within a 15 minute-walk to the north-east.
- Local shops, primary school, childcare and Nyamba Buru Yawuru are within a 5 minute-walk to the south-east.
- Three additional schools are within a 10 minute-walk to the south-east.
- Cable Beach is a 25 minute-walk to the west.

Whilst there are existing paved paths linking to these destinations, it is noted that there is minimal shade or rest stops provided along these routes, which would be a barrier to using these links in the hot local climate. There are no formal public transport services in Broome, only the Broome Explorer Bus as a regular tourist service for visitors to Broome, which has fares that are too high to be used as a regular bus service for the local community. A school bus route links the local area twice daily to local primary and secondary schools.

The proposed MESP consists of a mix of residential uses and public open spaces. A total residential yield of 115 dwellings is proposed, which is expected to generate a maximum of 92 vehicle trips in the peak hour, which is under the threshold to require analysis. The *Transport Impact Assessment Guidelines* (Western Australian Department of Planning and Western Australia Planning Commission,

August 2016) indicate that traffic analysis should cover sections of the road network where the structure plan traffic would be likely to increase traffic on any lane by more than 100 vehicles per hour.

The traffic generated by the site would be spread across the five access/egress points. These include two on the southern edge, one linking to Dakas Street and one linking to Cryer Court; and three on the western edge, linking to the Reid Road/Banu Avenue roundabout, and two directly to Reid Road, between Manggala Drive and Hay Road. The intersection analysis using SIDRA software shows that both before and after the development, all intersections are performing at the highest level of service (LOS A), which means free-flowing traffic.

Along with the traffic counts, vehicle speeds were recorded along Reid Road. The data collected showed that 11.5% of vehicles were recorded exceeding the 60km/h speed limit during the survey period, mostly within the 60-70km/h range. This indicates that speeding may be an issue on Reid Road in the study area. Additionally, within the last five years, two crashes were recorded along Reid Road adjacent to the MESP site – a rear end crash at the Manggala Drive roundabout and a right turn crash at the Banu Avenue roundabouts respectively. A further two crashes occurred on Reid Road north of the site. Therefore, reducing the speed limit to 50km/h in addition to traffic calming measures to support this reduction would be advised, both for the current conditions and with the addition of the new development.

The indicative cross-section for all internal roads within the MESP has been developed in line with Liveable Neighbourhoods Guidelines and Shire of Broome Local Planning Policy. The cross-section consists of a 7.4 metre-wide road, 4 metre-wide verge on both sides and a 2 metre-wide path on each side, to be offset a minimum of 0.3 metres from the property boundary. This is in addition to a pedestrian path around the perimeter of the site.

The MESP and surrounding local neighbourhood would benefit from a regular local bus service connecting the area to local services. There is a medium-term plan (5-10 years) to support future expansion of the existing bus service in Broome to better cater for all residential areas, this expansion should consider a route covering Reid Road to better serve the local residential areas, including the MESP.

1.0 Introduction

1.1 Background and Purpose

AECOM was commissioned by Hames Sharley on behalf of the Shire of Broome to prepare a Transport Impact Assessment (TIA) to support the proposed McMahon Estate Structure Plan (MESP).

The objective of this report is to provide an assessment in accordance with the *Transport Impact Assessment Guidelines* (Western Australian Department of Planning and Western Australia Planning Commission, August 2016) to support the Structure Plan.

1.2 Previous Transport Assessments

No previous transport assessments have been undertaken for the McMahon Estate structure plan.

1.3 Site Location and Study Area

McMahon Estate is a 10-hectare parcel of land located centrally within the south Cable Beach locality within the Shire of Broome, in the Kimberley region of Western Australia. The structure plan is a proposed redevelopment of vacant State owned land, adjacent to the local centre and Cable Beach Primary School. The site is roughly bounded by Reid Road to the west, Cable Beach Primary School to the south and residential areas to the northeast. The site boundary is shown in Figure 1.

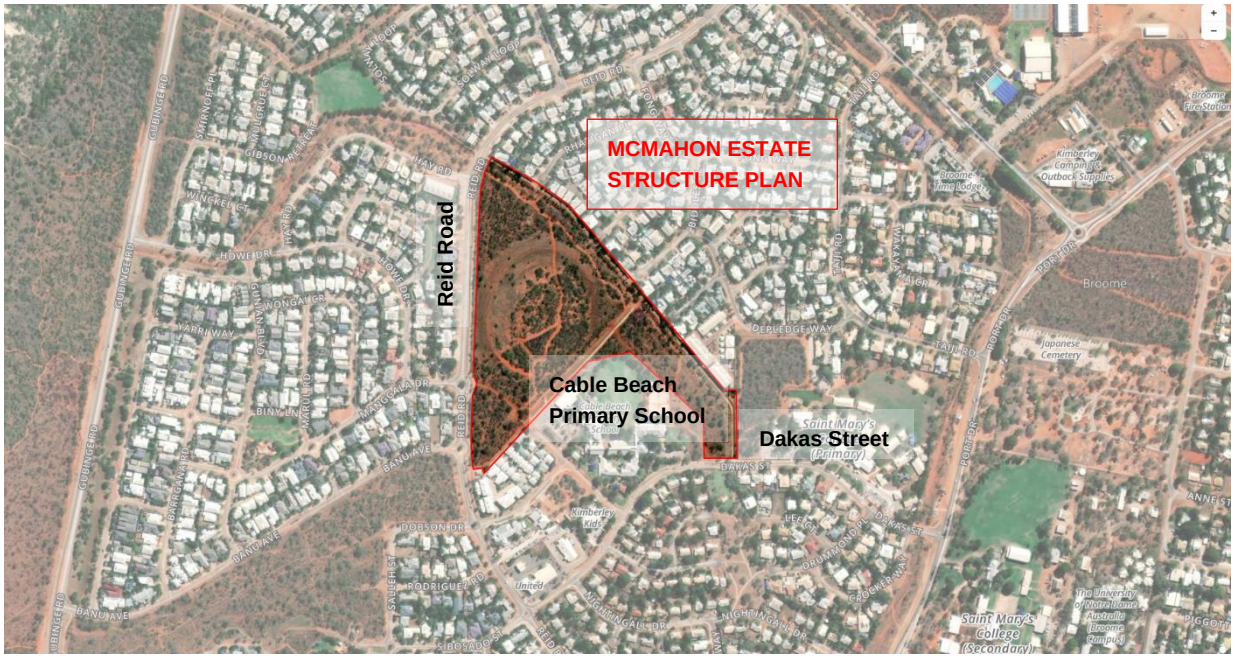


Figure 1 MESP Study Area (Source: Shire of Broome)

2.0 Planning Policy and Context

This section provides a brief overview of the planning policies and guidelines relevant to this TIA.

2.1 State Context

2.1.1 State Planning Policy (SPP) No. 7.2 – Precinct Design Guidelines (Department of Planning, Lands and Heritage, 2021)

This is a guide for the preparation, assessment and implementation of precinct structure plans, local development plans; and subdivision and development applications within precincts. The guidelines align with the overarching SPP 7.0 Design of the Built Environment, by setting the same Objectives and Design Principles. The Design Principles include the following:

- **Context and character** Good design responds to and enhances the distinctive characteristics of a local area, contributing to a sense of place.
- **Landscape quality** Good design recognises that together landscape and buildings operate as an integrated and sustainable system, within a broader ecological context.
- **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.
- **Functionality and build quality** Good design meets the needs of users efficiently and effectively, balancing functional requirements to perform well and deliver optimum benefit over the full life-cycle.
- **Sustainability** Good design optimises the sustainability of the built environment, delivering positive environmental, social and economic outcomes.
- **Amenity** Good design provides successful places that offer a variety of uses and activities while optimising internal and external amenity for occupants, visitors and neighbours, providing environments that are comfortable, productive and healthy.
- **Legibility** Good design results in buildings and places that are legible, with clear connections and easily identifiable elements to help people find their way around.
- **Safety** Good design optimises safety and security, minimising the risk of personal harm and supporting safe behaviour and use.
- **Community** Good design responds to local community needs as well as the wider social context, providing environments that support a diverse range of people and facilitate social interaction.
- **Aesthetics** Good design is the product of a skilled, judicious design process that results in attractive and inviting buildings and places that engage the senses.

In the guidelines, transport is referred to as the **Movement** design element, which has key linkages with the Context and character, Functionality and build quality, Sustainability, Amenity, Legibility, Safety and Community Design Principles.

2.1.2 Liveable Neighbourhoods (Draft 2015)

Liveable Neighbourhoods is the WAPC's primary policy for the design and assessment of structure plans and subdivision for new urban areas. It promotes urban design focused on walkable neighbourhoods. Community facilities and services are accessed by walking, cycling and public transport through an efficient, interconnected movement network. It is a performance-based policy that sets high-level objectives, design principles and requirements to address both strategic and operational aspects of structure planning and subdivision. Most relevant to transport considerations is **Element 2 – Movement Network**, which includes a number of detailed design considerations around street layout, street network, intersection spacing and street verge.

2.1.3 Safer Places by Design – Crime Prevention through Environmental Design Planning Guidelines (September 2021)

The Crime Prevention through Environmental Design Planning (CPTED) Guidelines uses the application of best practice principles and processes to the design of the built environment to minimise crime and fear of crime for enhanced community safety. It supports high quality design outcomes to create safer environments and great places for community enjoyment, of which transport is a key consideration. There are four Principles for this, with their own specific objectives, which are shown in Figure 2.

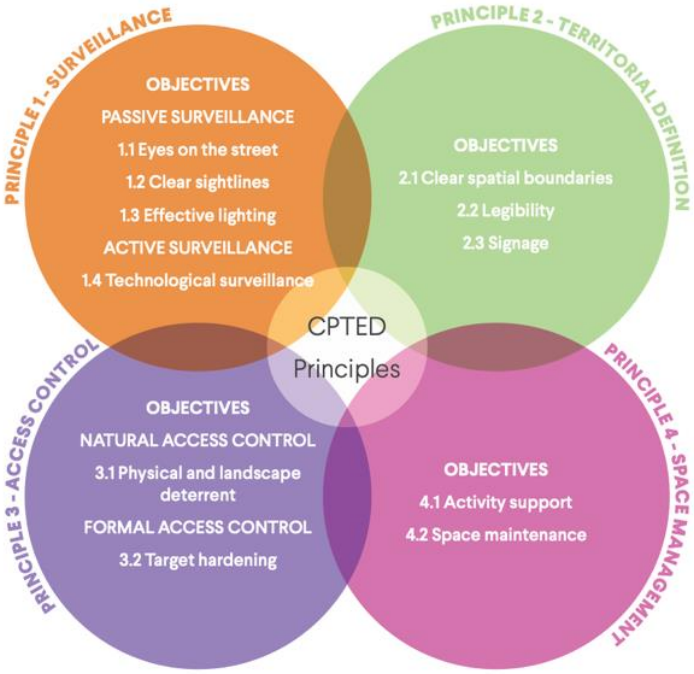


Figure 2 CPTED Principles and their Objectives

The guidelines set out how these considerations can be integrated into a typical design, assessment and decision making process for development proposals. **Part 4 – Safer Place Scenarios** is a useful reference point for the MESP as it contains guidance for specific land use and development scenarios. These scenarios demonstrate key considerations which address the CPTED principles and include relevant examples to this work, including neighbourhoods, precincts, residential, pedestrian and cycling networks and pedestrian access ways.

2.1.4 Transport Impact Assessment Planning Guidelines (Department of Planning, Lands and Heritage, 2016)

The Transport Impact Assessment (TIA) guidelines assist land use planners and transport practitioners to undertake and assess the transport impact of land use development proposals by bringing together the relevant technical standards and policies in order to consistently and comprehensively assess the level of impact that developments will have on the transport network. The guidelines are organised into five stand-alone volumes to cover the different stages of the planning approval process and the varying types of development applications. The volume most relevant and applicable to this MESP is *Volume 2 – Planning Schemes, Structure Plans and Activity Centre Plans*. The guidelines set out what transport information is required and the scope and content of the assessment in order to satisfy the relevant policies.

The key objectives of a TIA for a structure plan are as follows:

- Assess the proposed internal transport networks with respect to accessibility, circulation and safety for all modes, that is, vehicles, public transport, pedestrians and cyclists;

- Assess the level of transport integration between the structure plan area and the surrounding land uses;
- Determine the impacts of the traffic generated by the structure plan area on the surrounding land uses; and
- Determine the impacts of the traffic generated by the structure plan area on the surrounding transport networks.

2.2 Local Context

2.2.1 Shire of Broome Local Planning Strategy (2023) and Local Planning Scheme No. 7 (2023)

The purpose of the Strategy is to set out the long term planning directions for the Shire, apply any relevant state or regional planning policies and provide rationale for any land zoning or classification under the local planning scheme. The Strategy forms the strategic basis for the preparation and implementation of the Shire of Broome Local Planning Scheme (LPS) No. 7.

The Strategy set out a vision for how land use change and development will occur within the Shire, in response to the Strategic Community Plan 2021-2031. The vision of the Strategy is: **"Broome – a future for everyone"**. This includes four supporting aspirations, aligned with the Shire's core pillars– people, place, prosperity and performance.

One of the actions listed in the Strategy was to prepare a structure plan for McMahon Estate to consider:

- Provision of affordable housing and active open space;
- Improved connectivity with a focus on safety and legibility; and
- Integration of drainage through water sensitive urban design principles.

McMahon Estate was originally intended to be a major recreational oval. However, when the Broome Recreation & Aquatic Centre (BRAC) was developed nearby in 2002, the McMahon oval was no longer required and part of the site was repurposed for residential use (R40).

The Shire of Broome's LPS No. 7 then changed the zoning of the site from a mixture of individual Residential (R40) and 'Parks, Recreation and Drainage' zones, to a single consolidated 'Urban Development' zone, shown in Figure 3. This change was to allow for this proposed McMahon Estate Structure Plan, to deliver an improved urban layout, including making provision for integrated public open space and drainage and to allocate appropriate residential densities.

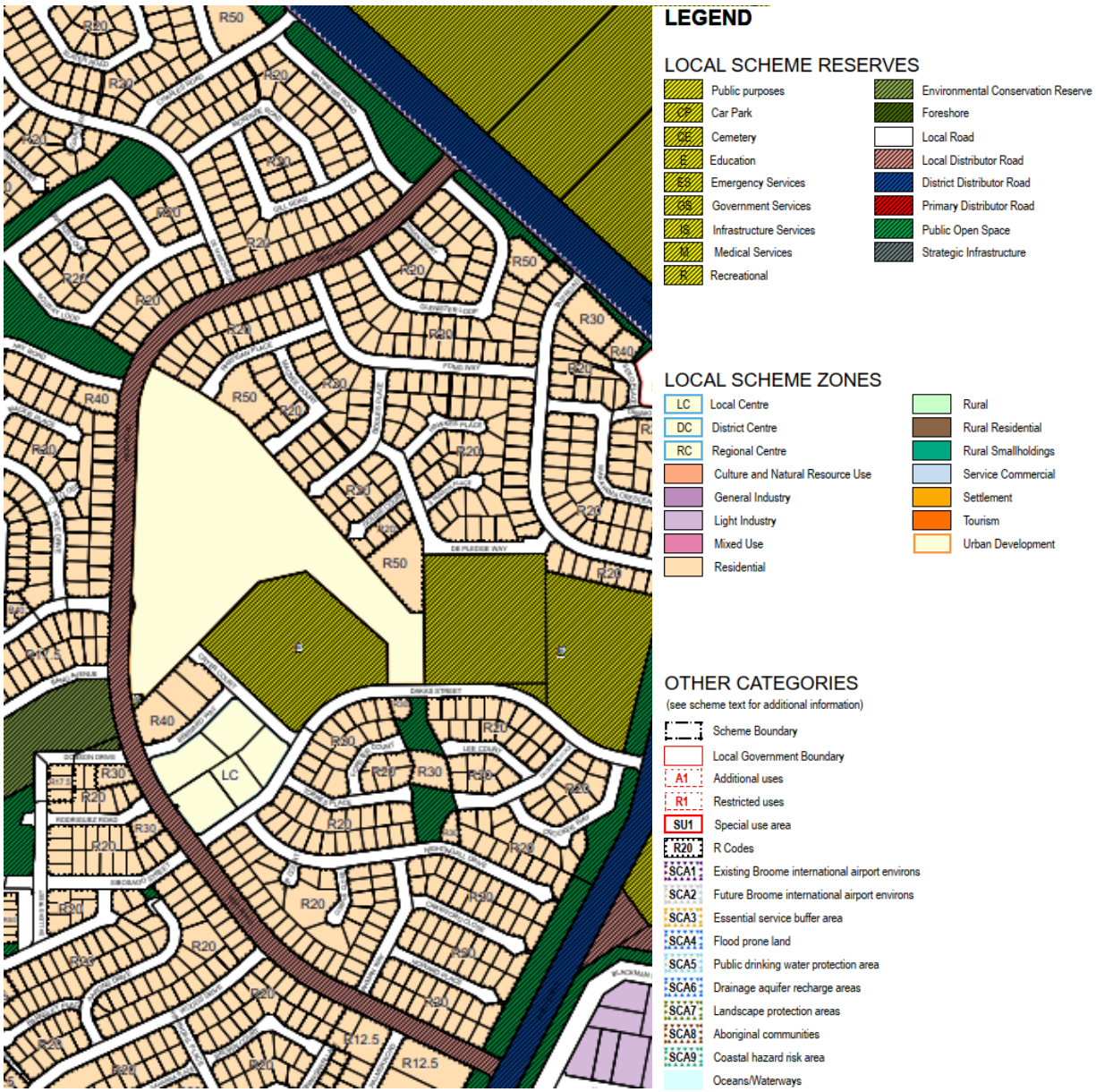


Figure 3 Local Planning Scheme No. 7 (Shire of Broome)

3.0 Existing Situation

3.1 Site Context

The McMahon Estate site is immediately bordered by residential areas to the west and north-east of the site and local community facilities to the south-east of the site, including the Cable Beach Primary School, Childcare Centre, Nyamba Buru Yawuru (place of the Yawuru) and local shops.

The west of the site is bordered by Reid Road, one of the local distributor roads in the area. A number of local roads (cul-de-sacs) end at the edge of the site, connected via walking/cycling only.

The site is currently used as a park, with some existing paths provided within and around the site, as shown in Figure 4.

3.2 Active Transport Network

There is an existing continuous pathway along the western, north-eastern and south-eastern edges of the site, which is partly unsealed on the south-eastern edge. This connects to the various local road cul-de-sacs on the north-eastern and south-eastern edges of the site, as shown in Figure 4.

On the east side of Reid Road is a continuous sealed path, suitable for pedestrians, but not wide enough to be a shared pedestrian/cycling path. There are unmarked pedestrian crossings with median refuge islands at three locations, two of which are at the existing roundabouts adjacent to the site.

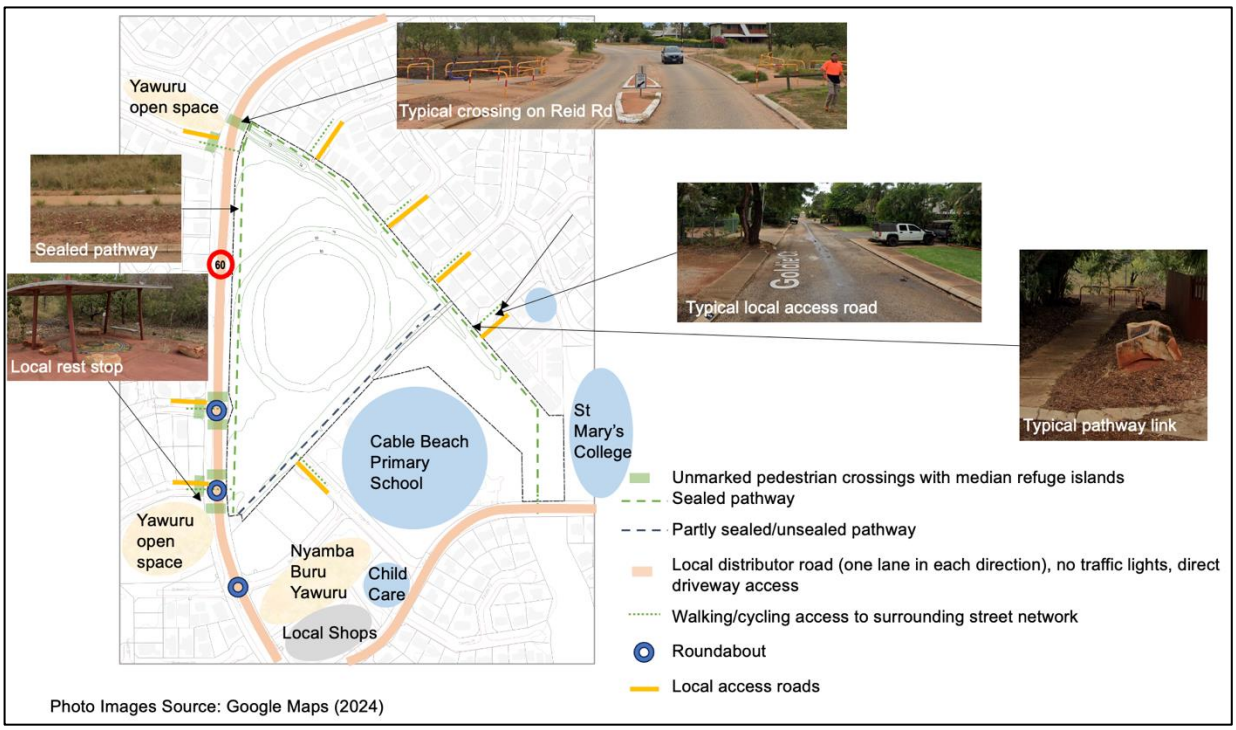


Figure 4 Existing Site Context and Active Transport Access

3.3 Public Transport Network

There are no formal public transport services in Broome. The only bus service that stops close to the site is a tourist service called the Broome Explorer Bus, shown in Figure 5. There are two bus stops for this service at least 15 minutes-walk away to the north-east of the site on Cable Beach Road. The service runs 7 days a week throughout the year, however its fares are not commensurate with typical public transport fares, being a lot higher at $5 for a single fare and $15 for a 24-hour pass. Therefore, this is not a feasible option for everyday travel.

A school bus route operates twice daily to link to local primary and secondary schools and passes closer to the site along Reid Road, Dakas Street and Fong Way/Taiji Street, as shown in Figure 6.

Figure 5 Map of Tourist Bus Route (Source: Broome Explorer Bus website)

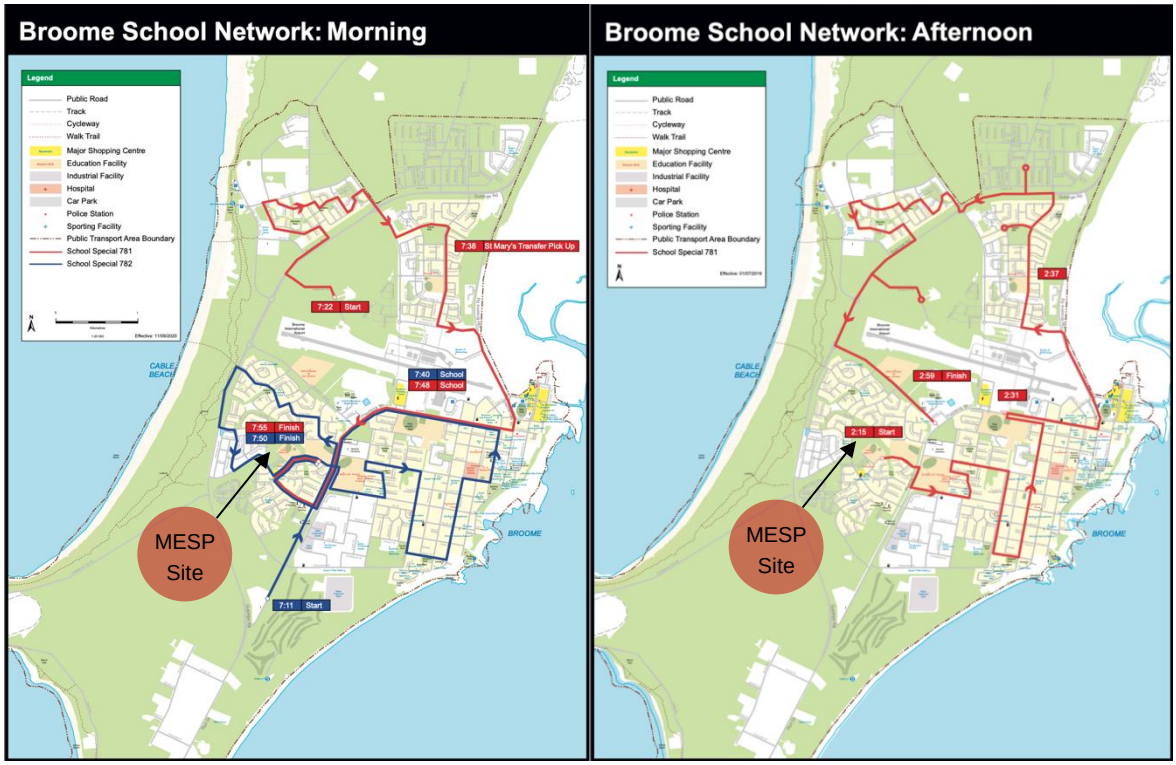


Figure 6 Broome School Bus Network (Source: Broome Explorer Bus website)

3.4 Road Network

Figure 7 shows the existing road hierarchy in the surrounding area of the MESP site.

The west of the site is bordered by a local distributor road, Reid Road, which provides a 60km/h vehicle link to the wider Cable Beach area. Reid Road intersects other local distributor roads Port Drive and Cable Beach Road East to connect to the wider Broome area and its amenities, including Broome Highway, a Primary Distributor Road that runs along the coast to the west of the site. All other roads in the immediate surrounds of the site are local access roads.

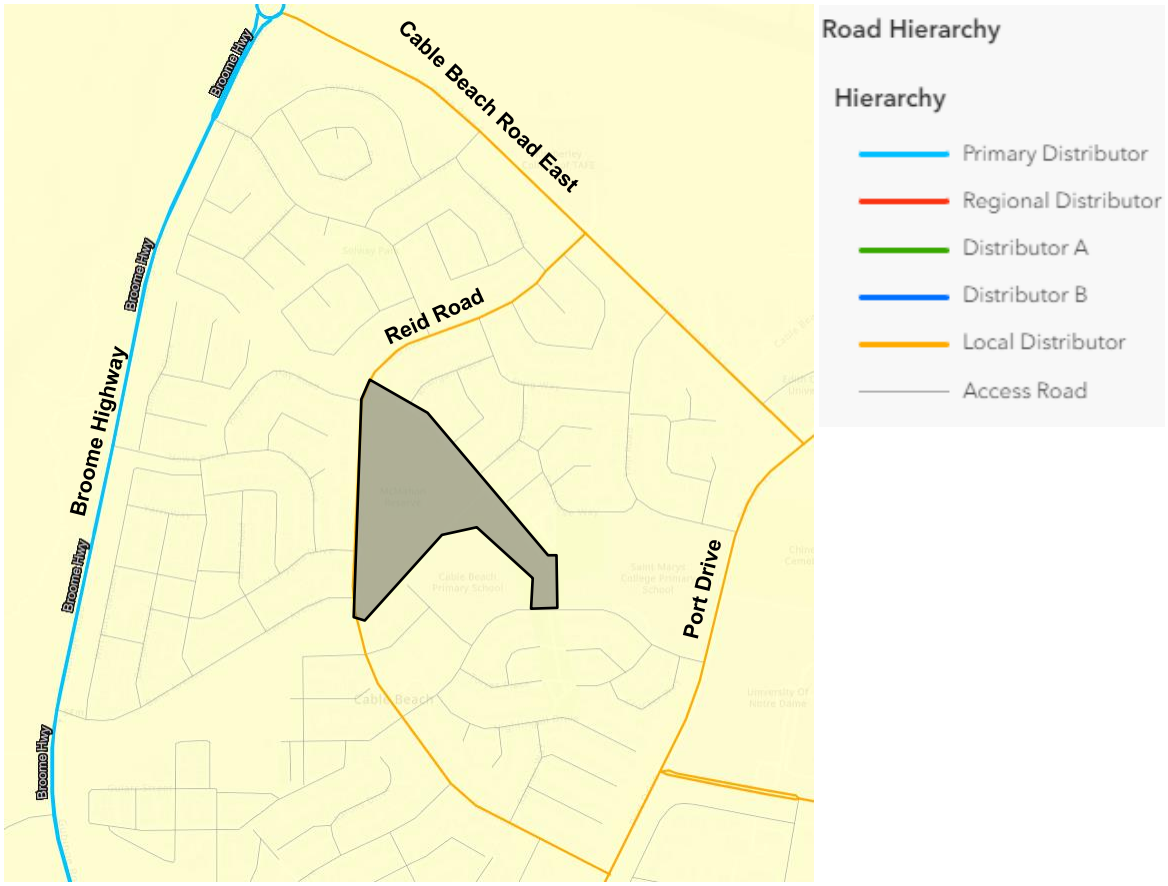


Figure 7 Existing Road Network (Main Roads WA Road Information Mapping System)

Table 1 provides a summary of the existing traffic volumes in the vicinity of the MESP site for the PM Peak (4pm – 5pm), these are the peak volumes taken from counts collected in 2024.

Traffic counts taken for Manggala Drive are not shown in Table 1, as they were not successful due to environmental damage to the counter. However, it is unlikely that the traffic volumes at this site would be higher than the peak volumes recorded at the other sites, such as Reid Road and Banu Avenue.

The peak volume by far occurs northbound on Reid Road at the count site south of Manggala Drive, with 242 vehicles northbound between 4pm – 5pm.

Table 1 PM Peak Hour Traffic Flow

Road	Location	Survey Date	Direction	
			SB/WB	NB/EB
Reid Rd	North of Hay Rd	12/08/2024	177	179
Reid Rd	South of Manggala Dr	12/12/2024	148	242
Hay Rd	West of Reid Rd	12/12/2024	34	22
Banu Ave	West of Reid Rd	12/12/2024	81	46

In addition to traffic counts, vehicle speeds were also recorded along Reid Road, with key statistics outlined in Table 2. The 95th percentile speed at the northern site (north of Hay Road) of 63.5 km/h suggests that speeding may be an issue along here – 11.5% of vehicles were recorded exceeding the 60km/h speed limit during the survey period, mostly within the 60-70km/h range, however vehicles were recorded at excessive speeds, including at 100 km/h or higher. At the site south of Manggala Drive, speeding is shown to be less of an issue, with the 95th percentile speed of 55.8 km/h falling within the

speed limit. However, several vehicles were also recorded at excessive speeds, despite the short distance of about 100 metres between two roundabouts, including vehicles recorded over 100 km/h[1].

Table 2 Reid Road Speed Statistics

Reid Road Location	North of Hay Rd	South of Manggala Dr
Survey period	Tuesday 13 August – Monday 9 September 2024 (27 days)	Monday 2 December – Monday, 16 December 2024 (14 days)
Total number of vehicles	90,096	50,258
85th percentile speed	58.77 km/h	48.87 km/h
95th percentile speed	63.54 km/h	55.80 km/h
Percentage exceeding 60 km/h speed limit	11.53% (10,391 vehicles)	2.33% (1,170 vehicles)
Percentage exceeding 80 km/h	0.081% (73 vehicles)	0.090% (45 vehicles)
Percentage exceeding 100 km/h	0.024% (12 vehicles)	0.002% (2 vehicles)

Figure 8 highlights the crashes recorded along Reid Road adjacent to the MESP site within the last 5 years[2]. In this period, two crashes were recorded along Reid Road adjacent to the MESP site – a rear end crash at the Manggala Drive roundabout and a right turn crash at the Banu Avenue roundabouts respectively. A further two crashes occurred on Reid Road north of the site up to Cable Beach Road East and an additional one at the Dobson Drive roundabout, south of the site.

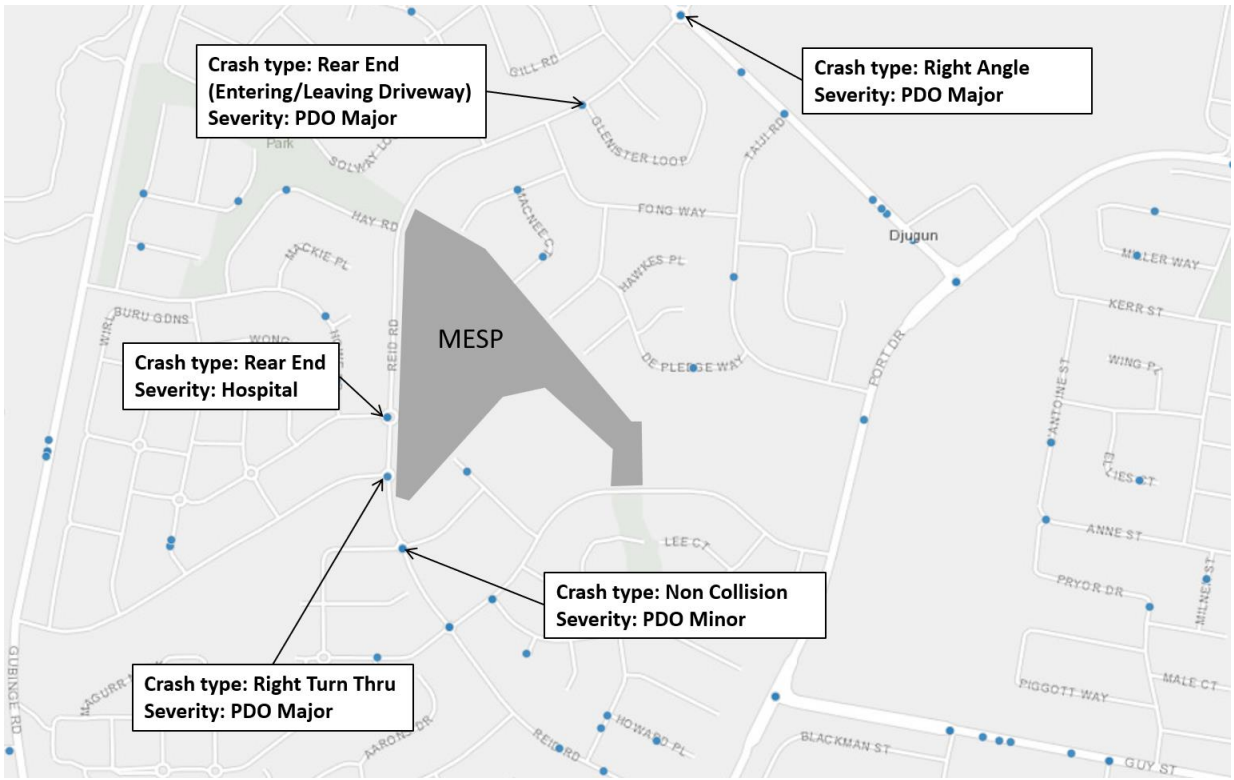


Figure 8 Reid Road Crashes

[1] It is acknowledged that the excessive speed recordings could be outliers, as it is possible for tube counters to record high speeds by accident, due to misinterpretation of sensor data or environmental factors. However, the high number of instances of these recordings indicates these should not be disregarded as anomalies.
[2] Crash Information (Last 5 Years), Main Roads WA

4.0 Integration with Surrounding Area

4.1 Trip Attractors and Generators

As shown on Figure 9, the McMahon Estate site is within a short walking/cycling distance to a number of key Broome amenities and destinations:

- TAFE, Broome Recreation & Aquatic Centre (BRAC) are within a 15 minute-walk to the north-east.
- Local shops, primary school, childcare and Nyamba Buru Yawuru are within a 5 minute-walk to the south-east.
- Cable Beach is a 25 minute-walk to the west.

Whilst there are existing paved paths linking to these destinations, it is noted that there is minimal shade or rest stops provided along these routes, which would be a barrier to using these links in the hot local climate.

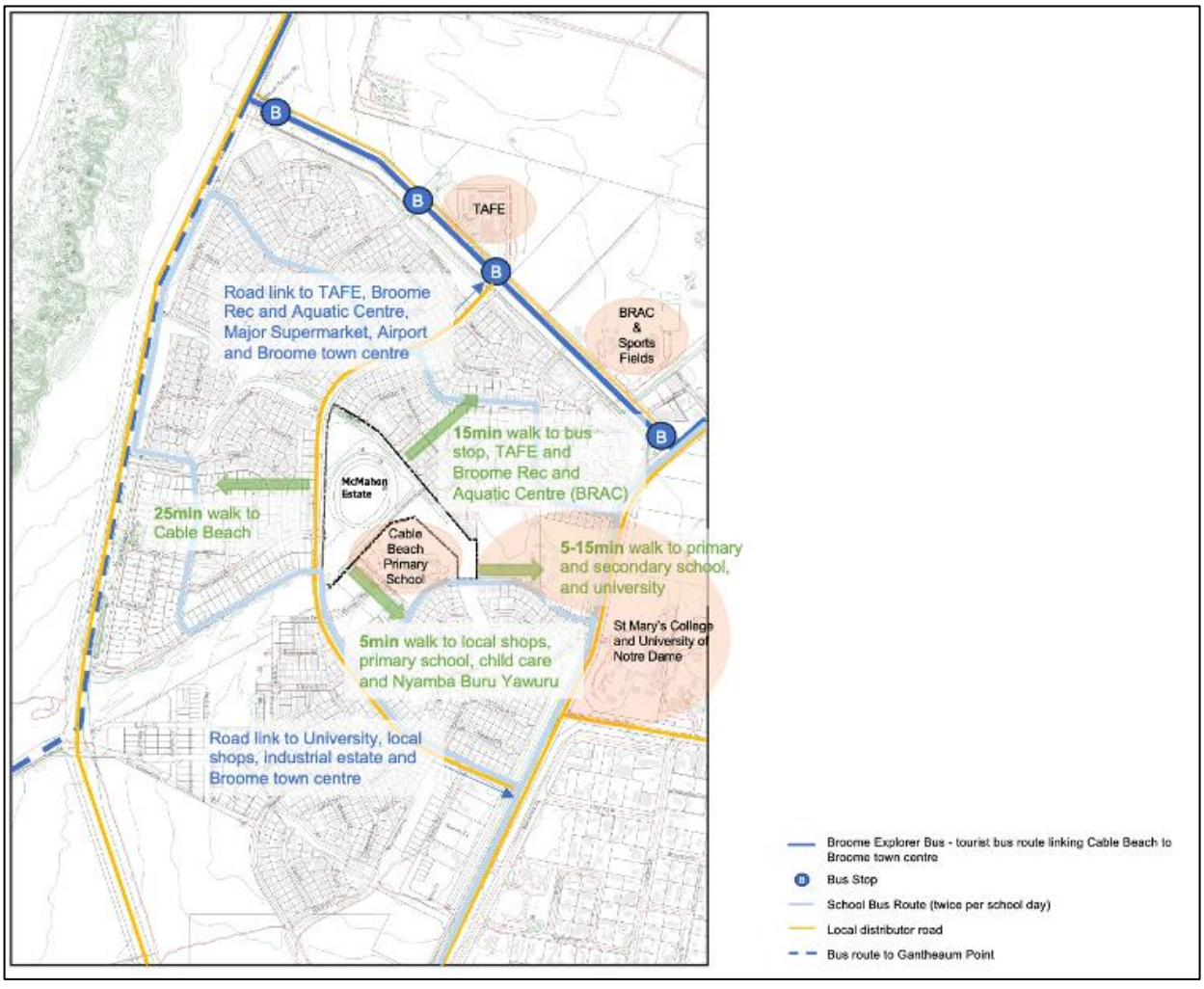


Figure 9 McMahon Estate Surrounding Land Uses

4.2 Future Developments

4.2.1 Broome Recreation & Aquatic Centre Redevelopment

The Broome Recreation & Aquatic Centre (BRAC) is located near McMahon Estate, about 1 kilometre northeast of the site (10-15 minute-walk). It is a major destination within the Shire, playing home to a wide range of sporting organisations and community events. The BRAC is also the official Emergency Evacuation Centre for the Shire of Broome.

The proposed redevelopment of the BRAC includes the construction of several new facilities and refurbishment of existing dry facilities to complement the aquatic area. The BRAC Masterplan is shown in Figure 10. Although already a key destination, the redevelopment will enhance the BRAC's offering and is likely to become an even more significant destination and trip attractor in the community.

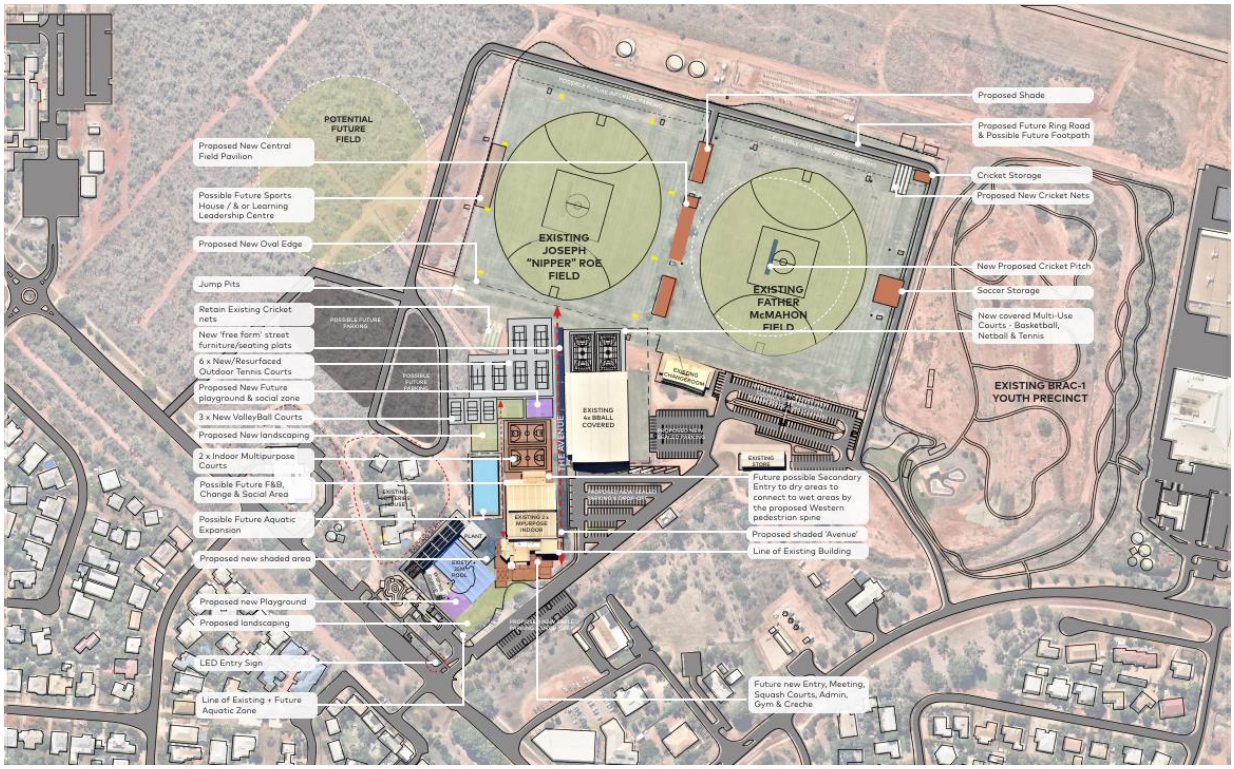


Figure 10 Broome Recreation & Aquatic Centre Redevelopment Masterplan (Shire of Broome)

4.3 Transport Infrastructure Changes

The Shire of Broome has been undertaking a series of road upgrades to improve the function and safety of the road network in the community. The following two upgrades are within the vicinity of the McMahon Estate site and proposed for delivery in 2024/25:

- **DeMarchi Road Blackspot** (Figure 11) – This blackspot is located just north of the McMahon Estate site. The proposed works include widening of the road, construction of a central median, pedestrian crossing and lighting upgrades, resulting in improved road safety in the local area network.
- **Frederick Street, BRAC entry/exit Roundabout** (Figure 12) – As part of the BRAC Redevelopment (section 4.2.1), it is also proposed to construct of new roundabout on Frederick Street to facilitate BRAC access.

Figure 11 DeMarchi Road Blackspot (Shire of Broome)

Figure 12 Frederick Street, BRAC entry/exit Roundabout (Shire of Broome)

5.0 McMahon Estate Local Structure Plan

5.1 Proposed Land Uses

The proposed MESP is shown on Figure 13, consisting of a mix of residential uses (between R20 and R40 densities) and public open spaces. A total residential yield of 115 dwellings is proposed, with the breakdown summarised in Table 3:

Table 3 Proposed MESP Residential Dwelling Yield

Residential Density	No. lots	Approximate maximum yield
R20	58	83 single dwellings
R25-R30	25	
R35-R40	3	32 grouped dwellings
Total		**115 dwellings**

Figure 13 McMahon Estate Local Structure Plan

5.2 Transport Networks

5.2.1 Active Transport Network

Footpaths two metres-wide are proposed on all the new roads throughout the MESP, except for the short cul-de-sac in the southeastern corner of the site near Dakas Street. This is in addition to a primary shared path, three metres-wide, around the perimeter of the MESP, connecting the local road network between Reid Road and Dakas Street.

This connection also ties in to existing cul-de-sacs at Goldie Court, Biddles Place, Macnee Court and Rhatigan Place. The existing path on the northern side of the school is also proposed to be upgraded, with a bridge structure proposed over the drainage infrastructure to allow use all year around (see Figure 14).

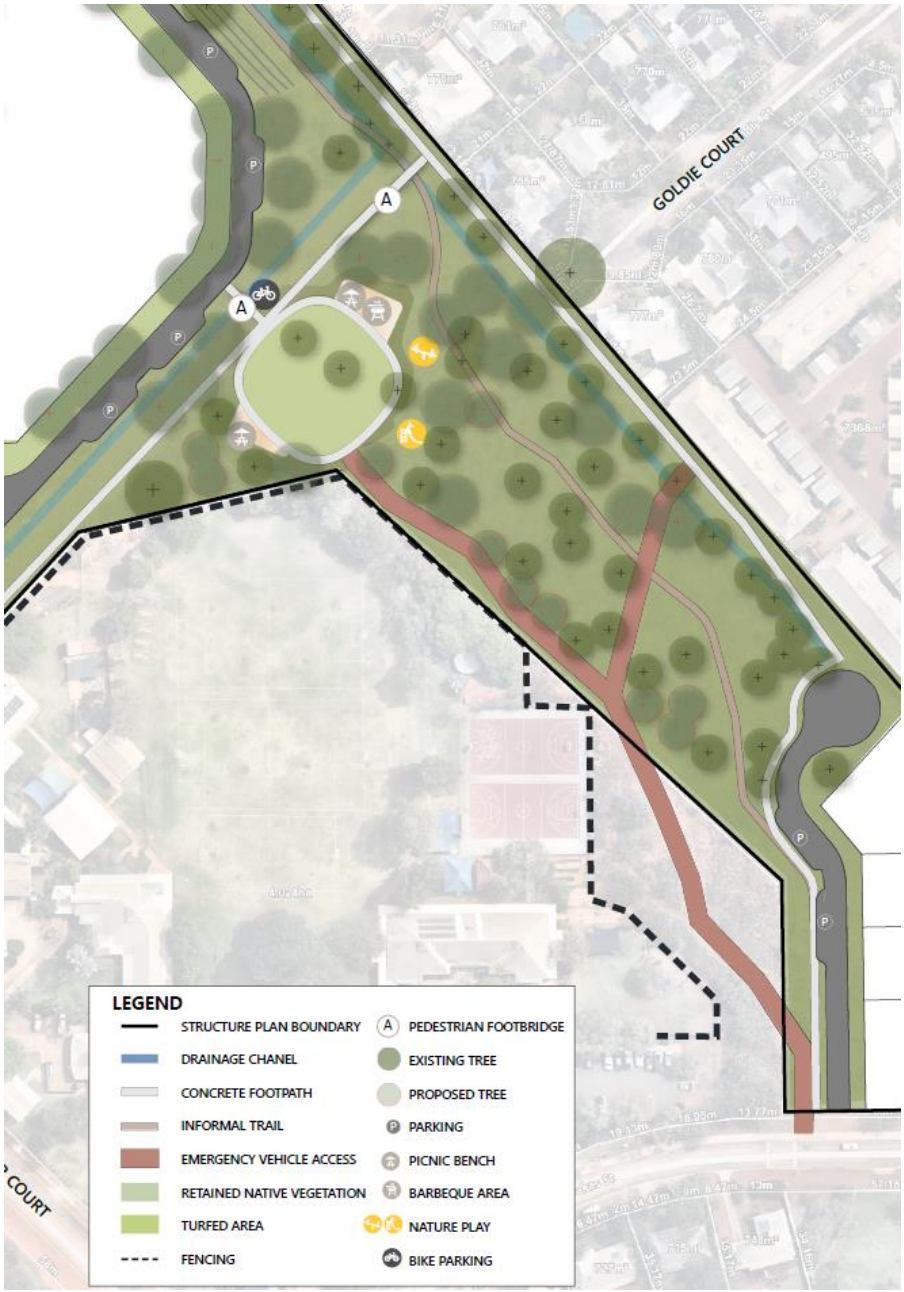


Figure 14: Local Park Concept Plan

Source: Hames Sharley

5.2.2 Safe Walk/Cycle to School Assessment

There are no schools proposed within McMahon Estate, however within 800 metres of the MESP boundary, there are five schools to the south east. Being within an 800-metre radius from the border of the MESP area, they are within a feasible walking/cycling distance for the new residents in the development (approximately 10 minutes' walk). See Figure 15 for schools that are within a walkable distance from the development.

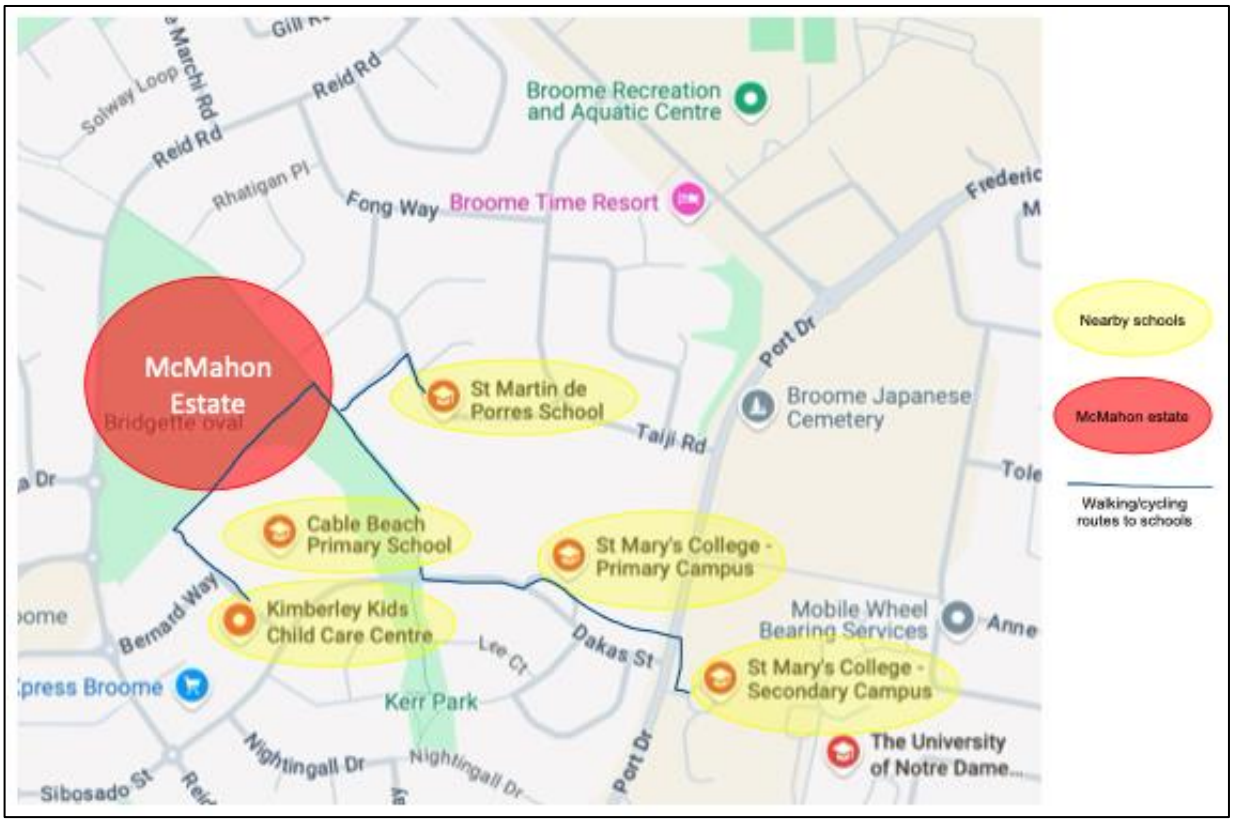


Figure 15 Schools within Walkable Catchment to MESP

Source: Google Maps

The most suitable walk/cycle routes to the local schools are shown in Figure 15. Walking/cycling access on these routes is via a shared concrete path (see Figure 14 for more detail) as students exit the McMahon Estate, which connects with local roads Cryer Court, Dakas Street and Goldie Court to link to the various schools. Each local road connecting to the schools has a footpath on at least one side and the roads are suitable for cycling, as they are local access roads with minimal traffic. To access St Mary's College – Secondary Campus, students can use the internal footpath provided between the primary school and secondary school campus. This footpath has a staged crossing at Port Drive (see Figure 16), suitable for a local distributor road as per Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings[3].

[3] Table 8.1 and Table 8.5 *'Austraods Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings'*, Austroads (2019).

Figure 16 Staged crossing connecting St Mary's Primary and Secondary Campus

Source: Google Maps

5.2.3 Public Transport Network

The MESP and surrounding local neighbourhood would benefit from a regular local bus service connecting the area to local services. There is a medium-term plan (5-10 years) to support future expansion of the existing bus service in Broome to better cater for all residential areas, this expansion should consider the option of including a route covering Reid Road.

5.2.4 Road Network

There are five road access/egress points proposed for the site to the surrounding road network. Two on the southern edge, one linking to Dakas Street and one linking to Cryer Court, which will provide a new link from the MESP directly to the local primary school and child care centre on the same street. On the western edge of the MESP there are three access/egress points, linking to the Reid Road/Banu Avenue roundabout, and two directly to Reid Road, between Manggala Drive and Hay Road.

Additionally, there will be 18 lots within the development located on the western edge, which will have the potential for direct driveway access to Reid Road, as shown in Figure 17**Error! Reference source not found.**. However, given the low traffic volumes on Reid Road, this is considered to have minimal impact to traffic flow.

Figure 17 Lots with potential for direct driveway access to Reid Road

It is noted that three of these lots also align with the Reid Road intersections with Manggala Drive and Banu Avenue. These properties are required to locate their driveways no closer than 6m to the street corner as required under AS2890.1[4], see Figure 18 for further detail. To accommodate these requirements, the two lots which front onto the roundabout at Manggala Drive will require access from the internal road within the MESP rather than Reid Road, in the form of a battle-axe access, as shown in Figure 17. The single lot at Banu Avenue will have adequate width to provide driveway access from its northern side.

[4] Section 5.3.5 Vehicular access, *'Residential Design Codes Volume 1'*, p.30 (2024, Department of Planning, Lands and Heritage)

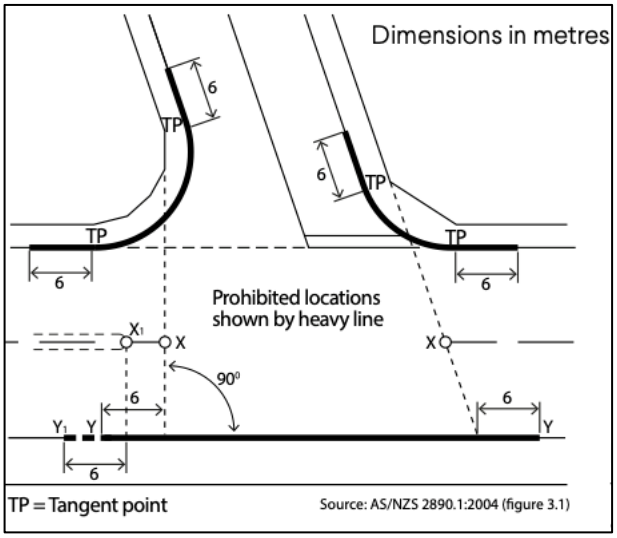


Figure 18 AS2890.1 - Prohibited locations of access driveways

In terms of the driveway access for the lots fronting Reid Road, garage setback requirements under the WA Residential Design Codes typically require a 4.5m setback which can be reduced to 3.0m for carports[5]. This will ensure any vehicle parking on a driveway does not impede on the existing footpath. Additionally, as the topography is flat in this area, consideration should be given to creating a rise in level of the driveway in order to slow vehicles entering/exiting and provide a level of safety for the intersecting footpath, as per Austroads guidance for driveways[6]. The garage setback will also assist with ensuring adequate sightlines for vehicles exiting driveways onto Reid Road.

Considering the speed limit along Reid Road of 60km/h and evidence of speeding issues along this section of road (see Section 3.4), there may be the need to reduce the speed limit, particularly considering the addition of the new development and additional traffic and turning movements this will bring to this length of Reid Road.

The MainRoads WA guidelines for speed zoning advise that the target speed should match the form and function of the roadway. At present, the speed is most appropriate for a local distributor road that has a moderate to low place value in a partially built-up area, with the indicative target speed for this being within the range of 60-80km/h[7]. However, with the addition of new housing on the opposite side of Reid Road, this will likely change the function to a neighbourhood street with a high place value.

The MainRoads WA guidelines for speed zoning advise that the indicative target speed for this type of environment along a local distributor road should be within the range of 40-50km/h[8]. Therefore, it is recommended that the speed along Reid Road be reduced to 50km/h to better suit the built-up environment along here, but also to address the road safety risks described in Section 3.4. Any speed reduction should also be supported by traffic calming measures, particularly in proximity of the existing pedestrian crossing north of Hay Road.

5.2.5 Cross-sections

The indicative cross-section is illustrated in Figure 19, proposed for all roads within the MESP. This has been developed in line with Liveable Neighbourhoods Guidelines and Shire of Broome Local Planning Policy. The cross-section consists of a 7.4 metre-wide two-way road, 4 metre-wide verge on both sides and a 2 metre-wide path on each side, to be offset a minimum of 0.3 metres from the property boundary.

[5] Section 5.2.1 Setback of carports and garages, *'Residential Design Codes Volume 1'*, p.21 (2024, Department of Planning, Lands and Heritage)
[6] Section 3.3.2 Driveways or Intersections into the Development, *'Guide to Traffic Management Part 12: Traffic Impacts of Developments'*, (2019, Austroads)
[7] Table 2: Typical Target Speeds Range for Road Types, '*Speed Zoning: Policy and Application Guidelines*', p.15 (2022, MainRoads WA)
[8] Table 2: Typical Target Speeds Range for Road Types, '*Speed Zoning: Policy and Application Guidelines*', p.15 (2022, MainRoads WA)

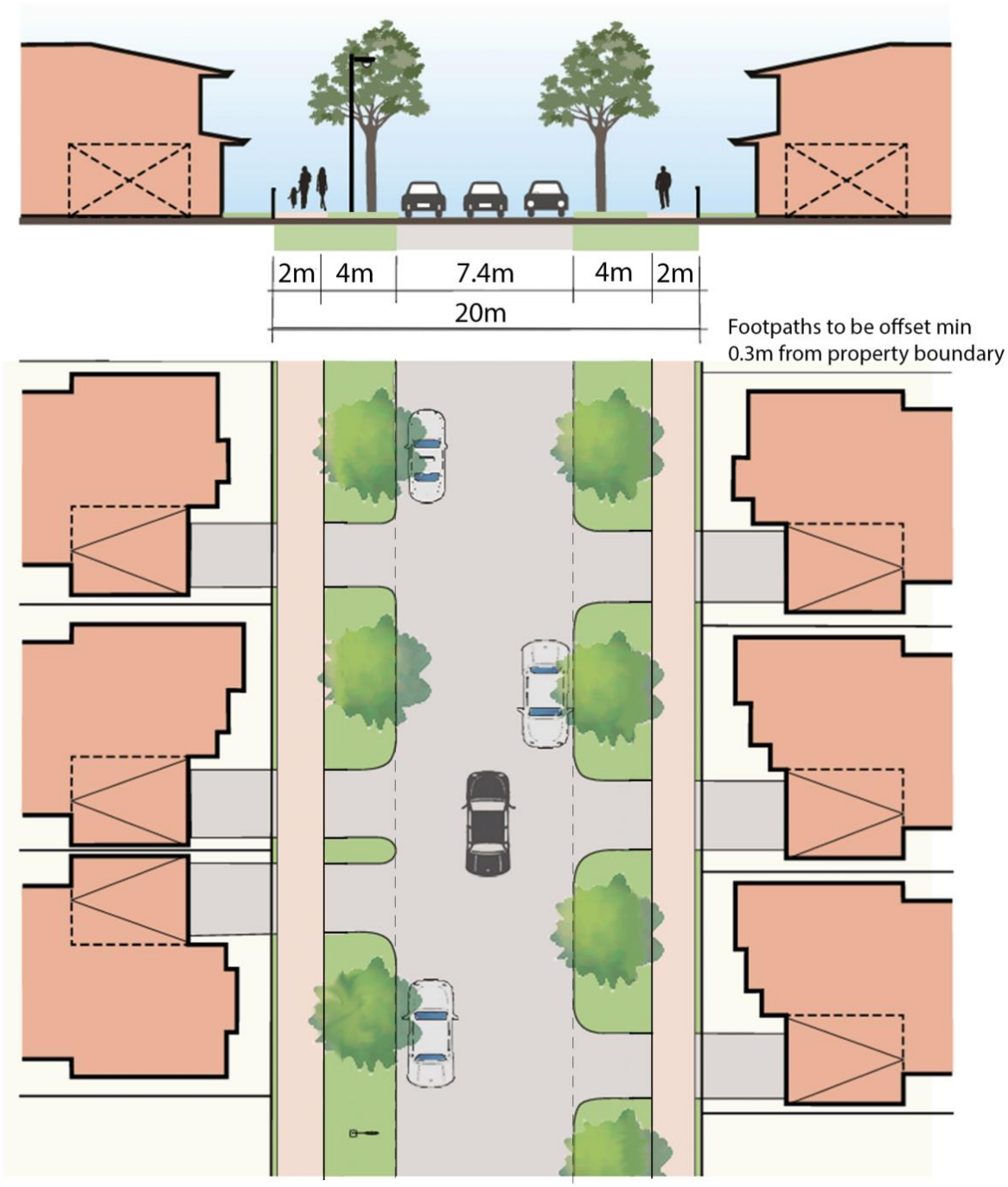


Figure 19 Indicative Cross-section

6.0 Analysis of Transport Network

6.1 Traffic Generation

From the proposed land uses discussed in Section 5.1, additional vehicle trips will be generated by the new residential dwellings with the MESP development. While there is also a local park proposed and surrounding public open space, these land uses are not expected to attract trips from outside of the immediate area, and any trips are likely to be outside of the traffic peak periods.

The forecast traffic generated by the increase in residential dwellings was determined using the typical vehicle trip generation rates sourced from the Transport Impact Assessment Guidelines[9]. Table 4 summarises the number of trips forecast for the AM and PM peaks using these rates.

Table 4 Additional Trip Generation based on TIA Guidelines

Peak	AM peak			PM peak		
Direction	In	Out	Total	In	Out	Total
Peak hour vehicle trip rates (per dwelling)	0.2	0.6	0.8	0.8	0.3	0.8
115 dwellings	23	69	92	58	35	92

6.2 Extent of Analysis

The TIA Guidelines indicate that traffic analysis should cover sections of the road network where the structure plan traffic would be likely to increase traffic on any lane by more than 100 vehicles per hour. As outlined in Section 6.1, the structure plan is expected to generate a maximum of 92 vehicle trips in the peak, which is under the threshold to require analysis. This traffic generation would be spread across the five access/egress points discussed in Section 5.2.4, therefore 18.4 vehicles in the peak for each access/egress point. However, in reality some vehicles will have direct driveway access to Reid Road as discussed in Section 5.2.4, which will reduce the number of vehicle movements at the access/egress points.

Additionally, the total traffic on the road network is expected to be low overall, even with some growth in background traffic and the addition of traffic generated by the structure plan. There are no other sites in the immediate area with plans for density changes or growth, so any changes in future traffic volumes are likely to be minimal.

Traffic volumes (outlined in Section 3.4) indicate a peak of 242 vehicles northbound between 4pm – 5pm at Reid Road, between Manggala Drive and Banu Avenue. This is equivalent to 4.03 vehicles per minute, or approximately 15 seconds between vehicles.

For the intersection analysis, *Transport Impact Assessment Guidelines* (Western Australian Department of Planning and Western Australia Planning Commission, August 2016) suggest undertaking intersection analysis for only one peak at this stage of the development, the peak with the highest volume. The PM peak represents the highest traffic volumes in the case of this site, therefore the PM peak was used to analyse the impact of the development traffic on the intersections.

The PM peak traffic volumes used in the intersection analysis are shown in Figure 20. These are based on traffic counts taken at the site in 2024 (see in Section 3.4) and the additional trip generation from the development, as shown in Table 4.

[9] Transport Impact Assessment Guidelines, Volume 2: Planning Schemes, Structure Plans and Activity Centre Plans, Guidelines (Department of Planning, Western Australian Planning Commission), Revised August 2016

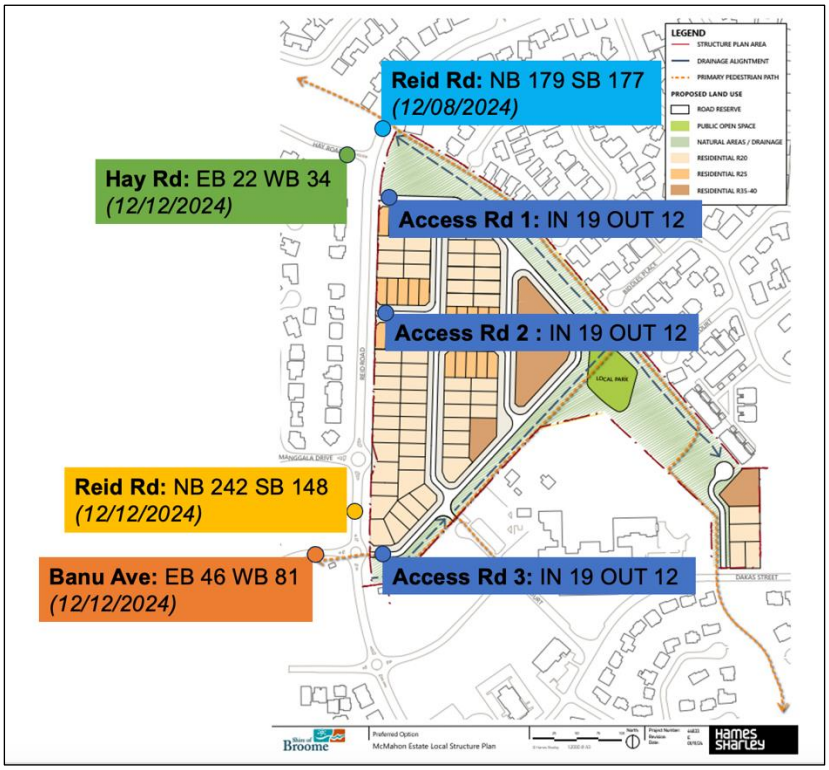


Figure 20 Traffic volumes used for intersection analysis

The following assumptions were made in order to undertake the intersection analysis:

- As turning movement counts for the intersections are not available, it is assumed that the number of turns will be a 50/50 split for all the mid-block volumes once they reach the intersections;
- To include Manggala Drive in the analysis, the counts for this street were assumed to be similar to Banu Avenue counts;
- There is minimal growth in background traffic expected, therefore only the current day traffic flows will be modelled, with and without development traffic.
- All the development traffic was directed to the new access roads along Reid Road and excluded from the remaining two access roads on the southern edge of the development as it is expected that most traffic will be coming and going via Reid Road to access most destinations in the wider Broome area.

The network modelled for the intersection analysis is shown in Figure 21. The two access roads from the development between Hay Road and Manggala Drive have been excluded and their traffic redirected to the existing intersections as their traffic impact is expected to be negligible.

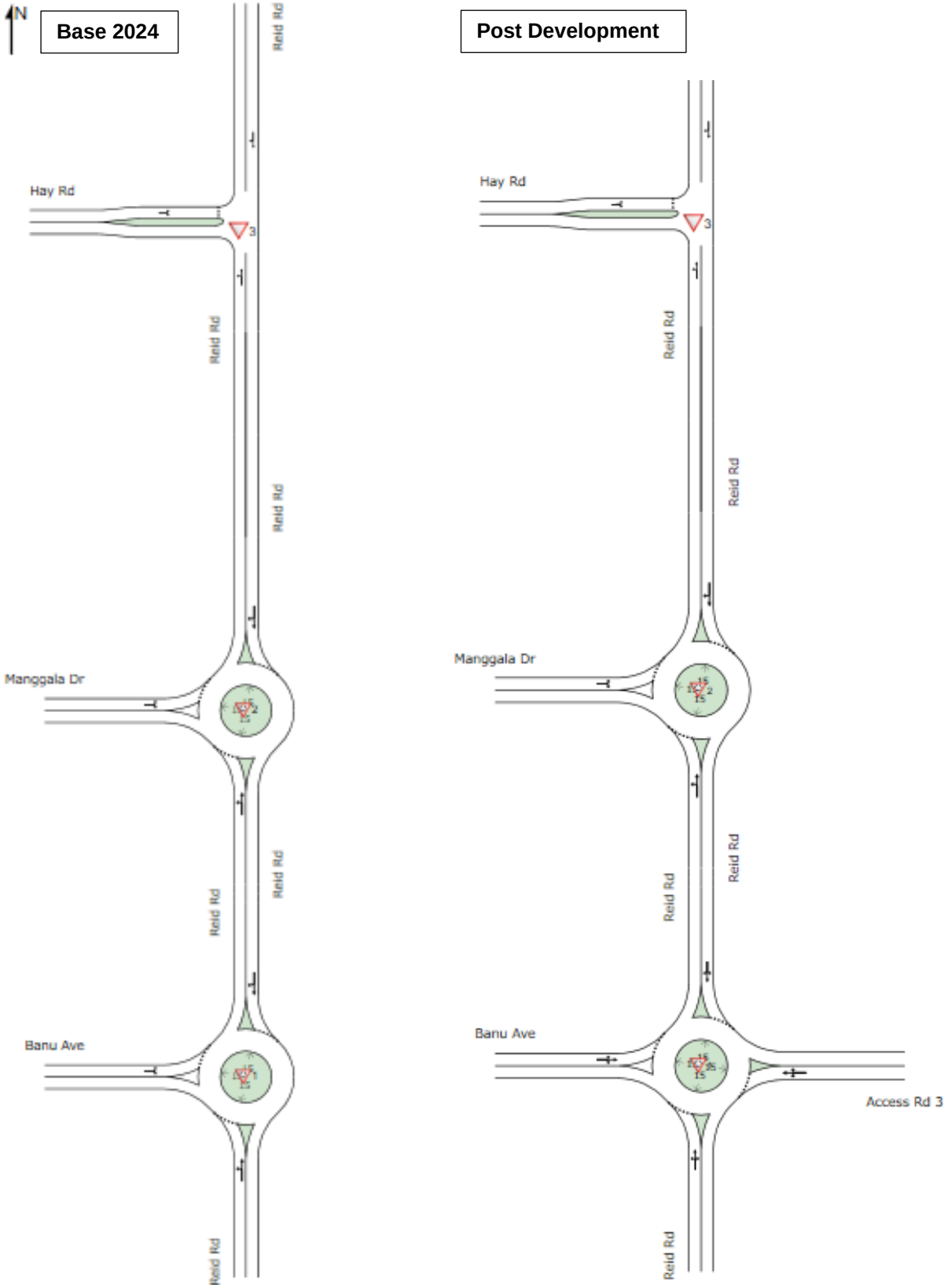


Figure 21 Network modelled in SIDRA

The resulting traffic volumes for the two scenarios are shown in Figure 22.

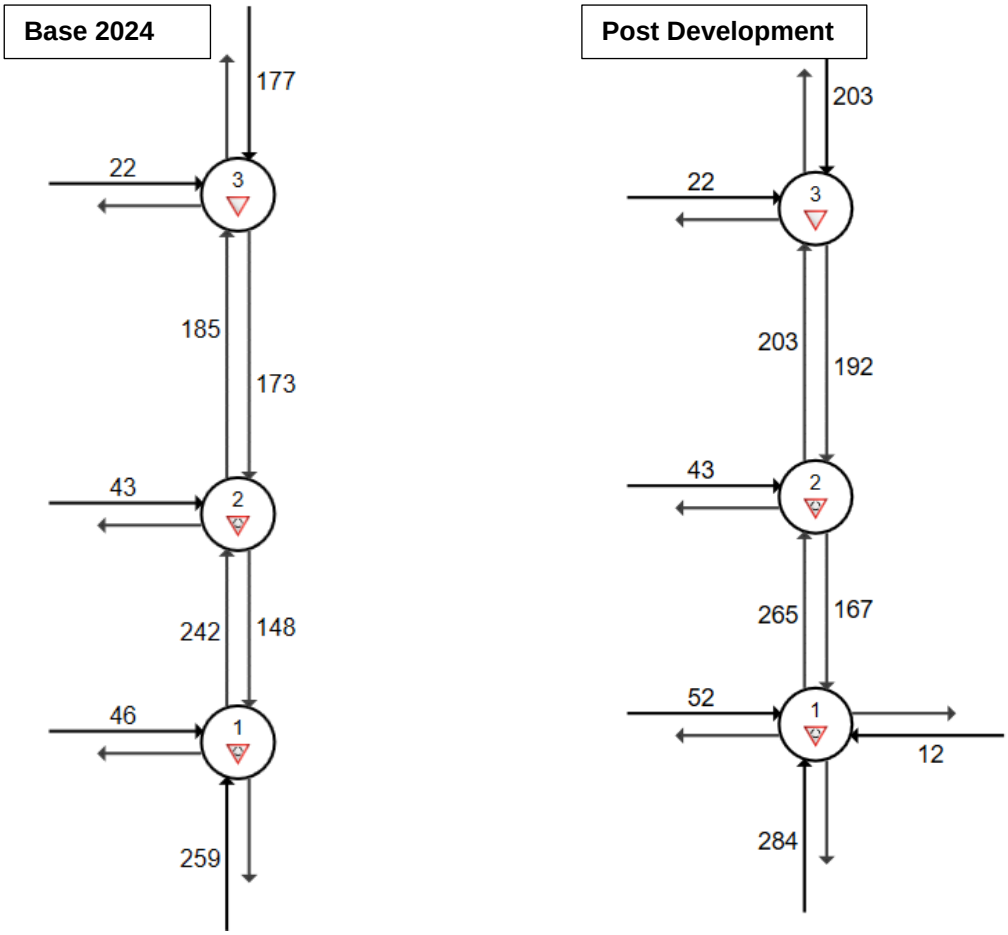


Figure 22 Network modelled with traffic volumes

The resulting Level of Service results from SIDRA are shown in Figure 23.

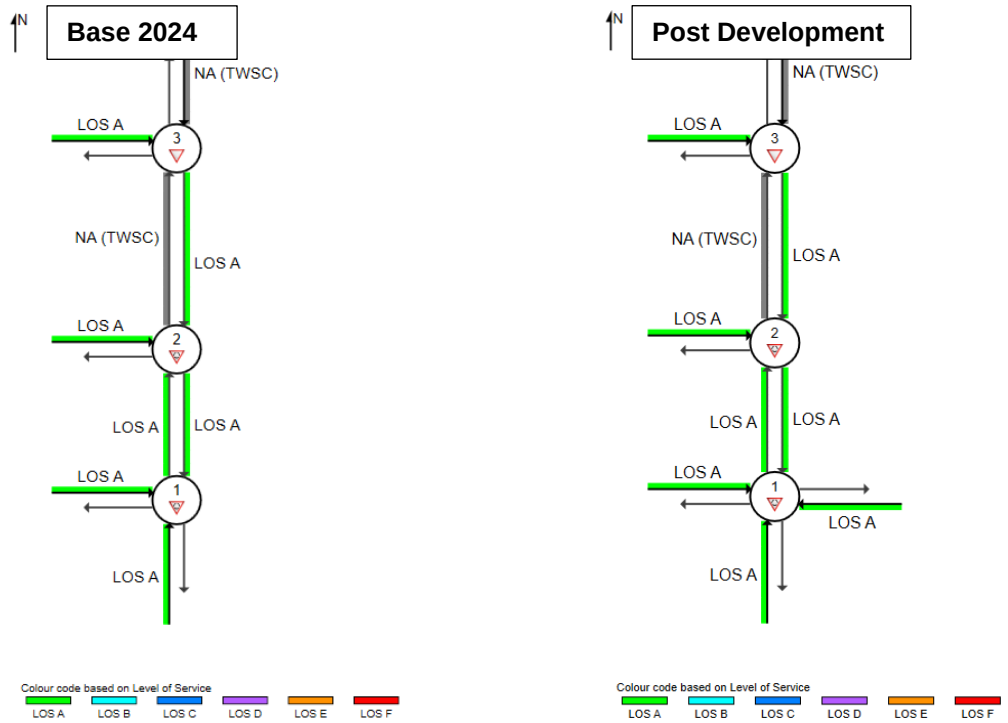


Figure 23 SIDRA Results - Level of Service

The SIDRA results show that for both the base case and with the addition of development traffic, the intersections would be performing at the highest possible level, which is a Level of Service (LOS) A. This represents free flow conditions and unimpeded manoeuvring of vehicles[10], even in the highest peak. All further results showed the same high level of service, with Degree of Saturation (volume to capacity ratio) ranging from 0.01 – 0.18 and the longest 95th Percentile Queue Distance being 18m on the northbound approach to the Banu Avenue/Reid Road roundabout. The full set of results for these are shown in Appendix A.

Therefore, as expected with such low development traffic being introduced to the network, there is very little impact to the intersections and road network.

6.3 Summary

The proposed MESP consists of a mix of residential uses and public open spaces. A total residential yield of 115 dwellings is proposed, which is expected to generate a maximum of 92 vehicle trips in the peak hour. This traffic generation would be spread across the five access/egress points discussed in Section 5.2.4, however in reality most vehicles will most likely use the three access points long Reid Road, equating to almost 31 vehicles in the peak hour for each access/egress point.

The TIA Guidelines indicate that traffic analysis should cover sections of the road network where the structure plan traffic would be likely to increase traffic on any lane by more than 100 vehicles per hour, therefore the traffic generated from this MESP is under the threshold to require analysis. However, for intersections, the TIA Guidelines require an analysis of the impact to the intersections in at least one of the peak hours. Therefore, SIDRA analysis was undertaken to show that the impact of the development traffic is minimal to the intersections and that they will continue to perform in free-flowing conditions.

The indicative cross-section for all internal roads within the MESP has been developed in line with Liveable Neighbourhoods Guidelines and Shire of Broome Local Planning Policy. The cross-section consists of a 7.4 metre-wide road, 4 metre-wide verge on both sides and a 2 metre-wide path on each side, to be offset a minimum of 0.3 metres from the property boundary. This is in addition to a 3-metre-wide shared path around the perimeter of the site.

18 properties in the new development will have direct driveway access to the local distributor road bordering the western edge of the site, Reid Road. Garage setback requirements under the WA Residential Design Codes typically require a 4.5m setback which can be reduced to 3.0m for carports for these properties. This will ensure any vehicle parking on a driveway does not impede on the existing footpath along Reid Road. It is noted that three of these lots also align with the Reid Road intersections with Manggala Drive and Banu Avenue. These properties are required to locate their driveways no closer than 6m to the street corner as required under AS2890.1.

Speeds were recorded along Reid Road along with the traffic counts, the data collected showed that 11.5% of vehicles were recorded exceeding the 60km/h speed limit during the survey period, mostly within the 60-70km/h range. This indicates that speeding may be an issue along here. Additionally, within the last five years, two crashes were recorded along Reid Road adjacent to the MESP site – a rear end crash at the Manggala Drive roundabout and a right turn crash at the Banu Avenue roundabouts respectively. A further two crashes occurred on Reid Road north of the site. Therefore, reducing the speed limit to 50km/h in addition to traffic calming measures to support this reduction would be advised, both for the current conditions and with the addition of the new development.

The site is well connected to the local road network and has good walking and cycling connections to local services and schools, however due to the hot local climate, the MESP and surrounding neighbourhoods would also benefit from a local bus service connecting it to the wider Broome area as an alternative to walking and cycling.

[10] Guide to Traffic Management Part 3: Traffic Studies and Analysis Methods, Austroads (2020a).

7.0 Conclusions and Recommendations

Overall, the MESP is estimated to have minimal impact on the surrounding road network and would benefit from having coverage by any future bus route expansion that the Shire of Broome is considering. Considering the speeds recorded along Reid Road and the recent 5-year crash history, it would be advised to consider reducing the speed limit to 50km/h in addition to traffic calming measures to support this reduction.

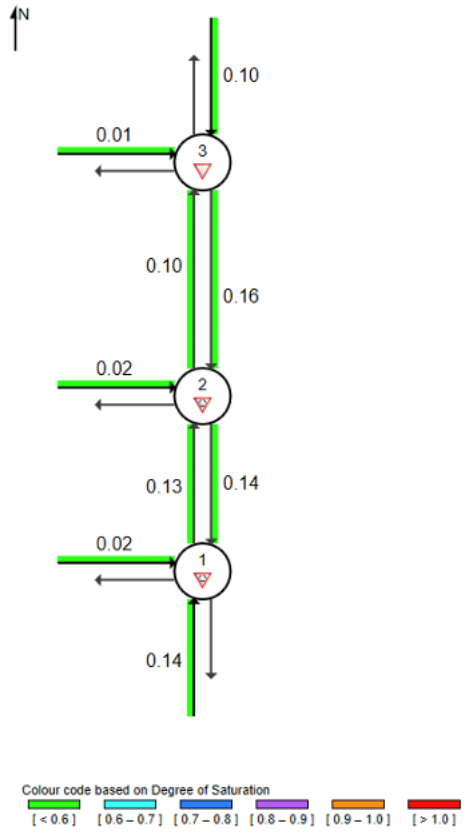
Appendix A

SIDRA Analysis

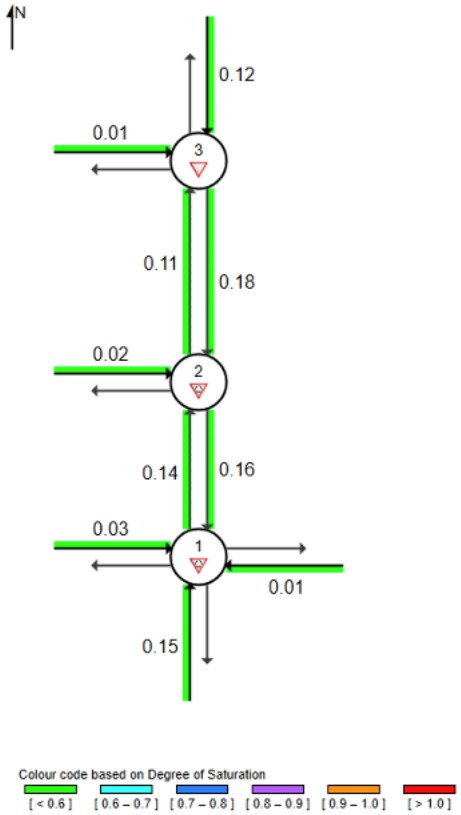
Appendix A SIDRA Analysis

SIDRA Results – Degree of Saturation

Base 2024

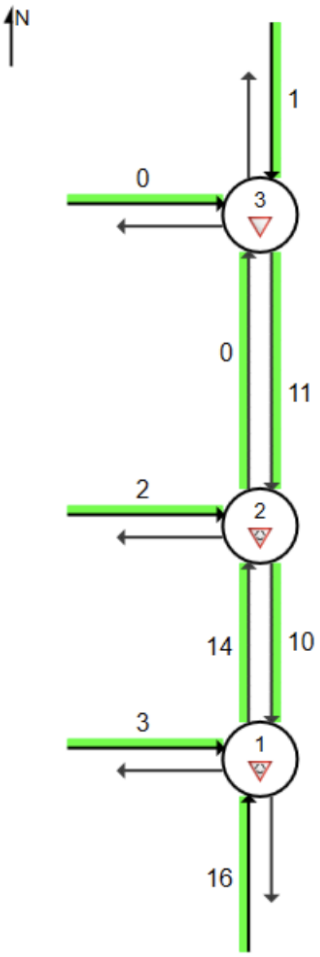


Post Development

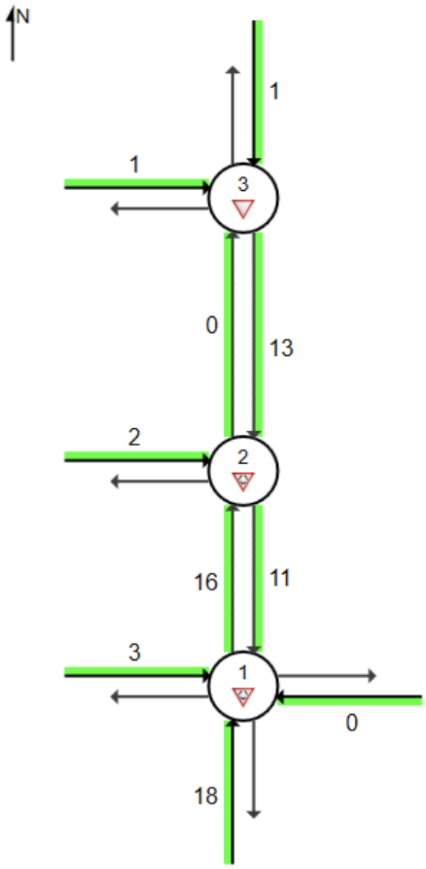


SIDRA Results – 95th Percentile Queue Distance (m)

Base 2024



Post Development



MOVEMENT SUMMARY

Site: 1 [Reid Rd / Banu Ave (Site Folder: Existing PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Base (Network Folder: Existing)]

Reid Rd / Banu Ave
Site Category: Base Year
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Reid Rd															
1	L2	All MCs	42	21.0	42	21.0	0.140	4.6	LOS A	0.6	6.6	0.21	0.44	0.21	44.0
2	T1	All MCs	231	56.0	231	56.0	0.140	5.1	LOS A	0.6	6.6	0.21	0.44	0.21	35.8
Approach			273	50.6	273	50.6	0.140	5.0	LOS A	0.6	6.6	0.21	0.44	0.21	39.2
North: Reid Rd															
5	T1	All MCs	113	56.0	113	56.0	0.140	4.1	LOS A	0.3	3.8	0.17	0.47	0.17	33.1
6	R2	All MCs	43	21.0	43	21.0	0.140	8.1	LOS A	0.3	3.8	0.17	0.47	0.17	42.0
Approach			156	46.3	156	46.3	0.140	5.2	LOS A	0.3	3.8	0.17	0.47	0.17	37.2
West: Banu Ave															
3	L2	All MCs	24	21.0	24	21.0	0.025	5.6	LOS A	0.1	1.1	0.49	0.58	0.49	41.9
4	R2	All MCs	24	21.0	24	21.0	0.025	9.6	LOS A	0.1	1.1	0.49	0.58	0.49	41.1
Approach			48	21.0	48	21.0	0.025	7.6	LOS A	0.1	1.1	0.49	0.58	0.49	41.4
All Vehicles			477	46.2	477	46.2	0.140	5.3	LOS A	0.6	6.6	0.22	0.46	0.22	38.8

MOVEMENT SUMMARY

Site: 3 [Reid Rd / Hay Rd (Site Folder: Existing PM)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Base (Network Folder: Existing)]

Reid Rd / Hay Rd
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Reid Rd															
1	L2	All MCs	18	9.0	18	9.0	0.098	5.7	LOS A	0.0	0.0	0.00	0.05	0.00	52.8
2	T1	All MCs	177	20.8	177	20.8	0.098	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.3
Approach			195	19.7	195	19.7	0.098	0.5	NA	0.0	0.0	0.00	0.05	0.00	58.6
North: Reid Rd															
5	T1	All MCs	168	20.8	168	20.8	0.104	0.0	LOS A	0.1	0.5	0.07	0.09	0.07	58.3
6	R2	All MCs	18	9.0	18	9.0	0.104	7.3	LOS A	0.1	0.5	0.07	0.09	0.07	51.7
Approach			186	19.7	186	19.7	0.104	0.7	NA	0.1	0.5	0.07	0.09	0.07	57.0
West: Hay Rd															
3	L2	All MCs	12	9.0	12	9.0	0.011	5.3	LOS A	0.0	0.2	0.28	0.54	0.28	46.2
4	R2	All MCs	12	9.0	12	9.0	0.011	5.7	LOS A	0.0	0.2	0.28	0.54	0.28	43.4
Approach			23	9.0	23	9.0	0.011	5.5	LOS A	0.0	0.2	0.28	0.54	0.28	45.2
All Vehicles			404	19.1	404	19.1	0.104	0.9	NA	0.1	0.5	0.05	0.10	0.05	57.0

MOVEMENT SUMMARY

Site: 1 [Reid Rd / Banu Ave (Site Folder: Post development)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Post Development (Network Folder: Existing)]

Reid Rd / Banu Ave
Site Category: Base Year
Roundabout

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Reid Rd															
1	L2	All MCs	42	21.0	42	21.0	0.153	4.6	LOS A	0.7	7.3	0.23	0.44	0.23	43.8
2	T1	All MCs	251	56.0	251	56.0	0.153	5.1	LOS A	0.7	7.3	0.23	0.44	0.23	35.3
3	R2	All MCs	6	0.0	6	0.0	0.153	8.7	LOS A	0.7	7.3	0.23	0.44	0.23	44.3
Approach			299	49.9	299	49.9	0.153	5.1	LOS A	0.7	7.3	0.23	0.44	0.23	39.0
East: Access Rd 3															
4	L2	All MCs	4	0.0	4	0.0	0.011	3.9	LOS A	0.0	0.1	0.37	0.49	0.37	43.9
5	T1	All MCs	4	0.0	4	0.0	0.011	4.0	LOS A	0.0	0.1	0.37	0.49	0.37	45.9
6	R2	All MCs	4	0.0	4	0.0	0.011	8.1	LOS A	0.0	0.1	0.37	0.49	0.37	43.3
Approach			13	0.0	13	0.0	0.011	5.3	LOS A	0.0	0.1	0.37	0.49	0.37	44.6
North: Reid Rd															
7	L2	All MCs	7	0.0	7	0.0	0.163	3.9	LOS A	0.4	4.4	0.21	0.46	0.21	44.0
5	T1	All MCs	125	56.0	125	56.0	0.163	4.2	LOS A	0.4	4.4	0.21	0.46	0.21	33.6
6	R2	All MCs	43	21.0	43	21.0	0.163	8.3	LOS A	0.4	4.4	0.21	0.46	0.21	42.2
Approach			176	45.1	176	45.1	0.163	5.2	LOS A	0.4	4.4	0.21	0.46	0.21	37.7
West: Banu Ave															
3	L2	All MCs	24	21.0	24	21.0	0.028	5.8	LOS A	0.1	1.2	0.51	0.58	0.51	41.9
11	T1	All MCs	6	0.0	6	0.0	0.028	5.2	LOS A	0.1	1.2	0.51	0.58	0.51	45.0
4	R2	All MCs	24	21.0	24	21.0	0.028	9.9	LOS A	0.1	1.2	0.51	0.58	0.51	41.2
Approach			55	18.6	55	18.6	0.028	7.6	LOS A	0.1	1.2	0.51	0.58	0.51	42.1
All Vehicles			542	44.0	542	44.0	0.163	5.4	LOS A	0.7	7.3	0.26	0.46	0.26	39.4

MOVEMENT SUMMARY

Site: 3 [Reid Rd / Hay Rd (Site Folder: Post development)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

Network: N101 [Post Development (Network Folder: Existing)]

Reid Rd / Hay Rd
Site Category: Base Year
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	Aver. Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Reid Rd															
1	L2	All MCs	18	9.0	18	9.0	0.106	5.7	LOS A	0.0	0.0	0.00	0.05	0.00	52.9
2	T1	All MCs	194	20.8	194	20.8	0.106	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.3
Approach			212	19.8	212	19.8	0.106	0.5	NA	0.0	0.0	0.00	0.05	0.00	58.7
North: Reid Rd															
5	T1	All MCs	196	20.8	196	20.8	0.119	0.0	LOS A	0.1	0.5	0.07	0.08	0.07	58.4
6	R2	All MCs	18	9.0	18	9.0	0.119	7.6	LOS A	0.1	0.5	0.07	0.08	0.07	51.8
Approach			214	19.8	214	19.8	0.119	0.6	NA	0.1	0.5	0.07	0.08	0.07	57.3
West: Hay Rd															
3	L2	All MCs	12	9.0	12	9.0	0.011	5.4	LOS A	0.0	0.2	0.30	0.54	0.30	46.2
4	R2	All MCs	12	9.0	12	9.0	0.011	5.8	LOS A	0.0	0.2	0.30	0.54	0.30	43.3
Approach			23	9.0	23	9.0	0.011	5.6	LOS A	0.0	0.2	0.30	0.54	0.30	45.2
All Vehicles			448	19.2	448	19.2	0.119	0.8	NA	0.1	0.5	0.05	0.09	0.05	57.2